PROCEEDINGS

Paradoxes of Progress

Architecture and Education in a Post-Utopian Era

89th ACSA Annual Meeting

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Association of Collegiate Schools of Architecture

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CONFERENCE THEME

PARADOXES OF PROGRESS:
ARCHITECTURE AND EDUCATION IN A POST-UTOPIAN ERA

PARADOXES OF PROGRESS: ARCHITECTURE AND EDUCATION IN A POST-UTOPIAN ERA

CONFERENCE CO-CHAIRS:
Thomas Fisher, University of Minnesota
Christine Macy, Dalhousie University

As we look back on the last century and ahead to the next, can we, as Edward Rothstein asked in a recent New York Times essay, have "progress without utopia?" Can we, in other words, improve the lives of people, the health of cities, the condition of the environment, and the quality of architecture without reductive, one-size-fits-all solutions? Can we control the paradoxical nature of progress, where advances in one area seem to bring decline in others? And can we come to grips with the notion that progress itself, viewed with such skepticism in many quarters, is also inextricably tied to what we do as architects and educators, when we design new things, create new knowledge, educate new students? The difficult and important task before us involves a critical assessment of progress, "measured," as Richard Rorty has written, "by the extent to which we have made ourselves better than we were in the past rather than by our increased proximity to a goal." We invite you to join us in this task.

The conference has a number of special focus sessions to provide a forum for discussion among the sub-disciplines within the academy. We will also have a series of critical conversations with leading thinkers and practitioners in the field to extend and challenge questions raised by the conference.

The topic sessions examine the "paradoxes of progress" from a series of interdisciplinary perspectives: technics, praxis, civics, environment, media, design culture, and historiography.

SPEAKERS

Keynote Address

Invited Speakers

KEYNOTE ADDRESS

DELIVERED FRIDAY, MARCH 16, 2001

Host: Dr. Clara Adams, Vice President,
Morgan State University

Paradoxes and Crises

MELVIN L. MITCHELL, FAIA
Morgan State University

Paradoxes and Crises

MELVIN L. MITCHELL, FAIA
Morgan State University

I am pleased at this opportunity to share with you observations that might represent a fortuitous intersection of the conference theme of "Paradoxes of Progress," and my forthcoming book titled *The Crisis of the African-American Architect: Conflicting Cultures of Architecture and (Black) Power.* If you haven't already figure this out, Harold Cruse's seminal 1967 book, *The Crisis of the Negro Intellectual* is a big influence on my worldview and therefore on the concept of my book. I ask your indulgence as I first establish a 20th century context for these observations and thoughts. I am going to use the next 45 minutes to look briefly at three issues that I cover more fully in my book:

- The first issue is architecture and race over the first half of the 20th century in a climate that found the notion of blackness and architecture to be somewhat of an oxymoron in the white as well as much of the black world.
- The secondly issue is a brief overview of my book's central thesis on the need for an ending of the eighty-year-old cultural estrangement between African-American architects and Black America. I pose four new contemporary role models as bookends to the early 20th century models from Tuskegee and Howard University that I touch on under the first issue.
- And lastly I come to the question "is there a fit between the agenda and mission of the typical Historically Black College & University (HBCU) program" the endemic orthodox culture of architecture, and the needs of Black America as a cultural and economic construct. Along the way, I touch briefly on the Carnegie-Boyer Report.

ISSUE ONE

In the final decade of the 19th century a big event that symbolized the architectural energy and aspirations of America was probably the Columbian Exposition, commonly known as the Chicago World's Fair. That event also symbolized America's growing inferiority complex towards things European. We know that the "White City" as the Fair also came to be known, was not just a reference to the dominant color scheme of the major structures. Still, I remain captivated by Daniel Burnham, the executive architect of the Fair, and his now famous dictum *"make no little plans for they fail to stir the hearts of men."*

So in 1893, the year the Fair opened, a question you might be asking yourself right now is *"what possible architectural event could have been happening in the world of 5 million people of African descent on American soil - 4 million of them still only 30 years removed from chattel slavery – what indeed, that warrants mentioning in the same breath as the magnificent 650 acre Chicago World's Fair and its many structures designed by an elite group of American architects to trumpet the might and majesty of American power and genius to the rest of the world?"*

It just so happens that at that very moment in time a few hundred miles to the south of Chicago a man named Booker T. Washington was in the critical take-off phases of transforming a barren 100 acre farm that he had acquired a decade earlier. Because of Mr. Washington's vision and faith, it was here that men whose parents may have been born into slavery could realistically harbor Burnham type dreams and build big important buildings. By 1900 that 100-acre farm would be a 2,000-acre campus with 50 substantial structures for nearly 1,500 students.

Five years earlier Washington had ignited a debate between himself and W.E.B. Du Bois with that famous Atlanta Compromise speech. Du Bois of course responded bitterly in that equally famous chapter titled "On Mr. Washington and Others" in the now classic little book *The Souls of Black Folk.* It should now be clear that both men were right; Washington was simply positing that Black America needed to be left alone to build on a prodigious scale by drawing on the skills, brains, and creativity of her people. Du Bois was merely reminding Washington that without the protection of the vote, the law of the land, and full civil rights, those buildings were at the mercy of white caprice –witness later Tulsa, Oklahoma and Rosewood, Florida. Fortunately, that Washington-Du Bois conundrum of a hundred years ago is no longer in existence today.

If we step back thirty years prior to the 1865 year of black emancipation, William Ware was establishing America's first architecture school at MIT in Boston. Twenty-five years later MIT would matricu-

late the first African-American, who, through Mr. Washington's patronage at Tuskegee, would become Black America's composite of Ware and Burnham. Robert Robinson Taylor, the son of a successful Durham, North Carolina builder. Taylor would graduate as valedictorian of his architecture school class at MIT in 1892 just as Burnham was preparing for the opening of the Chicago Fair. Taylor is the same man that the ACSA Robert R. Taylor Awards Program is named after. Washington also saw in Taylor the perfect synthesis of the growing Washington-Du Bois dialectic.

Mr. Washington literally plucked Taylor out of the graduation commencement line at MIT and brought him to the Tuskegee, Alabama campus. Thanks to the research and doctoral dissertation of Florida A & M professor Richard Dozier - also formerly a professor here at Morgan - we have intimate details about the Washington-Taylor relationship.

Mr. Washington's first charges to Taylor was to oversee the design of the major structures needed to house the growing Tuskegee enterprise. Washington was not prepared to farm out this task of building his *Black City* to white architects. Taylor was also charged with establishing an architecture program to train the children of former slaves to facilitate Mr. Washington's agenda of completing the design of the Tuskegee campus and the school houses, churches, and homes throughout the deep south. Kendrick Gradison, a University of Michigan landscape architecture professor wrote an insightful paper a few years ago that placed these activities at Tuskegee inside of a more nuanced black cultural context of community development.

Equally important to Washington was his belief in the primacy of descriptive geometry based drawing as an important tool in cognitive development. Like the preceding arch American architect father figure Thomas Jefferson at the University of Virginia, Washington had a passionate belief in the relationship between the physical setting and the learning process. Accordingly, Taylor's other charge from Washington was to prepare and organize the students to actually construct these campus structures with their own hands including the making of their own bricks. ***Unfortunately, it is solely this last charge that is most popularly known and associated with Mr. Washington today.***

Taylor quickly recruited several men while training several others to assist him in his charges. The most historically notable man was William Sidney Pittman. Aside from being a talented architect, Pittman also had the good sense to marry Portia Washington, the comely daughter of Booker T. Washington. By 1907 Pittman would go on to win the competition to design the Negro Building, one of a series of large exhibition halls similar to the first one that Washington had Taylor and his students build at the 1895 Cotton States Exhibition in Atlanta. Pittman's completed building was for the Jamestown, Virginia Tercentennial Exhibition. To me the real architectural significance of this project is that its picture - along with Pittman's picture and the story of the project - would fall into the hands of a 15 year old high school newspaper boy in Los Angeles whose teachers were telling him that his notion about being an architect was preposterous.

That youngster, naned Paul Revere Williams, would go on to become the most celebrated African-American architect of the 20th century. Thanks to the research and 1992 doctoral dissertation of African-American architect Wesley Henderson, we know about the life and times of Williams in great detail. In a 1993 released book *Paul R. Williams: A Legacy of Style*, Williams' granddaughter Karen Hudson provides stunning visual evidence that her grandfather was a first rate American architect by any fair measure. Williams went on to act as the fountainhead to an important school of black west coast architects during the 1940 to 1980 period. Several of those men were also featured in Henderson's dissertation.

By 1910, William Augustus Hazel, another North Carolina born black architect was at Tuskegee helping Taylor to train black architects and builders. By 1920 - several years after Mr. Washington's death and with Tuskegee substantially built-up - Hazel would follow several other Tuskegee graduates to Washington, DC. Hazel would land at Howard University and offer the first courses in architecture taught there that same year. The shift in the centroid of architectural training for blacks from Tuskegee to Howard was now underway. Hazel would be the magnet for another Tuskegee instructor coming to Howard. Albert Irving Cassell, born in 1895 right here outside of Baltimore in Towson, had come to Tuskegee after graduating from the Cornell architecture program in 1919, to later join the Howard faculty in 1924.

In 1925, young Cassell welcomed the arrival of Mordecai Johnson, Howard University's first black president. Johnson could have easily passed for a white man but choose to live out his productive life by the country's "one acknowledged drop of African blood" rule. In 1926 Cassell handed the academic reins to young Washingtonian Hilyard Robinson who also doubled as a designer in the on-campus office that Johnson had Cassell establish. From 1926 to 1938, Cassell would use Johnson's patronage to master plan and design-build several of the most important structures on campus. Like Taylor at Tuskegee, Cassell would train others to carry on building at Howard and throughout Washington, DC.

By the mid-1920s during the Harlem Renaissance in New York City, the transition of the center of black architectural education from Tuskegee to Howard was nearly complete. Even though the Harlem Renaissance was being quarterbacked from Howard's campus by commuting philosophy professor Alain Locke, there was only a tangential connection of architecture to the Renaissance. That connection was through Robinson, the first black modernist with avant-garde leanings. During the latter part of the Renaissance decade Robinson, while chairing the architecture program at Howard , was also advocating as well as designing European modernist style social housing in DC.

The downside here is that the Penn and Columbia educated Robinson, along with similarly educated and socialized incoming black architect-professors, unwittingly abandoned the Tuskegee-Booker T. Washington mode of practice. Not realizing the implications, the new watchword for the Howard based Northerners was "professionalism" as championed by the separate white world of architecture. This word was actually code for "white high-class

gentleman professionals seeking a sharp separation from the crass world of building." This was in marked contrast to the old Tuskegee master-builder architects who designed, employed and trained craftsmen, built, arranged loans, and developed small real estate projects through out the deep south in the manner they had been socialized from building the Tuskegee campus. Robinson and the new incoming Northerners, despite admirable CIAM type social housing advocacy stances, saw architecture in technical rather than cultural terms. To the extent that they thought about culture it was WASP culture.

I call this new Howard era the second big significant juncture after the Tuskegee era between African-American architects and Black America. This second juncture, lasting from 1920 up through the early 1960s, was actually a disconnection. For black architects, "*White Gentlemanly Professionalism*" ultimately triumphed over the greater need for a new modernist praxis based on black culture, aesthetics, music, and above all, economics.

Somewhat of an exception to the new trend was Cassell, who, despite his Ivy League education, remained more ideologically aligned with the old fading Tuskegee paradigm. Before he died Cassell, had acquired land and was pursuing a large FHA loan to build a black new town in Calvert County, Maryland.

In 1931 a new faculty member, Philadelphian and University of Pennsylvania trained Howard Hamilton Mackey, organized an exhibit at Howard of the work of the handful of black architects from around the country. This group included the old Tuskegee architects Taylor, Pittman, and John Lankford, who had built extensively in Washington, DC. The exhibit also included the work of the Howardites Cassell, Mackey, Robinson, and Louis Fry, Sr. The pioneering residential work of Californian Paul R. Williams was also included. So was the work of Calvin and Moses McKissack, a family owned firm of licensed architects, engineers, and contractors in Nashville, Tennessee.

Out of this exhibit came several historic cross-continental joint ventures. The most important was the joining forces of young Hilyard Robinson's fledgling Washington, DC office with the more seasoned west coast practice of Paul Williams. The two would be the beneficiaries of progressive minded – often Jewish – federal officials commissioning them to design large public housing projects including the now national historic register designated Langston Terrace Homes in DC. This 1935 built work caused influential critic Lewis Mumford to write in his New Yorker "Skyline" column that Robinson's design rivaled the best social housing work then being produced throughout Western Europe by modernist architect icons.

Robinson would eventually also hook up with the McKissacks on an interesting 1940 commission from the US War Department to design and construct an airbase near the Tuskegee campus. This was part of a larger experiment that progressive white Americans inside of the War Department at the Pentagon had to undertake in order to overturn a white supremacist article of faith that black people were not capable of flying combat warplanes.

The Robinson-Williams transcontinental joint-venture, through the continued patronage of Mordecai Johnson, would go on to design several other major structures on Howard's campus. Perhaps the most significant one of all relative to black architects was the 1946 commission to design the 100,000 SF School of Engineering and Architecture Building which would open in 1952.

Having firmly taken the academic reins by 1934 Mackey, along with Fry – the first African-American to graduate from the Gropius led Harvard Graduate of Design in 1945 - led Howard to ACSA accreditation by 1950. By the time these two men would retire in the early 1970s, they could lay claim to having trained over 50% of the black architects in the US as well as scores of others throughout the African Diaspora, and natives of India, Iran, and Central America.

ISSUE TWO

In Washington, DC on the night of April 4, 1968 after the assassination of Dr. King, *everything changed.* By the end of this period of the Black Power sixties Black America was insistently demanding several things on behalf of those African-Americans who aspired to architectural life. One was that black architects be given some of the publicly funded commissions to design projects in black communities. Another was for the enrollment of black students in elite white architecture schools. Black America also asked that black architects be given major design opportunities in White America but that demand was highly problematic. Given the reality that architecture in White America occurs at the intersection of power and culture, Black America had no serious leverage in the power corridor.

But as to the architectural work in Black America, every since the 1920s Harlem Renaissance era "professionalism" had been contributing to the overall estrangement of black architects from Black America on several levels. First, black architects had been relentlessly socialized in white as well as the handful of black architectural schools to believe that modern architecture had no color. We believed that glorious Heroic International Style Modern Architecture was politically innocent and not a vehicle to express black culture. Yet white culture was precisely what Wright was unabashedly expressing in "Organism" and "Broad-Acre Cites." White European culture in the Machine Age was precisely what Corbu was attempting to express.

Cornel West of the Du Bois Institute at Harvard makes some even more provocative observations about Corbu and black music, black-brown-red-female bodies, and "other" in the chapter titled "Race and Architecture" in his most recent book *The Cornel West Reader.* In my book I expand on this through my notion that somewhere along the way black architects failed to note what was evident to black artists like Aaron Douglas of the Harlem Renaissance era and Romare Bearden of the second Renaissance era of the Black Power Movement sixties. Both men were deeply conscious of the reality that the entire modern art and architecture movement was early 1900s Picasso-Cubist based, and that Cubism was West Afri-

can culture based. This was apparently lost on black as well as today's white architects. I speculate about what might have been had these two giants set their sights on architecture.

In the third critical juncture between the end of the sixties and today's Information Revolution Age, larger political acts throughout Black America caused a growth spurt in the number of black architects. There were now twenty times as many black architects and practices than would exist were it not for the earlier vision of Booker T. Washington, along with the aggressive exercise of raw political power in the turbulent 1960s and 1970s by black elected officials, black private, public, and institutional based citizens, and a handful of courageous and creative white people.

We have Brad Grant and Dennis Mann's early 1990s research to thank for our "good news-bad news" knowledge about the actual numbers. As raw numbers as well as percentages of total national figures, there were a lot more black architects in 1993 than had existed just thirty years earlier. But the percentage numbers were still nowhere near to being in the same league with the growing percentage numbers for black lawyers, doctors, engineers, business managers, and even some branches of science.

Professionalism, buttressed by the myths, rituals, and shibboleths of the academy including the small black wing, were indirectly telling black practitioners, students, and secondary school prospects that black culture and Black America were barren sources for architecture. The message was that "architecture" was the signature buildings done in White America by white males. All else, especially housing and community development, was categorized as "building" or exotic sideshows. The message was that to do "architecture" you needed powerful white clients and patrons. So prospective black architects in secondary schools made rational decisions. They instead went into medicine, law, business, engineering, and even some sciences. Those were areas of national life that were sending a different and more coherent set of messages to black youth.

Meanwhile Black America's 1960s to today's culture has been scaling new heights of world acclaim – particularly the music, be it the blues, jazz, hip-hop, or "urban" R & B pops. Black cultural arts were flowering – dance, theater, literature, film, and other forms of communications. And all of these cultural arts had physical, business, and financial implications for architects. Spike Lee and a rash of young black filmmakers were breaking new ground while reflecting and respecting black culture. The Marsalis boys and the new wave of young jazz lions were demonstrating how much all of America was in debt to Armstrong, Ellington, Holiday, Parker, Miles, Coltrane, Sarah, and Ella.

Cultures are triptychs of art-music-architecture. American culture is a gumbo stew of white, black, brown, red, and yellow, just like her music. Black music – America's music - was surpassing all modernist architecture while actually influencing that architecture in so many ways. Where was the black cultural interpretation of modern architecture? Somehow that question was never seriously posed or debated even at the height of the searing hot Black Power Seventies.

But lest you think my book is all gloom and doom about the estranged relationship of African-American architects to Black America let me dispel such a notion right now. In New York City several important ideas have been brewing of late. A bright, energetic group of young New York City based African-American women architects recently launched a magazine called *blacklines*. They are calling for a re-integration of the black design-build-development community. And then they are calling for that community to re-integrate with the culture and cultural sectors of Black America. What they are doing is as important to black architects as were the cultural movements ignited by the Museum of Modern Art on behalf of white architects.

Which brings me to a short story. The *blacklines* ladies orchestrated a wonderful conference last fall at Pratt in Brooklyn. For three days black designers debated, read papers, networked, and commiserated about the state of affairs of Black "design" America. Columbia's dean Bernard Tschumi was there for a while looking ever so bored. Stephen Kliments, former editor of *Architectural Record* and still a doyen of the established mainstream architectural press, was also in attendance. I had heard earlier that Kliments was writing a book on black architects. I asked him to tell me just what was his *take* or *angle* on the subject. He responded that he was writing about and showcasing the work of a select group of black firms and their struggles for acceptance in mainstream (he meant "white") America. I told him that I was also writing a book on black architects and that my *angle* was their need to re-connect culturally with Black America. Kliments politely remarked that that sounded interesting. He then said what was *really* on his mind. He asked "do you think that there will ever be a black version of the 'New York Five'?"

Now we are getting down to brass tacks. My response was " if a Colin Rowe or Vincent Scully class academic, or a Phillip Johnson class "star" practitioner, and to boot, the New York Museum of Modern Art along with the rest of the architectural press establishment decides to anoint five black architects for whatever bizarre reasons, no problem." I got a quizzical look and an attempt to change the subject. Before letting him do that, I told him that what I thought would be more interesting is if five black New York architects were to begin to simultaneously excite the imaginations of black New York's communities of hip-hop moguls, dot.com entrepreneurs, writers, jazz and blues musicians, poets, intellectuals, investment bankers, real estate and building entrepreneurs, community development corporations, politicians, and the rest of the black middle class.

Which is precisely what the five young black women architects of blackline magazine were attempting to do. My point is simply that when it comes to black architects, the Kliments of the architectural establishment world can be counted on to miss the trees in their search for the forest.

Fortunately, in attendance at the *blacklines* conference were a number of young black architect-scholars like Craig Wilkens who is doing groundbreaking work on the potential connections between hip-hop and architecture. Wilkens is writing, theorizing, and researching matters that are going to be enormously helpful. But I

caution Craig that hip-hop culture and music – at least the stuff I see on videos – in its undiluted form is already a black architecture. There is a danger of hip-hop losing its potency once brought into the academy studios and conjoined with architectural "professionalism"

In my book I talk in some detail about four role models – parts of a new canon that must be constructed – for black (and deeply thinking non-black) architects. The first and perhaps most important role model is not actually an architect. She is someone who confesses to once seriously wanting to be an architect in her early youth. I can assure her that with her undergraduate liberal arts degree from Stanford and her doctorate in American culture from the University of California, along with her razor sharp mind full of cultural insights, she has as much that is important to say as any contemporary architectural theorist or star architect that I have read. And I've read most of them. This first model is ***bell hooks.*** You will just have to read her to know what I am talking about. Start with her book *Art On My Mind – Visual Politics* and go right to the chapter "Black Vernacular – Architecture as Cultural Practice."

My second role model is a young New Yorker who has been an important figure in the black design world every since the 1991 release of his book *African-American Architects In Practice.* ***Jack Travis,*** of Harlem, is one of the few black architects on the scene today practicing and building while openly, unapologetically, and with celebration, embracing the notion of a *black architecture.* New York's black élites are slowly beginning to seek him out to design what he calls "culturally specific" homes and offices. This is reminiscent of Corbu and his Villa period in Paris during the 1920s. Travis is debunking the still lingering myth that a black architecture would be a trivialized and devalued architecture. Travis is the spiritual godfather to the *blacklines magazine* ladies.

My third model is the late ***Harry Simmons*** of Brooklyn and Harlem. Simmons holds a special place in my heart. We struggled through Howard together back in those turbulent sixties – actually I struggled. He didn't; calculus, physics, and structures courses were no more than childish games to Simmons. After graduate school at Pratt he planted his flag in Brooklyn while I was doing my thing in DC. His very first act was to purchase a four-story brownstone. He turned this home and office into a veritable community center in Brooklyn. His passion for housing his people in affordable, culturally thoughtful designs of new and rehabilitated structures was without bounds. He died tragically in his twin engine plane in 1994. He epitomized several important ideas. One is that the decision to be an architect is not also a decision to be personally poverty-stricken. Another is that the surface of meaningful work for creative, entrepreneur- architects in Black America has barely been scratched.

The fourth model and addition to the expanded canon is a giant of a man who built a successful high profile conventional practice in the mid-west but didn't rest on his laurels. ***Charles McAfee*** of Kansas City, Wichita, and Atlanta put his money where many people's mouths are. In the early 1990s he, along with a group of other African-American businessmen put together 20 million dollars in debt and equity capital to build an inner-city modular housing plant. For McAfee this was a revival of a twenty-year old venture. He built his first modular housing plant in a depressed area of Wichita back in the seventies. Today his newest plant employs working and middle-class people in good paying skilled jobs building homes for themselves and their neighbors. These are homes and communities that Charles also designed. He is now the leader of a rapidly growing national movement of inner-city homebuilding factories. McAfee is now talking to countries throughout Africa about his ideas.

ISSUE THREE

The "academy" of 123 accredited architecture schools dispersed throughout the nation's 3,000 four-year colleges also includes a well-oiled architectural media establishment and a lionized handful of rock star class globetrotting, museum designing architect-artists. The academy also includes a group of star-struck camp followers of the stars who like to be known as critics and even historians. All in all, the "academy" is one big happy incestuous affair. Nestled invisibly inside of the academy are the accredited programs at Historically Black Colleges & Universities, of which the program here at Morgan is counted. The important thing is this statistic provided from the research of Brad and Dennis*: those 7% of the schools in the American architectural academy currently enroll 45% of the African-American students in architectural school.*

Thomas Fisher, currently the dean of architecture at the University of Minnesota and formerly the editor of *Progressive Architecture Magazine* has written a thoughtful little book, *In the Scheme of Things.* He argues persuasively that the academy and the profession are in a state of crisis. He thinks that professionally, the public no longer believes that architects are essential to the making of the built environment. He also believes that the academy has no real clue about how to re-structure curricula around the realities of the now ubiquitous Information Age Revolution.

I am not prepared to go that far. I think that Dean Fisher somewhat overstates his case. But I do think that the architecture profession has for all practical purposes been deregulated. Architects are not irrelevant in the public's mind. But they are on their own in the marketplace now dominated by the developer and the construction manager. Current remaining appearances of state regulatory protection of the architect's role may now be only a fig leaf.

The collection of organizations that represent the interests of the academy and the profession recently joined forces and sought the assistance of the Carnegie Foundation in the research and writing of a detailed self-examination. Some people, myself included, naively thought that this new look at architecture would be as structurally reformist as was the 1910 Flexner Report on the state of medicine. Tom Fisher and I are on the same page here.

A graduate level research university based clinical model was born that we know as the teaching hospital. Supply and demand control issues resulted in a respected powerful and well-compensated prac-

titioner. This is still the case today despite the doctor's difficulties with the managed care accountants and lawyers.

But the recent Carnegie-Boyer Report did not fundamentally challenge any of the myths, rituals, fetishes, and paradigms of the architectural academy. It of coursed called for an end to racial apartheid; for an increased use of computers; and for a more seamless transition from the academy to the profession. *But nobody's status quo in the academy was threatened. Perhaps wisely.* In Philadelphia last year Gil Cook reminded some of us about the difference between an international terrorist and a tenured faculty member. According to Gil, ***you can at least negotiate with an international terrorist.***

But what about Dean Fisher's other assertion that the schools really just don't know how they are supposed to deal with information technology reality? If you look closely you will find that there are several schools that know exactly what to do and they are doing it well. Pre-eminent among those would be none other than MIT - the oldest and, perhaps in retrospect, the most racially enlightened American architecture school. Architect-mathematician Nicholas Negraponte's closely affiliated MIT Media Lab is also a big tip-off that MIT has figured this thing out. The current MIT architecture dean has written several persuave books. He once quipped – seemingly only facetiously at the time - that there would soon be a handheld 29 dollar computer that would render all of the 500 year-old skills of the architect valueless in the marketplace.

Meanwhile, MIT scholar Mark Jarzombek has looked seriously at the notion that the legitimate demands of resources sustainability, environmental justice, and capitalism will transform the Studio – still the heart of the matter and sine qua non of architectural education. Studio will evolve into an intensely knowledge based building technology and environmental design research laboratory. Some schools will get there sooner than others will. As computing power is destroying the walls between the disciplines of architecture, landscape architecture, and city planning, so also are the walls crumbling between that set of disciplines and the entertainment sectors, the construction industries, the engineering and biological sciences, and finance capital.

Dean Fisher's concern that the profession has lost its way also has to be approached with caution. There is now that Miami based New Urbanist-Neo-Traditional Development movement. They are certainly in the right church if not always at the right pew. Their Jane Jacobsian notions about housing, holistic community development, and place-making being far more important than the signature and object buildings that still seems to pre-occupy much of the academy and the profession, are right on the money.

But I still have my differences with the New Urbanists – I am still trying to divine an appropriate Harlem based version of New Urbanism. For lack of a better term I will just call what I am looking for "New (Black) Urbanism" and trust that my audience understands that I am talking culture and economics here and not racial exclusion. Anyway, I am grateful that the New Urbanists have captured an entire architecture and planning school and transformed the curriculum into a neo-traditional community development enterprise. Select urban based architecture schools – Morgan being one of them - simply must rediscover this Jane Jacobs fervor. The New Urbanists have made my job at Morgan that much easier since I have a similar agenda.

Here at Morgan, I am interested in the question of how do we give the one million African-American citizens of greater Baltimore and the state of Maryland the opportunity of seeing a serious black architectural practice presence in the coming years. That will not happen without a deliberate strategy of cultural and economic rapprochement between those citizens and black designers.

We go back to the basics of urban shelter as well as to Abraham Flexner. The graduate component of our school has to function as the medical school equivalent of a teaching hospital. And who are our patients/customers? Any entity in the city that is involved in housing and community development while also increasing small black construction and development company opportunities to participate. We have to position our graduate program as a serious consultant alternative for the city housing and community development agencies and the network of CDCs, foundations, and housing and community development lenders that are reviving and conserving Baltimore's neighborhoods.

Some of our students will be able to do some of their IDP time right in our own on-campus teaching hospital while others acquire IDP credits in local offices. This is facilitated by our all-evening classes and studios similar to our model at the Boston Architectural Center. At Morgan we call our teaching hospital CEBER – the Center for Built Environment Reserch. At our co-host school at College Park they call their arm CADRE. Most architecture schools today have such a clinical arm. But I have yet to figure out how these clinics differ from what Max Bond started doing at ARCH back in the late 1960s. At Morgan CEBER is under the very able leadership of Mahendra Parekh who is our senior faculty member, a long time city practitioner, and a gifted urban housing designer.

I also come back to our Neo-Traditional Development stars Andres Duany and his wife, Dean Elizabeth Plater-Zyberk down in Miami. They have already established that a school can keep its NAAB accreditation ticket with a tightened focus that leaves out the isolated object buildings, museums, office tower, convention centers, and so on that our star architects favor. Those things are specialties best left to the local offices. The focus is rightly on teaching and learning place-making and urban housing of every kind, block by block along with the related community facilities.

At Morgan we must make sure that this is overlaid with a thorough grounding in the holistic use of information technology and the techniques of creative real estate development finance. We can no longer afford to graduate people who only know how to *design* buildings. Our graduates have to know how to actually ***produce*** housing and neighborhoods – and pass the ARE. I believe that those skills and behavior are sure routes for the successful start-up of urban housing oriented practices by interdisciplinary develop-design-build entities. Opportunities to expand those entities into other areas such as health care, commercial facilities, and privatizing educational facilities will follow from acquired housing based competencies and relationships with community decision makers.

In closing, I come back to where I started. The HBCU schools cannot be culturally neutral miniature replicas of their larger sister school counterparts across the river, down at the other end of the interstate highway, or in the next town over. Understandably, each HBCU program has its own campus culture slant. But these programs, now enrolling nearly half of all black students, must take an aggressive leadership role of defining new canons, new heroes, new paradigms, and new allegiances. Some of the HBCU programs have already started down that road. But we must all redouble our efforts. We cannot afford to repeat the mistakes of the past eighty years since the start of the Harlem Renaissance. Back then we swore first allegiance – perhaps unwittingly and innocently – to the culture of architecture and "professionalism" rather than to the culture of Black America – a culture that is one of the engines of American culture.

Don't misunderstand me. There is room and need for those who prefer the role of "architect who just happens to be black" and aspiring to design signature cultural buildings. That is their right.

I end with this thought; Duke Ellington was gifted in art and drawing as an adolescent. He received a scholarship to Pratt but declined in order to pursue his music. In his autobiography *Music is My Mistress*, he writes a page – you might say he blows a rift – that he titled "Walls." It is as profound in its architectural thinking as anything else I have read by the 20th century modernist architectural icons. Ellington, one of America's greatest 20th century cultural figures, was once asked for his thoughts on the source of his musical genius. His response was ***"I don't compose jazz. I compose Negro music."***

Invited Speakers

Brian MacKay-Lyons
Architect, Professor, NSAA, RAIC, RCA, (HON) FAIA

Giuseppe Lignano
Ada Tolla
Lot/Ek

Malcolm Holzman, FAIA
Hardy Holzman Pfeiffer Associates
2001 Tau Sigma Delta Gold Medal Laureate

Brian MacKay-Lyons

Architect, Professor, NSAA, RAIC, RCA, (HON) FAIA

Architect Brian MacKay-Lyons practices in Halifax, Nova Scotia. His firm has focused on houses, public buildings and urban design commissions, which have accumulated to form an extensive and consistent body of work in Nova Scotia. His modern regionalist architectural language combines the use of archetypal forms with local building practices that grow out of material and culture. As a result, the work has both a local and international audience, as evidenced by the more than 100 publications. In addition, his buildings have received some 53 awards for design including five Governor General's Awards and four *Canadian Architect* Awards. A traveling exhibition of MacKay-Lyons work is presently touring the United States and Europe. Brian has lectured or taught at several schools of architecture, including Dalhousie University, where he is a professor.

Image of Atrium: ***Faculty of Computer Science, Dalhousie University,*** *Halifax, Nova Scotia. 1998 - 1999. Photographer: Chris Reardon*

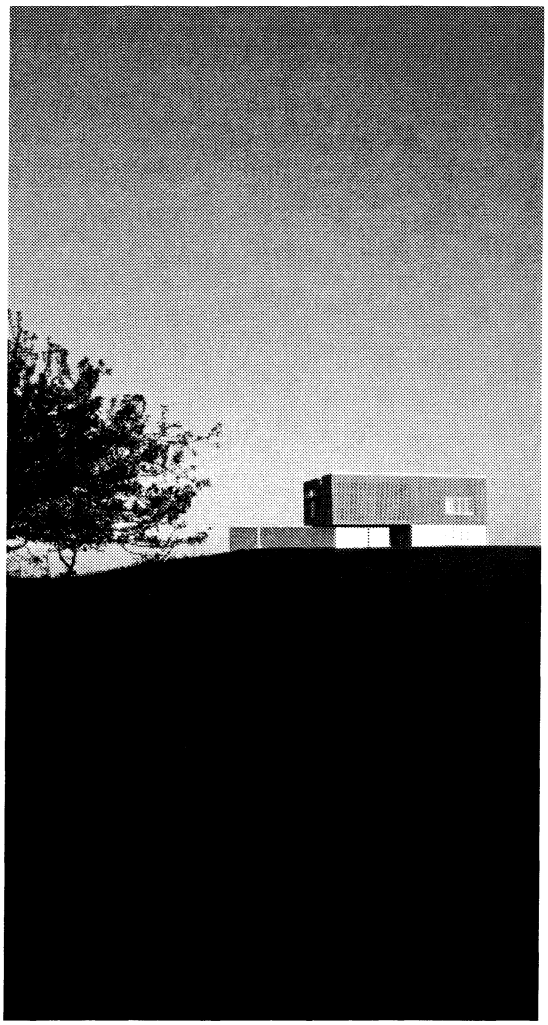


Image of house on hilltop with tree: ***House on Nova Scotia Coast # 22.*** *South Shore, Nova Scotia. 1997 - 1998. Photographer: Jamie Steeves*

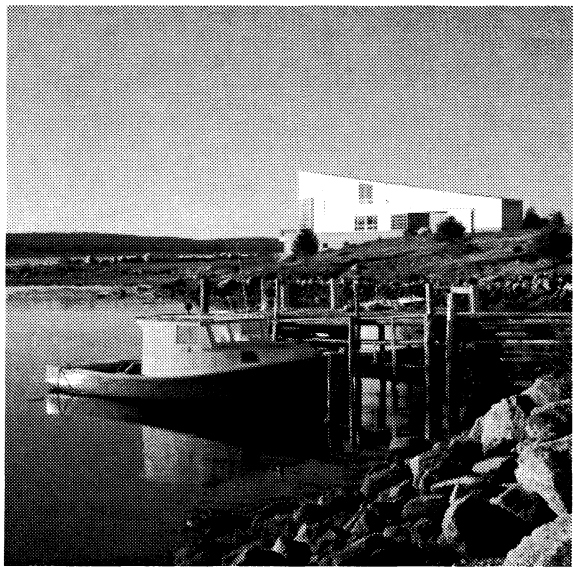


Image across cove: ***Howard House.*** *West Pennant. Nova Scotia. 1995 - 1998. Photographer: Jamie Steeves*

Giuseppe Lignano
Ada Tolla
Lot/Ek

LOT/EK is an ongoing investigation into the 'artificial nature', or the unmappable outgrowth of familiar, unexplored, manmade and technological elements woven into the urban/suburban reality

LOT/EK is extracting from this artificial nature prefabricated objects, systems and technologies to be used as raw materials

LOT/EK is the random encounter with such objects which are displaced, transformed and manipulated to fulfill program needs

LOT/EK is the dialogue that develops with the specific features of these already existing objects and generates unexpected spatial/functional solutions

LOT/EK is re-thinking the ways in which the human body interacts with products and by-products of the industrial/technological culture

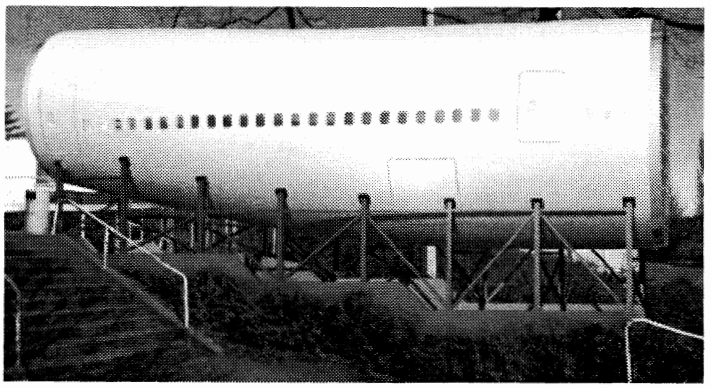
LOT/EK is re-inventing domestic/work/play spaces and functions and questioning conventional configurations

LOT/EK is blurring the boundaries between art, architecture, entertainment and information

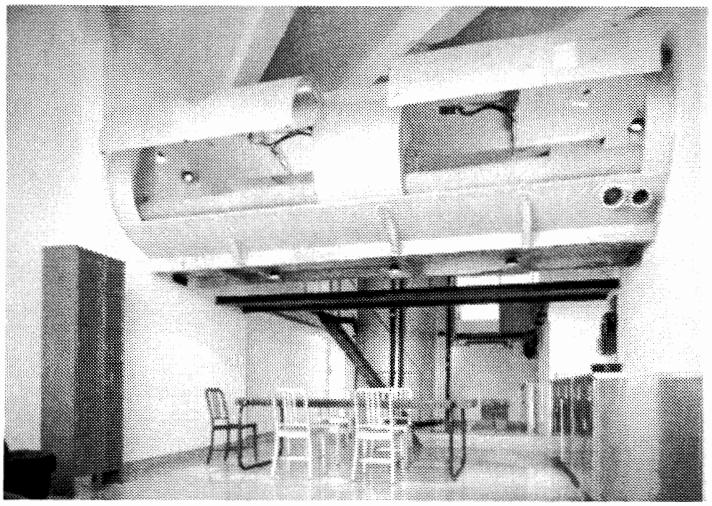
LOT/EK is an architecture studio based in New York

LOT/EK is Ada Tolla and Giuseppe Lignano, who were born and raised in Naples, Italy, graduated from the School of Architecture of the Universita' di Napoli (1982-89) and completed post-graduate studies at Columbia University in New York (1990-91)

PROJECT: TV-TANK. television lounging tube.



PROJECT: STUDENTS PAVILION. multifunctional space. University of Washington. Seattle. (in progress)

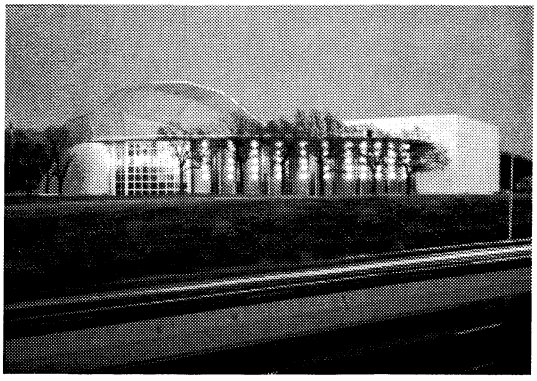


PROJECT: MORTON LOFT. West Village. New York

Malcolm Holzman, FAIA

Hardy Holzman Pfeiffer Associates

2000-2001 Tau Sigma Delta Gold Medal Laureate

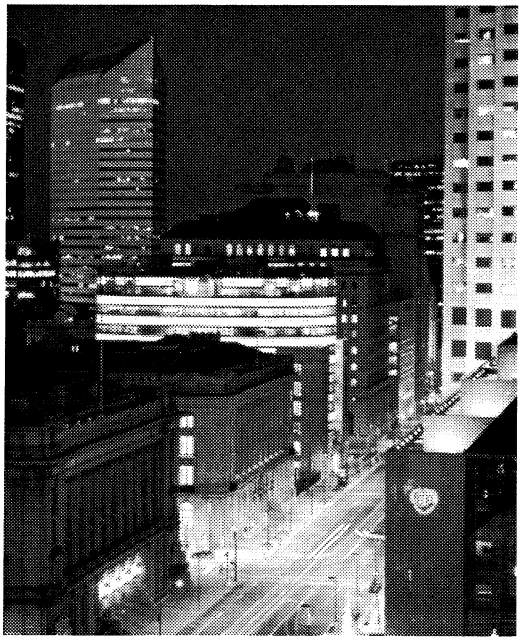


Murchison Performing Arts Center. University of North Texas. Denton, TX

On March 16, Malcolm Holzman, FAIA, Founding Partner of Hardy Holzman Pfeiffer Associates, received the 2001 Gold Medal from Tau Sigma Delta, the honor society of architecture and the allied arts. The Gold Medal is the society's highest award, presented annually for exemplary contributions to the field.

Malcolm Holzman's buildings, described as having a brash beauty, are acknowledged for their evocative nature, technical vision, use of distinctive materials and singular character. He has completed commissions in 25 states, which represent some of this country's most notable architecture. His projects include the restoration of the Hawaii Theatre Center, Honolulu, HI; Orchestra Hall, Minneapolis, MN; San Angelo Museum of Fine Arts, San Angelo, TX; the David Saul Smith Union at Bowdoin College; the Murchison Performing Arts Center at the University of North Texas, Denton, TX; and the renovation and expansion of the Cleveland Public Library. His work shows a diversity of design solutions, reflecting a wide range of building types and the application of materials unique to the region of each project. He has won numerous awards for his work.

Hawaii Theatre Center. Honolulu. HI



Cleveland Public Library. Cleveland. OH

Mr. Holzman's advocacy of architectural excellence extends to education and publication. He has held endowed chairs in schools of architecture at Yale University (1976 and 1987), the University of Wisconsin-Milwaukee (1978 and 1979), Ball State University (1992) and the University of Texas (1999). In recognition of his advancement of architecture and urbanism over a sustained period of time, he received the Pratt Institute Distinguished Alumni Award (1990). He also has contributed to a range of publications. Stonework, his exposition on building with stone in the 21st Century, will be published later this year.

A fellow of the AIA, Mr. Holzman is active in a variety of professional organizations. He is a member of the Interior Design Hall of Fame, the Municipal Art Society, and the Architectural League of New York. He is a former trustee of the Amon Carter Museum (1981-1990) and Pratt Institute (1991-1994). Mr. Holzman was born in Newark, New Jersey, in 1940, and received a Bachelor of Architecture Degree from Pratt Institute in 1963. He founded HHPA in 1967 with Hugh Hardy and Norman Pfeiffer.

The award was presented at the annual meeting of the Association of Collegiate Schools of Architecture, which took place in Baltimore on March 16. Mr. Holzman delivered the Tau Sigma Delta Plenary Lecture at the meeting. Past Gold Medal recipients include Alexander Girard, Kenneth Frampton, Richard Meier, Denise Scott-Brown, Peter Eisenman, Vincent Scully and Cesar Pelli.

CRITICAL CONVERSATIONS

Ecological Literacy and the Education of Designers

Working Cities: Density, Risk, Spontaneity

Drawing as Theory

Theory in Context

Ecological Literacy and the Education of Designers

Co-chairs: Mary Guzowski, University of Minnesota and
Joyce S. Lee, AIA Committee on the Environment

Key Panelist:
DAVID ORR, PH.D.
Oberlin College

Respondents:
MARVIN ROSENMAN
Ball State University

JAMES WINES
The Pennsylvania State University

Session Summary

MARY GUZOWSKI
University of Minnesota

JOYCE S. LEE
AIA Committee on the Environment

Is it possible that "*...all education is environmental education*" as proposed by David Orr in *Ecological Literacy*? The "Environment Session" of the 89th Annual Meeting of the ACSA explored the cultural and environmental implications of ecological design literacy. Dr. David Orr, Director of Environmental Studies at Oberlin College presented the following paper, which challenged design educators to broaden their understanding of ecological design education and practice. Professors Marv Rosenman (Ball State) expanded the conversation to include findings from the EASE Project (Educating Architects for a Sustainable Future), while James Wines (Penn State) explored the intersections between ecology and design aesthetics (based on his recent book entitled *Green Architecture*). The session highlighted the need for ACSA to take leadership in developing an explicit agenda for addressing ecological literacy in design education. It is clear that the design professions need to become more ecologically literate. We need to change the way we design, build, live, and work. We need to prepare students to be leaders and stewards of new methods of thinking and creating. Dr. David Orr and Professors Marv Rosenman and James Wines emphasized that it is time for ACSA and architectural educators to design new models of education that support all of life.

Architecture, Ecological Design, and Human Ecology

DAVID ORR, PH.D.
Oberlin College

"We shape our buildings, thereafter they shape us."
—Winston Churchill

From the 35th floor of a downtown office tower that dominates the new Atlanta skyline, one can see two problems that all architects of high rise buildings face. The question is how to bring the thing to an end gracefully before gravity and money do so. Some architects just quit, hence the flat roof. But most embellish the finale in various ways with one kind of flourish or another, each somewhat more outlandish than the one built the year before. The result, what some call "an interesting skyline," is a kind of fever chart of the collected psyches of architects and their clients that shape the modern megalopolis. The results, however, are more than just show. These are the buildings that contribute greatly to traffic congestion, poverty, climatic change, pollution, biotic impoverishment, and land degradation. If less visually dramatic, the same could be said of the designers of the modern suburb and shopping mall. In both cases the problem is that the art and science of architecture and related applied disciplines has been whittled down by narrow gauge thinking.

The importance of regarding architecture in a larger context lies in the big numbers of our time. We have good reason to believe that humankind will build more buildings in the next fifty years than in the past five thousand. Done by prevailing design standards, we will cast a long shadow on the prospects of all subsequent generations. No longer can we substitute cheap fossil energy for design intelligence or good judgement. The implications for the education of architects and the design professions generally are striking. Let me propose three.

First, the esthetic standards for design will have to be broadened to embrace wider impacts. Designers ought to aim to cause no ugliness, human or ecological, somewhere else or at some later time. For education, this means that the architectural curriculum must include ethics, ecology, and tools having to do with whole systems analysis, and least-cost, end-use considerations. Further, educational standards need to include a more sophisticated and ecologically grounded understanding of place and culture.

Second, it should be recognized that architecture and design are fundamentally pedagogical. Churchill had it right: we are shaped by our buildings and landscapes in powerful but subtle ways. The education of all design professions ought to begin in the recognition that architecture and landscapes are a kind of crystallized pedagogy that informs well or badly, but never fails to inform. Design inevitably instructs us about our relationships to nature and people that makes us more or less mindful and more or less ecologically competent. The ultimate object of design is not artifacts, buildings, or landscapes, but human minds.

Third, architecture and design ought to be seen in their largest context that has to do with health. At the most obvious level 'sick buildings' reflect not simply bad design but a truncated concept of design. A larger design perspective would place architecture and landscape architecture as subfields of the art and science of health with more than passing affinity for healing and the holy.

Architecture is commonly taught and practiced as if it were only the art and science of designing buildings, which is to say merely as a technical subject at the mercy of the whims of clients. I would like to offer a contrary view that architecture ought to be placed into a larger context as a subfield of ecological design. The essay that follows might best be considered as a series of notes on the boundaries of this larger field of design. Earlier forays into this area by van der Ryn and Cowan (1996) laid the groundwork for a more expansive view of the design professions. I intend to build on that foundation to connect design professions, and the education of designers to the larger issues of human ecology.

THE PROBLEM OF HUMAN ECOLOGY

Whatever their particular causes,[1] environmental problems all share one fundamental trait: with rare exceptions they are unintended, unforeseen, and sometimes ironic, side effects of actions arising from other intentions. We intend one thing and sooner or later get something very different. We intended merely to be prosperous and healthy but have inadvertently triggered a mass extinction of other species, spread pollution throughout the world, and triggered climatic change—all of which undermines our prosperity and health. Environmental problems, then, are mostly the result of a miscalibration between human intentions and ecologi-

cal results, which is to say that they are a species of design failure.

The possibility that ecological problems are design failures is perhaps bad news because it may signal inherent flaws in our perceptual and mental abilities. On the other hand, it may be good news. If our problems are, to a great extent, the result of design failures the obvious solution is better design, by which I mean a closer fit between human intentions and the ecological systems where the results of our intentions are ultimately played out.

The perennial problem of human ecology is how different cultures provision themselves with food, shelter, energy, and the means of livelihood by extracting energy and materials from their surroundings (Smil, 1994). Ecological design describes the ensemble of technologies and strategies by which societies use the natural world to construct culture and meet their needs. Since the natural world is continually modified by human actions, culture and ecology are shifting parts of an equation that can never be solved. Nor can there be one correct design strategy. Hunter-gatherers lived on current solar income. Feudal barons extracted wealth from sunlight by exploiting serfs who farmed the land. We provision ourselves by mining ancient sunlight stored as fossil fuels. The choice is not whether human societies have a design strategy or not, but whether it works ecologically or not and can be sustained within the regenerative capacity of the ecosystem. The problem of ecological design has become more difficult as the human population has grown and technology has multiplied. It is now the overriding problem of our time affecting virtually all other issues on the human agenda. How and how intelligently we weave the human presence into the natural world will reduce or intensify other problems having to do with ethnic conflicts, economics, hunger, political stability, health, and human happiness.

At the most basic level, humans need 2200 to 3000 Calories per day, depending on body size and activity level. Early hunter-gatherers used little more energy than they required for food. The invention of agriculture increased the efficiency with which we captured sunlight permitting the growth of cities (Smil, 1991, 1994). Despite their differences, both showed little ecological foresight. Hunter-gatherers drove many species to extinction and early farmers left behind a legacy of deforestation, soil erosion, and land degradation. In other words, we have always modified our environments to one degree or another, but the level of ecological damage has increased with the level of civilization and with the scale and kind of technology.

The average citizen of the United States now uses some 186,000 Calories of energy each day, most of it derived from oil and coal (McKibben, 1998). Our food and materials come to us via a system that spans the world and whose consequences are mostly concealed from us. The average food molecule is said to have traveled over 1300 miles from where it was grown or produced to where it is eaten (Meadows, 1998). In such a system, there is no way we can know the human or ecological consequences of eating. Nor can we know the full cost of virtually anything that we purchase or discard. We do know, however, that the level of environmental destruction has risen with the volume of stuff consumed and with the distance it is transported. By one count we waste more than one million pounds of materials per person per year. For every 100 pounds of product, we create 3200 pounds of waste. (Hawken, 1997, 44) Measured as an "ecological footprint" i.e., the land required to grow our food, process our organic wastes, sequester our carbon dioxide, and provide our material needs, the average North American, by one estimate, requires some 5 hectares of arable land per person per year (Wackernagel and Rees, 1996). But at the current population level the world has only 1.3 hectares of useable land per person. Extending our lifestyle to everyone, would require the equivalent of two additional Earths!

Looking ahead, we face an imminent collision between a growing population with rising material expectations and ecological capacity. At some time in the next century, given present trends, the human population will reach or exceed 10 billion, perhaps as many as 15-20 percent of the species on earth will have disappeared forever, and the effects of climatic change will have become manifest. This much and more is virtually certain. The immediate problem is simply that of feeding, housing, clothing, and educating another 4-6 billion people and providing employment for an additional 2 to 4 billion without wrecking the planet in the process. Given our inability to meet basic needs of one-third of the present population there are good reasons to doubt that we will be able to do better with the far larger population now in prospect.

THE DEFAULT SETTING

The regnant faith, however, holds that science and technology will find a way to do so without our having to make significant changes in our philosophies, politics, economics, or in the directions of the growth oriented society. Rockefeller University professor, Jessie Ausubel, for example, asserts that:

> *after a very long preparation, our science and technology are ready also to reconcile our economy and the environment . . . In fact, long before environmental policy became conscious of itself, the system had set decarbonization in motion. A highly efficient hydrogen economy, landless agriculture, industrial ecosystems in which waste virtually disappears: over the coming century these can enable large, prosperous human populations to co-exist with the whales and the lions and the eagles and all that underlie them (Ausubel, 15).*

We have, Ausubel states, "liberated ourselves from the environment." This view is similar to that of futurist, Herman Kahn several decades ago when he asserted that by the year 2200 "humans would everywhere be rich, numerous, and in control of the forces of nature" (Kahn and Martel, 1976). In its more recent version, those believing that we have liberated ourselves from the environment cite advances in energy use, materials science, genetic engineering, and artificial intelligence that will enable us to do much more with far less and eventually transcend ecological limits altogether. Humanity will then take control of its own fate, or more

accurately, as C. S. Lewis once observed, some few humans will do so, purportedly acting on behalf of all humanity (1970, 67-91).

Ausubel's optimism coincides with the widely held view that we ought to simply take over the task of managing the planet (*Scientific American*, 1989). In fact the technological and scientific capability is widely believed to be emerging in the technologies of remote sensing, geographic information systems, computers, the science of ecology (in its managerial version), and systems engineering. The problems of managing the Earth, however, are legion. For one thing the word 'management' does not quite capture what the essence of the thing being proposed. We can manage, say, a 747 because we made it. Presumably, we know what it can and cannot do even though they sometimes crash for reasons that elude us. Our knowledge of the Earth is in no way comparable. We did not make it, we have no blueprint of it, and will never know fully how it works. Second, the target of management is not quite what it appears to be since a good bit of what passes for managing the Earth is in fact managing human behavior. Third, under the guise of objective neutrality and under the pretext of emergency, management of the Earth is ultimately an extension of the effort to dominate people through the domination of nature. And can we trust those presuming to manage to do so with fairness, wisdom, foresight, and humility and for how long?

Another, and more modest, possibility is to restrict our access to nature rather like a fussy mother in bygone days keeping unruly children out of the formal parlor. To this end Professor Martin Lewis proposes what he calls a "Promethean environmentalism" that aims to protect nature by keeping us away from as much of it as possible (Lewis, 1992). His purpose is to substitute advanced technology for nature. This requires the development of far more advanced technologies, more unfettered capitalism, and probably some kind of high-tech virtual simulation to meet whatever residual needs for nature that we might retain in this Brave New World. Professor Lewis dismisses the possibility that we could become stewards, ecologically competent, or even just a bit more humble. Accordingly, he disparages those whom he labels "eco-radicals" including Aldo Leopold, Herman Daly, and E. F. Schumacher who question the role of capitalism in environmental destruction, raise issues about appropriate scale, and disagree with the directions of technological evolution. Lewis' proposal to protect nature by removing humankind from it, however, raises other questions. Will people cut off from nature be sane? Will people who no longer believe that they need nature be willing, nonetheless, to protect it? If so, will people no longer in contact with nature know how to do so? And was it not our efforts to cut ourselves off from nature that got us into trouble in the first place? On such matters Professor Lewis is silent.

Despite the pervasive optimism about our technological possibilities, there is a venerable tradition of unease about the consequences of unconstrained technological development from Mary Shelley's *Frankenstein* to Lewis Mumford's critique of the "megamachine." But the technological juggernaut that has brought us to our present situation, nonetheless, remains on track. We have now arrived, in Edward O. Wilson's view, at a choice between two very different paths of human evolution. One choice would aim to preserve "the physical and biotic environment that cradled the human species" along with those traits that make us distinctively human. The other path, based on the belief that we are now exempt from the "iron laws of ecology that bind other species," would take us in radically different directions, as "*Homo proteus* or 'shapechanger man'" (Wilson, 1998; 278). But how much of the earth can we safely alter? How much of our own genetic inheritance should we manipulate before we are no longer recognizably human? This second path, in Wilson's view, would "render everything fragile" (298). And, in time, fragile things break apart.

The sociologist and theologian, Jacques Ellul, is even more pessimistic. "Our machines," he writes, "have truly replaced us." We have no philosophy of technology, in his view, because "philosophy implies limits and definitions and defined areas that technique will not allow." (1990: 216) Consequently, we seldom ask where all of this is going, or why, or who really benefits. The "unicity of the [technological] system" Ellul believes, "may be the cause of its fragility" (1980: 164). We are "shut up, blocked, and chained by the inevitability of the technical system, at least until the self-contradictions of the "technological bluff," like massive geologic fault lines, give way and the system dissolves in "enormous global disorder." At that point he thinks that we will finally understand that "everything depends on the qualities of individuals" (1990: 412).

The dynamic is, by now, familiar. Technology begets more technology, technological systems, technology driven politics, technology dependent economies, and finally, people who can neither function nor think a hair's breadth beyond the limits of one machine or another. This, in Neil Postman's view, is the underlying pattern of western history as we moved from simple tools, to technocracy, to "technopoly." In the first stage, tools were useful to solve specific problems but did not undermine "the dignity and integrity of the culture into which they were introduced" (Postman, 23). In a technocracy like England in the 18th and 19th centuries, factories undermined "tradition, social mores, myth, politics, ritual and religion." The third stage, technopoly, however, "eliminates alternatives to itself in precisely the way Aldous Huxley outlined in Brave New World." It does so "by redefining what we mean by religion, by art, by family, by politics, by history, by truth, by privacy, by intelligence, so that our definitions fit its new requirements" (48). Technopoly represents, in Postman's view, the cultural equivalent of AIDS, which is to say a culture with no defense whatsoever against technology or the claims of expertise (63). It flourishes when the "tie between information and human purpose has been severed."

The course that Professor Ausubel and others propose fits into this larger pattern of technopoly that step by step is shifting human evolution in radically different directions. Professor Ausubel does not discuss the risks and unforeseen consequences that accompany unfettered technological change. These, he apparently believes, are justifiable as unavoidable costs of progress. This is precisely the kind of thinking which has undermined our capacity to refuse technologies that add nothing to our quality of life. A

system which produces automobiles and atom bombs will also go on to make super computers, smart weapons, genetically altered crops, nano technologies, and eventually machines smart enough to displace their creators. There is no obvious stopping point, which is to say that having accepted the initial premises of technopoly the powers of control and good judgement are eroded away in the blizzard of possibilities.

Advertised as the essence of rationality and control, the technological system has become the epitome of irrationality in which means overrule careful consideration of ends. A rising tide of unanticipated consequences and "normal accidents" mock the idea that experts are in control or that technologies do only what they are intended to do. The purported rationality of each particular component in what E. O. Wilson calls a "thickening web of prosthetic devices" added together as a system lacks both rationality and coherence. Nor is there anything inherently human or even rational about words such as "efficiency," "productivity," or "management," that are used to justify technological change. Rationality of this narrow sort has been "as successful—if not more successful—at creating new degrees of barbarism and violence as it has been at imposing reasonable actions" (Saul, 32). Originating with Descartes and Galileo, the foundations of the modern worldview were flawed from the beginning. In time, those seemingly small and trivial errors of perception, logic, and heart cascaded into a rising tide of cultural incoherence, barbarism, and ecological degradation that have now engulfed the earth. Professor Ausubel's optimism, notwithstanding, this tide will continue to rise until it has finally drowned every decent possibility that might have been unless we choose a more discerning course.

ECOLOGICAL DESIGN

The unfolding problems of human ecology, in other words, are not solvable by repeating old mistakes in new and more sophisticated and powerful ways. We need a deeper change of the kind Albert Einstein had in mind when he said that the same manner of thought that created problems could not solve them. We need what architect Sim van der Ryn and mathematician, Steward Cowan define as an ecological design revolution. Ecological design in their words is "any form of design that minimize(s) environmentally destructive impacts by integrating itself with living processes . . . the effective adaptation to and integration with nature's processes" (van der Ryn and Cowan, 1996, x, 18). For Landscape architect, Carol Franklin ecological design is a "fundamental revision of thinking and operation" (Franklin, 264). Good design does not begin with what we can do, but rather with questions about what we really want to do (Wann, 22). Ecological design, in other words, is the careful meshing of human purposes with the larger patterns and flows of the natural world and the study of those patterns and flows to inform human actions (Orr, 1994, 104).

Amory Lovins, Hunter Lovins, and Paul Hawken, to this end propose a transformation in energy and resource efficiency that would dramatically increase wealth while using a fraction of the resources we currently use (1999).[1] Transformation would not occur, however, simply as an extrapolation of existing technological trends. They propose, instead, a deeper revolution in our thinking about the uses of technology so that we don't end up with "extremely efficient factories making napalm and throwaway beer cans" (Benyus, 262). In contrast to Ausubel, the authors of Natural Capitalism propose a closer calibration between means and ends. Such a world would improve energy and resource efficiency by, perhaps, ten-fold. It would be powered by highly efficient small-scale renewable energy technologies distributed close to the point of end-use. It would protect natural capital in the form of soils, forests, grasslands, oceanic fisheries, and biota while preserving biological diversity. Pollution, in any form, would be curtailed and eventually eliminated by industries designed to discharge no waste. The economy of that world would be calibrated to fit ecological realities. Taxes would be levied on things we do not want such as pollution and removed from things such as income and employment that we do want. These changes signal a revolution in design that draws on fields as diverse as ecology, systems dynamics, energetics, sustainable agriculture, industrial ecology, architecture, and landscape architecture.[2]

The challenge of ecological design is more than simply an engineering problem of improving efficiency—reducing the rates at which we poison ourselves and damage the world. The revolution that van der Ryn and Cowan propose must first reduce the rate at which things get worse (coefficients of change) but eventually change the structure of the larger system. As Bill McDonough and Michael Braungart argue, we will need a "second industrial revolution" that eliminates the very concept of waste (McDonough & Braungart, 1998). This implies, in their words, putting "filters on our minds, not at the end of pipes." In practice, the change McDonough proposes implies, among other things, changing manufacturing systems to eliminate the use of toxic and cancer causing materials and the development of closed loop systems that deliver "products of service" not products that are eventually discarded to air, water, and land-fills.

The pioneers in ecological design begin with the observation that nature has been developing successful strategies for living on Earth for 3.8 billion years and is, accordingly, a model for:

- Farms that work like forests and prairies,
- Buildings that accrue natural capital like trees,
- Waste water systems that work like natural wetlands,
- Materials that mimic the ingenuity of plants and animals,
- Industries that work more like ecosystems, and
- Products that become part of cycles resembling natural materials flows.

Wes Jackson, for example, is attempting to redesign agriculture in the Great Plains to mimic the prairie that once existed there (Jackson, 1980). Paul Hawken proposes to remake commerce in the image of natural systems (Hawken, 1993). The new field of industrial ecology is similarly attempting to redesign manufacturing to

reflect the way ecosystems work. The new field of "biomimicry" is beginning to transform industrial chemistry, medicine, and communications. Common spiders, for example, make silk that is ounce for ounce 5 times stronger than steel with no waste byproducts. The inner shell of an abalone is far tougher than our best ceramics (Benyus, 97). By such standards, human industry is remarkably clumsy, inefficient, and destructive. Running through each of these is the belief that the successful design strategies, tested over the course of evolution, provide the standard to inform the design of commerce and the large systems that supply us with food, energy, water, and materials, and remove our wastes (Benyus, 73).

The greatest impediment to an ecological design revolution is not, however, technological or scientific, but rather human. If intention is the first signal of design, as Bill McDonough puts it, we must reckon with the fact that human intentions have been warped in recent history by violence and the systematic cultivation of greed, self-preoccupation, and mass consumerism. A real design revolution will have to transform human intentions and the larger political, economic, and institutional structure that permitted ecological degradation in the first place. A second impediment to an ecological design revolution is simply the scale of change required in the next few decades. All nations, but starting with the most wealthy, will have to:

- Improve energy efficiency by a factor of 5-10;
- Rapidly develop renewable sources of energy;
- Reduce the amount of materials per unit of output by a factor of 5-10;
- Preserve biological diversity now being lost everywhere;
- Restore degraded ecosystems;
- Redesign transportation systems and urban areas;
- Institute sustainable practices of agriculture and forestry;
- Reduce population growth and eventually total population levels;
- Redistribute resources fairly within and between generations; and
- Develop more accurate indicators of prosperity, wellbeing, health and security.

We have good reason to think that all of these must be well underway within the next few decades. Given the scale and extent of the changes required, this is a transition for which there is no historical precedent. The century ahead will test, not just our ingenuity, but our foresight, wisdom, and sense of humanity as well.

The success of ecological design will depend on our ability to cultivate a deeper sense of connection and obligation without which few people will be willing to make even obvious and rational changes in time to make much difference. We will have to reckon with the power of denial, both individual and collective, to block change. We must reckon with the fact that we will never be intelligent enough to understand the full consequences of our actions, some of which will be paradoxical and some evil. We must learn how to avoid creating problems for which there is no good solution technological or otherwise (Hunter, 1997; Dobb, 1996) such as the creation of long-lived wastes, the loss of species, or toxic waste flowing from tens of thousands of mines. In short a real design revolution must aim to foster a deeper transformation in human intentions and the political and economic institutions that turn intentions into ecological results. There is no clever shortcut, no end-run around natural constraints, no magic bullet, and no cheap grace.

THE INTENTION TO DESIGN

Designing a civilization that can be sustained ecologically and one that sustains the best in the human spirit will require us, then, to confront the wellsprings of intention, which is to say human nature. Our intentions are the product of many things at least four of which have implications for our ecological prospects. First, with the certain awareness of our mortality, we are inescapably religious creatures. The religious impulse in us works like water flowing up from an artesian spring that will come to the surface in one place or another. Our choice is not whether we are religious or not as atheists would have it, but whether the object of our worship is authentic or not. The gravity mass of our nature tugs us to create or discover systems of meaning that places the human condition in some larger framework that explains, consoles, offers grounds for hope, and, sometimes, rationalizes. In our age, nationalism, capitalism, communism, fascism, consumerism, cyberism, and even ecologism have become substitutes for genuine religion. But whatever the ism or the belief, in one way or another we will create or discover systems of thought and behavior which give us a sense of meaning and belonging to some larger scheme of things. Moreover, there is good evidence to support the claim that successful resource management requires, in E. N. Anderson's words, "a direct, emotional religiously 'socialized' tie to the resources in question" (1996;169). Paradoxically, however, societies with much less scientific information than we have often make better environmental choices. Myth and religious beliefs, which we regard as erroneous, have sometimes worked better to preserve environments than have decisions based on scientific information administered by presumably "rational" bureaucrats (Lansing, 1991). The implication is that solutions to environmental problems must be designed to resonate at deep emotional levels and be ecologically sound.

Second, despite all of our puffed up self-advertising as Homo sapiens, the fact is that we are limited, if clever, creatures. Accordingly, we need a more sober view of our possibilities. Real wisdom is rare and rarer still if measured ecologically. Seldom do we foresee the ecological consequences of our actions. We have great difficulty understanding what Jay Forrester once called the "counterintuitive behavior of social systems" (Forrester, 19ck) We are prone to overdo what worked in the past, with the result that

many of our current problems stem from past success carried to an extreme. Enjoined to "be fruitful and multiply," we did as commanded. But at six billion and counting, it seems that we lack the gene for enough. We are prone to overestimate our abilities to get out of self-generated messes. We are, as someone put it, continually overrunning our headlights. Human history is in large measure a sorry catalog of war and malfeasance of one kind or another. Stupidity is probably as great a factor in human affairs as intelligence. All of which is to say that a more sober reading of human potentials suggests the need for a fail-safe approach to ecological design that does not over tax our collective intelligence, foresight, and goodness.

Third, quite possibly we have certain dispositions toward the environment that have been hardwired in us over the course of our evolution. E. O. Wilson, for example, suggests that we possess what he calls "biophilia" meaning an innate "urge to affiliate with other forms of life" (Wilson, 1984, 85). Biophilia may be evident in our preference for certain landscapes such as savannas and in the fact that we heal more quickly in the presence of sunlight, trees, and flowers than in biologically sterile, artificially lit, utilitarian settings. Emotionally damaged children, unable to establish close and loving relationships with people, sometimes can be reached by carefully supervised contact with animals. And after several million years of evolution it would be surprising indeed were it otherwise. The affinity for life described by Wilson and others, does not, however, imply nature romanticism, but rather something like a core element in our nature that connects us to the nature in which we evolved and which nurtures and sustains us. Biophilia certainly does not mean that we are all disposed to like nature or that it cannot be corrupted into biophobia. But without intending to do so, we are creating a world in which we do not fit. The growing evidence supporting the biophilia hypothesis suggests that we fit better in environments that have more, not less, nature. We do better with sunlight, contact with animals, and in settings that include trees, flowers, flowing water, birds, and natural processes than in their absence. We are sensuous creatures who develop emotional attachment to particular landscapes. The implication is that we need to create communities and places that resonate with our evolutionary past and for which we have deep affection.

Fourth, for all of our considerable scientific advances, our knowledge of the Earth is still minute relative to what we will need to know. Where are we? The short answer is that despite all of our science, no one knows for certain. We inhabit the third planet out from a fifth-rate star located in a backwater galaxy. We are the center of nothing that is very obvious to the eye of science. We do not know whether the Earth is just dead matter or whether it is, in some respects, alive. Nor do we know how forgiving the ecosphere may be to human insults. Our knowledge of the flora and fauna of the Earth and the ecological processes that link them together is small relative to all that might be known. In some areas, in fact, knowledge is in retreat because it is no longer fashionable or profitable. Our practical knowledge of particular places is often considerably less than that of the native peoples we displaced. As a result, the average college graduate would flunk even a cursory test on their local ecology, and stripped of technology most would quickly founder.

To complicate things further, the advance of human knowledge is inescapably ironic. Since the enlightenment, the goal of our science has been a more rational ordering of human affairs in which cause and effect could be empirically determined and presumably controlled. But after a century of promiscuous chemistry, for example, who can say how the 100,000 chemicals in common use mix in the ecosphere or how they might be implicated in declining sperm counts, or rising cancer rates, or disappearing amphibians, or behavioral disorders? And having disrupted global biogeochemical cycles, no one can say with assurance what the larger climatic and ecological effects will be. Undaunted by our ignorance, we rush ahead to re-engineer the fabric of life on earth! Maybe science will figure it all out. But I think that it is more probable that we are encountering the outer limits of social-ecological complexity in which cause and effect are widely separated in space and time and in a growing number of cases no one can say with certainty what causes what. Like the sorcerer's apprentice, every answer generated by science gives rise to a dozen more questions, and every technological solution gives rise to a dozen more problems. Rapid technological change intended to rationalize human life tends to expand the domain of irrationality. At the end of the bloodiest century in history, the enlightenment faith in human rationality seems overstated at best. But the design implication is, not less rationality, but a more complete, humble, and ecologically solvent rationality that works over the long-term.

Who are we? Conceived in the image of God? Perhaps. But for the time being the most that can be said with assurance is that, in an evolutionary perspective humans are a precocious and unruly newcomer with a highly uncertain future. Where are we? Wherever it is, it is a world full of irony and paradox, veiled in mystery. And for those purporting to reweave the human presence in the world in a manner that is ecologically sustainable and spiritually sustaining, the ancient idea that God (or the gods) mocks human intelligence should never be far from our minds.

ECOLOGICAL DESIGN PRINCIPLES

First, ecological design is not so much about how to make things as it is how to make things that fit gracefully over long periods of time in a particular ecological, social, and cultural context. Industrial societies, in contrast, operate in the conviction that "if brute force doesn't work you're not using enough of it." But when humans have designed with ecology in mind there is greater harmony between intentions and the particular places in which those intentions are played out that:

- Preserves diversity both cultural and biological
- Utilizes current solar income
- Creates little or no waste
- Accounts for all costs

- Respects larger cultural and social patterns

Second, ecological design is not just a smarter way to do the same old things or a way to rationalize and sustain a rapacious, demoralizing, and unjust consumer culture. The problem is not how to produce ecologically benign products for the consumer economy, but how to make decent communities in which people grow to be responsible citizens and whole people who do not confuse what they have with who they are. The larger design challenge is to transform a society that promotes excess consumption and human incompetence, concentrates power in too few hands, and destroys both people and land. Ecological design ought to foster a revolution in our thinking that changes the kinds of questions we ask from "how can we do the same old things more efficiently" to deeper questions such as:

- Do we need it?
- Is it ethical?
- What impact does it have on the community?
- Is it safe to make and use?
- Is it fair?
- Can it be repaired or reused?
- What is the full cost over its expected lifetime?
- Is there a better way to do it?

The quality of design, in other words, is measured by the elegance with which we join means and worthy ends. In Wendell Berry's felicitous phrase, good design "solves for pattern" thereby preserving the larger patterns of place and culture and sometimes this means doing nothing at all (Berry, 1981. 134-145). In the words of John Todd, the aim is "elegant solutions predicated on the uniqueness of place."[3] Ecological design, then, is not simply a more efficient way to accommodate desires as it is the improvement of desire and all of those things that effect what we desire.

Third, ecological design is as much about politics and power as it about ecology. We have good reason to question the large scale plans to remodel the planet that range from genetic engineers to the multinational timber companies. Should a few be permitted to redesign the fabric of life on the earth? Should others be permitted to design machines smarter than we are that might someday find us to be an annoyance and discard us? Who should decide how much of nature should be remodeled, for whose convenience, and by what standards? In an age when everything seems possible, where are the citizens or other members of biotic community who will be effected by the implementation of grandiose plans? The answer is that they are now excluded. At the heart of the issue of design, then, are procedural questions that have to do with politics, representation, and fairness.

Fourth, it follows that ecological design is not so much an individual art practiced by individual "designers" as it is an ongoing negotiation between a community and the ecology of particular places. Good design results in communities in which feedback between action and subsequent correction is rapid, people are held accountable for their actions, functional redundancy is high, and control is decentralized. In a well designed community, people would know quickly what's happening and if they don't like it, they know who can be held accountable and can change it. Such things are possible only where: livelihood, food, fuel, and recreation are, to a great extent, derived locally; when people have control over their own economies; and when the pathologies of large-scale administration are minimal. Moreover, being situated in a place for generations provides long memory of the place and hence of its ecological possibilities and limits. There is a kind of long-term learning process that grows from the intimate experience of a place over time.[4] Ecological design, then, is a large idea but is most applicable at a relatively modest scale. The reason is not that smallness or locality has any necessary virtue, but that human frailties limit what we are able to comprehend, foresee, as well as the scope and consistency of our affections. No amount of smartness or technology can dissolve any of these limits. The modern dilemma is that we find ourselves trapped between the growing cleverness of our science and technology and our seeming incapacity to act wisely.

Fifth, the standard for ecological design is neither efficiency nor productivity, but health beginning with that of the soil and extending upward through plants, animals, and people. It is impossible to impair health at any level without affecting that at other levels. The etymology of the word health reveals its connection to other words such as healing, wholeness, and holy. Ecological design is an art by which we aim to restore and maintain the wholeness of the entire fabric of life increasingly fragmented by specialization, scientific reductionism, and bureaucratic division. We now have armies of specialists studying bits and pieces of the whole as if these were, in fact, separable. In reality it is impossible to disconnect the threads that bind us into larger wholes up to that one great community of the ecosphere. The environment outside us is also inside us. We are connected to more things in more ways than we can ever count or comprehend. The act of designing ecologically begins with the awareness that we can never entirely fathom those connections and with the intent to faithfully honor what we cannot fully comprehend and control. This means that ecological design must be done cautiously, humbly, and reverently.

Sixth, ecological design is not reducible to a set of technical skills. It is anchored in the faith that the world is not random but purposeful and stitched together from top to bottom by a common set of rules. It is grounded in the belief that we are part of the larger order of things and that we have an ancient obligation to act harmoniously within those larger patterns. It grows from the awareness that we do not live by bread alone and that the effort to build a sustainable world must begin by designing one that first nourishes the human spirit. Design, at its best, is a sacred art reflecting the faith that, in the end, if we live faithfully and well, the world will not break our hearts.

Finally, the goal of ecological design is not a journey to some utopian destiny, but is rather more like a homecoming. Philosopher, Suzanne Langer, once described the problem in these words:

> *Most people have no home that is a symbol of their childhood. not even a definite memory of one place to serve that purpose. Many no longer know the language that was once their mother-tongue. All old symbols are gone . . . the field of our unconscious symbolic orientation is suddenly plowed up by the tremendous changes in the external world and in the social order. (Langer, 292)*

In other words, we are lost and must now find our way home again. For all of the technological accomplishments, the twentieth century was the most brutal and destructive era in our short history. In the century ahead we must chart a different course that leads to restoration, healing, and wholeness. Ecological design is a kind of navigation aid to help us find our bearings again. And getting home means remaking the human presence in the world in a way that honors ecology, evolution, human dignity, spirit, and the human need for roots and connection.

CONCLUSION

Ecological design, then, involves far more than the application of instrumental reason and advanced technology applied to the problems of shoehorning billions more of us into an earth already bulging at the seams with people. Humankind, as Abraham Heschel once wrote, "will not perish for want of information; but only for want of appreciation . . . what we lack is not a will to believe but a will to wonder." (Heschel, 37) The ultimate object of ecological design is not the things we make but rather the human mind and specifically its capacity for wonder and appreciation.

The capacity of the mind for wonder, however, has been all but obliterated by the very means by which we are passively provisioned with food, energy, materials, shelter, health-care, entertainment, and by those that remove our voluminous wastes from sight and mind. There is hardly anything in these industrial systems that fosters mindfulness or ecological competence let alone a sense of wonder. To the contrary these systems are designed to generate cash which has itself become an object of wonder and reverence. It is widely supposed that formal education serves as some kind of antidote to this uniquely modern form of barbarism. But conventional education, at its best, merely dilutes the tidal wave of false and distracting information embedded in the infrastructure and processes of technopoly. However well intentioned, it cannot compete with the larger educational effects of highways, shopping malls, supermarkets, urban sprawl, factory farms, agribusiness, huge utilities, multinational corporations, and nonstop advertising that teaches dominance, power, speed, accumulation, and self-indulgent individualism. We may talk about how everything is ecologically connected, but the terrible simplifiers are working overtime to take it all apart.

If it is not to become simply a more efficient way to do the same old things, ecological design must become a kind of public pedagogy built into the structure of daily life. There is little sense in only selling greener products to a consumer whose mind is still pre-ecological. Sooner or later that person will find environmentalism inconvenient, or incomprehensible, or too costly and will opt out. The goal of ecological design is to calibrate human behavior with ecological realities while educating people about ecological possibilities and limits. We must begin to see our houses, buildings, farms, businesses, energy technologies, transportation, landscapes, and communities in much the same way that we regard classrooms. In fact, they instruct in more fundamental ways because they structure what we see, how we move, what we eat, our sense of time and space, how we relate to each other, our sense of security, and how we experience the particular places in which we live. More important, by their scale and power they structure how we think, often limiting our ability to imagine better alternatives.

When we design ecologically we are instructed continually by the fabric of everyday life—pedagogy informs infrastructure which in turn informs us. The growing of food on local farms and gardens, for example, becomes a source of nourishment for the body and instruction in soils, plants, animals, and cycles of growth and decay (Donahue, 1999). Renewable energy technologies become a source of energy as well as insight about the flows of energy in ecosystems. Ecologically designed communities become a way to teach about land use, landscapes, and human connections. Restoration of wildlife corridors and habitats instructs us in the ways of animals. In other words ecological design becomes a way to expand our awareness of nature and our ecological competence.

Most importantly, when we design ecologically we break the addictive quality that permeates modern life. "We have," in the words of Philosopher Bruce Wilshire,

> *"encase(d) ourselves in controlled environments called building and cities. Strapped into machines, we speed from place to place whenever desired, typically knowing any particular place and its regenerative rhythms and prospects only slightly."*

We have alienated ourselves from "nature that formed our needs over millions of years [which] means alienation within ourselves." (Wilshire, 18) Given our inability to satisfy "our primal needs as organisms" we suffer what he calls a deprivation of ecstasy that stemmed from the 99% of our life as a species spent fully engaged with nature. Having cut ourselves off from the cycles of nature, we find ourselves strangers in an alien world of our own making. Our response has been to create distractions and addictive behaviors as junk food substitutes for the totality of body-spirit-mind nourishment we've lost and then to vigorously deny what we've done. Ecstasy deprivation, in other words, results in surrogate behaviors, mechanically repeated over and over again, otherwise known as addiction. This is a plausible, even brilliant, argument with the ring of truth to it.[5]

Ecological design, finally, is the art that reconnects us as sensuous creatures evolved over millions of years to a sensuous, living,

and beautiful world. That world does not need to be remade but rather revealed. To do that we do not need research as much as the rediscovery of old and forgotten things. We do not need more economic growth as much as we need to re-learn the ancient lesson of generosity, which is to say that the gifts we have must move, that we can possess nothing. We are only trustees standing for only a moment between those who preceded us and those who will follow. Our greatest needs have nothing to do with possession of things but rather with heart, wisdom, thankfulness, and generosity of spirit. And these things are part of larger ecologies that embrace spirit, body, and mind—the beginning of design.

Design in its largest sense joins a variety of disciplines around the issue of how we provision six (soon to be 8-10 billion people) with food, energy, water, shelter, health care, and materials and do so sustainably and fairly on a planet with a biosphere. Design is not just about how we make things, but rather how we make things that fit harmoniously in an ecological, cultural, and moral context. It is therefore about systems, patterns, and connections. It is also a part of a long-term conversation between ecologists and designers of the built environment and technosphere the essence of which is whether design becomes yet one more clever way to make end-runs around natural systems or is disciplined and informed by an understanding of nature. At its best, design is a field of applied ethics that joins perspectives, and disciplines that otherwise remain disparate and often disjointed. Problems of environmental justice, for example, are unsolvable unless a morally robust design intelligence is applied to the design of food systems, energy use, materials flows, waste cycling in ways that do not compromise standards of fairness and human dignity. Justice, in this perspective, is a design problem, but it is also a criterion for design and a result of good design. But design itself requires both robust ethics and mastery of design skills and analytic abilities.

SOURCES

Abram, D., 1996. The Spell of the Sensuous. New York: Pantheon.

Alexander, C., et.al., 1977. A Pattern Language. New York: Oxford University Press.

Anderson, E.N., 1996. Ecologies of the Heart. New York: Oxford University Press.

Ausubel, J. 1996. "Liberation of the Environment," *Daedalus*, 125: 3, pp. 1-18.

Benyus, J. 1997. Biomimicry. New York: William Morrow.

Berman, M., 1989. Coming to Our Senses. New York: Simon and Schuster.

Berry, W., 1977. The Unsettling of America. San Francisco: Sierra Club Books.

Berry, W., 1981. The Gift of Good Land. San Francisco: North Point Press, 1981.

Daly, H., 1996. Beyond Growth. Boston: Beacon Press.

Dobb, E., 1996. "Pennies From Hell," *Harpers* (October), pp. 39-54.

Donahue, B., 1999. Reclaiming the Commons. New Haven: Yale University Press.

Ellul, J., 1980. The Technological System. New York: Continuum.

Ellul, J., 1990. The Technological Bluff. Grand Rapids: Eerdmans.

Forrester, J., 1971. "Counter-Intuitive Behavior of Social Systems," *Technology Review* (January).

Franklin, C. 1997. "Fostering Living Landscapes," in Thompson, G., and Steiner, F., (eds) Ecological Design and Planning. New York: JohnWiley & Sons.

Hardin, G., 1968. "The Tragedy of the Commons," *Science* (December 13), pp. 8-13.

Hawken, P., 1993. The Ecology of Commerce. New York: HarperCollins.

Hawken, P., 1977. "Natural Capitalism," *Mother Jones* (April), pp. 40-53.

Hawken, P., Lovins, H., Lovins, A. 1999. Natural Capitalism. Boston: Little Brown.

Heschel, A.J., 1990 (1951). Man is Not Alone: A Philosophy of Religion. New York: Farrar, Straus, and Giroux.

Hunter, J. Robert, 1997. Simple Things won't Save the Earth. Austin: University of Texas Press.

Jackson, W., 1985. New Roots for Agriculture. Lincoln: University of Nebraska Press.

Kahn H. and Brown, Wm., 1976. The Next Two Hundred Years. New York: Wm. Morrow.

Kellert, S., and Wilson, E. O., 1993. The Biophilia Hypothesis. Washington: Island Press.

Langer, S., 1976 (1942), Philosophy in a New Key. Cambridge: Harvard University Press.

Lansing, S., 1991. Priests and Programmers. Princeton: Princeton University Press.

Lewis, C.S., 1970 (1947). The Abolition of Man. New York: MacMillan.

Lewis., M, 1992. Green Delusions. Durham: Duke University Press.

McDonough, W., and Braungart, M., 1998. "The Next Industrial Revolution," *The Atlantic Monthly*, 282: 4, October, pp. 82-92.

McKibben. W., 1998. "A Special Moment in History," *The Atlantic Monthly*, (May), pp. 55-78.

Meadows, D., 1998. "The Global Citizen," *Valley News* (July 4).

Meadows, D., Meadows, D., and Randers, J., 1992. Beyond the Limits. Post Mills: Chelsea Green.

Merchant, C., 1980. The Death of Nature. NewYork: Harper & Row.

Mumford, L., 1974. The Myth of the Machine: The Pentagon of Power. New York: Harcourt, Brace, Jovanovich.

Orr, D., 1994. Earth in Mind. Washington: Island Press.

Postman, N., 1992. Technopoly: The Surrender of Culture to Technology. New York: Knopf.

Sachs, W., Loske, R., Linz, M., 1998. Greening the North. London: ZED Books.

Saul, J. R., 1992. Voltaire's Bastards: The Dictatorship of Reason in the West. New York: Vintage.

Scientific American, 1989. Special Issue, (September) "Managing Planet Earth."

Smil, V., 1991. General Energetics. New York: Wiley-Interscience.

Smil, V., 1994. Energy in World History. Boulder: Westview.

Sturt, G., 1984 (1923). The Wheelright's Shop. Cambridge: Cambridge University Press.

Suzuki, D., 1998., The Sacred Balance. Amherst: Prometheus Books.

Todd, J., and Todd, N,

Van Der Ryn, S., Cowan, S., 1996. Ecological Design. Washington: Island Press.

Von Weizsacker, E., Lovins, A., Lovins, H., 1997. Factor Four. London: Earthscan.

Wackernagel, M., and Rees, W., 1996. Our Ecological Footprint. Philadelphia: New Society.

Wann, D., 1996. Deep Design. Washington: Island Press.

White, L., 1967. "The Historic Roots of our Ecologic Crisis," *Science* 155l. (10 March), 1203-1207.

Wilshire, B., 1998. Wild Hunger: The Primal Roots of Modern Addiction. Lanham, MD: Rowman & Littlefield.

Wilson, E. O., 1984. Biophilia. Cambridge: Harvard University Press.

Wilson, E. O., 1998. Consilience. New York: Knopf.

NOTES

[1]Our ecological troubles have been variously attributed to Judeo-Christian religion (Lynn White), our inability to manage common property resources such as ocean fisheries (Garrett Hardin), lack of character (Wendell Berry), gender imbalance (Carolyn Merchant), technology run amuck (Lewis Mumford), disenchantment (Morris Berman), the loss of sensual connection to nature (David Abram), exponential growth (Donella Meadows), and flaws in the economic system (Herman Daly).

[2]The roots of ecological design can be traced back to the work of Scottish biologist, D'Arcy Thompson and his magisterial *On Growth and Form* first published in 1917. In contrast to Darwin's evolutionary biology, Thompson traced the evolution of life forms back to the problems elementary physical forces such as gravity pose for individual species. His legacy is an evolving science of forms evident in evolutionary biology, biomechanics, and architecture. Ecological design is evident in the work of Bill Browning, Herman Daly, Paul Hawken, Wes Jackson, Aldo Leopold, Amory and Hunter Lovins, John Lyle, Bill McDonough, Donella Meadows, Eugene Odum, Sim van der Ryn, and David Wann.

[3]The phrase is John Todd's, see John and Nancy Todd, From Eco-Cities to Living Machines: Principles of Ecological Design (Berkeley: North Atlantic Books, 1994).

[4]George Sturt, once described this process in his native land as "The age-long effort of Englishmen to fit themselves close and ever closer into England . . . "(Sturt, p. 66).

[5]See also David Abram's remarkable book The Spell of the Sensuous. New York: Pantheon.

Working Cities:
Density, Risk, Spontaneity

Moderator: Anthony W. Schuman,
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Protagonist:
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Panelists:
PHOEBE CRISMAN
University of Virginia

TERRY HEINLEIN
Wentworth Institute of Technology

MICHAEL PYATOK
University of Washington

ROY STRICKLAND
Massachusetts Institute of Technology

Session Summary

ANTHONY W. SCHUMAN
New Jersey Institute of Technology

Max Bond's essay criticizes trends in contemporary urbanism — the "risk-free bourgeois vision" -that do not extend the benefits of urban reinvestment to the whole population – "to working people in need of working cities." The four respondents, three blind refereed papers and one invited speaker, approached this call at different scales and strategies, with differing views about architecture's role in redressing this trend.

Terry Heinlein's work with students in East Cambridge, MA, was skeptical about the power of an alternative architectural vision to derail the gentrifying forces of private development. Only tight zoning restrictions can maintain the physical character of the present "messy" urban neighborhood. Even measures like tax incentives for low-income homeowners will not stop the upward spiral of real estate values. The student work focused on small social service buildings (day care, senior center) dispersed in the neighborhood to provide anchors for the remaining residents in the face of larger scale redevelopment.

Michael Pyatok, nationally-known for his practice in affordable housing, argues that "democratic" urbanism can be promoted by an architecture that recognizes residents' need for economic development. His work in Oakland, CA provides concrete examples of how residential design can anticipate and accommodate people's desire to transform part of their home into a store or office, through the relationship of the dwelling to the street and through the interior design of the units. His work adds depth to the notion of "everyday urbanism" and carries an implicit critique of prescriptive design codes that prefer esthetic order to messy vitality. Pyatok's work epitomizes the model of architect as community activist.

Invited speaker Roy Strickland discussed the innovative work of his New American School Design project at MIT, an interdisciplinary workshop for architecture and planning students. By linking physical renovation to curricular reform he is able to utilize school reform as a community development tool. In Paterson, NJ, for example, his "city as school" concept involves renovating spaces in a number of downtown buildings for use as dispersed classroom clusters around the city. His work emphasizes the architect working in partnership with public agencies, here the board of education.

While the first three panelists focused on infill projects in existing neighborhoods, Phoebe Crisman addressed the question of how to create a heterogeneous, "spontaneous" urbanism within "an overarching vision or framework strong enough to produce or stimulate particular physical conditions." She advocated a hybrid approach consisting of physically distinct but interrelated urban "projects." Using Amsterdam's Eastern Docklands development as an example, she demonstrated how large scale development could be tempered at the urban scale by introducing different building types and functions and at the building scale by flexible unit design based on a row-house/loft building hybrid. Her example emphasized the high level of public oversight and high degree of collaboration among design, planning and engineering consultants in the process.

Working Cities:
Density, Risk, Spontaneity

J. MAX BOND, Jr.
Davis Brody Bond LLP

Cities reflect social and cultural norms as well as economic and technical means. They are also expressions of belief and will. The current state of our cities reflects much about our time: mobility, governmental policies, technical shifts, race relations, materialism. Notwithstanding the continuing growth of suburbs and their attendant "edge cities" there is also evidence of a renewed interest in our older cities. Urban redevelopment is being driven by a number of factors, from retooling of the local economy to creative re-use of former industrial districts. While this redevelopment is welcome in any guise, contemporary urbanism in the U.S. betrays tendencies that are antithetical to true urban regeneration because they don't deal with the whole city.

We are witnessing the **suburbanization** of our cities through the replacement of multi-family dwellings with single family homes and row housing. This makes inefficient use of the existing urban infrastructure and impairs the ability of neighborhoods to generate the local commerce that distinguishes walking cities from car-dependent suburbs.

Our cities are undergoing a process of **sanitization**, an effort to redesign complex urban environments with a narrower palette pitched to bourgeois sensibilities. New York City's Forty-second Street, for example, was not only a sleazy precinct but also an entertainment center for working class kids. The redevelopment sponsored by Disney may make tourists more comfortable, because it is so familiar, but at the cost of the city's messy realism.

Urban regeneration is often propelled by the **gentrification** of working class districts into expensive upper middle class enclaves. This process is frequently attended by cultural cleansing and the withdrawal of support systems for people of low income.

There is a palpable **fear of risk** in current American culture that wants to make everything safe and predictable. As a nation we are ambivalent about the very diversity we value. The success of the ersatz townscapes at Disney World's Epcot and Universal Studios' CityWalk confirms both our attraction to and fear of close encounters with other cultures. The city offers the possibility of the unexpected, even shocking, encounter.

These phenomena reinforce the **consumerism** that is the bedrock of our national economy and ideology. They manifest an imbalance in spending on private as opposed to public amenities, an emphasis on consumer products instead of buildings and places. The shopping mall and festival marketplace remove the agora to privately owned and controlled settings. Government policy favors the private automobile over mass transit despite the cost in congestion, pollution and personal injury. Budget surpluses are targeted for tax cuts rather than improved services and environments.

We may participate in a global society but we live in geographically specific places. A list of what makes good cities is fairly obvious, encompassing physical, economic, social and environmental elements. But in U.S. cities these elements are rarely applied with equal resources and commitment to the vast areas inhabited by the majority of people – **working people in need of working cities.** I speak here of quality housing, schools and libraries; of reliable and efficient municipal services; of properly funded and maintained public transportation; of parks and playgrounds. In poorer neighborhoods these essentials of decent living are too often inadequate. Because there is a high correlation between poverty and race in our cities, this burden falls disproportionately on minority groups.

Transforming a city to serve all the people requires a shift in values, attitude and will. America is rich enough to be able to make choices and create the city that reflects our goals. What will it take to create a working city? An emphasis on ordinary buildings as well as the exceptional. A focus on the public realm and systems. Increased emphasis on the visual quality of the environment. A merging of the disciplines of architecture and urban design. A shift in government priorities to support desirable land uses and urban systems. Support for the local economy, including the informal sector.

Cities must be well designed. Urban populations will only grow significantly if cities provide services, amenities and an attractive physical environment for all people. For poor people cities offer opportunity, for artists and dissidents they offer freedom. For all they present the possibility of social interaction and cultural growth. These qualities have been intrinsic to cities throughout history and explain why people still flock to vibrant urban neighborhoods. The range of possibilities offered by cities is also why our urban future does not reside in a risk-free bourgeois vision but in a denser more broadly based model of a pluralistic, dynamic and public urbanism.

Drawing as Theory

Moderators: Albert C. Smith and Kendra Schank Smith,
University of Utah

Key Panelist:
MARCO FRASCARI
Virginia Polytechnic Institute and State University,
Washington/Alexandria Architecture Consortium

Panelists:
LAURA AUERBACH
Syracuse University

ERIC NAY
Ball State University

ALEXANDER ORTENBERG
University of California,
Los Angeles

MAURIZIO SABINI
Kent State University

GREGOR WEISS
American University of Sharjah

DOUGLAS WOODWARD
Columbia University

Session Summary

ALBERT C. SMITH
KENDRA SCHANK SMITH
University of Utah

The panel of four respondents was selected to address Marco Frascari's statement on Drawing as Theory. Laura Auerbach talked about the duality of the architectural drawing. She noted that they contain both practical and utilitarian elements, as well as imaginative, symbolic and intangible aspects of human existence, fusing the two polarities of the instrumental and the poetic. Taking a historical view of working drawings in relation to technology, Alexander Ortenberg discussed drawings and production in context of contemporary critique of the law of contract. Additionally, he challenged the notion that increasingly meticulous working drawings have resulted from the imperatives and possibilities of new technology.

Two responses concerned the experience of the architecture drawing as part of what we know. Maurizio Sabini spoke about how in real architectural drawings, experience is layered, contaminated, deconstructed, and re-assembled as constructs of architectural knowledge are continuously challenged and put into play. Gregor Weiss and Eric Nay discussed the discourse that takes place regarding the qualities of the hand drawn image, their perceptual value and the kinds of information they possess. They noted that at a fundamental level as in orthodox drawing, this always includes an understanding of the qualities of textures that make up the surfaces that we ultimately see and know as objects.

Drawing as Theory

MARCO FRASCARI
Virginia Polytechnic Institute and State University,
Washington/Alexandria Architecture Consortium

The majority of contemporary designers and clients are intertwined within a Gordian knot of convention codes regulations and contracts resulting from an economy and legislation that see buildings as commodities rather than architecture. An investment intensive production based on a financially controlled technology, proscribed by corporate sponsorship and support, have worked out diverse construction and developing techniques, which require an abuse of graphic representations and have put an unnecessary burden on the nature of architectural drawings. By confusing data with knowledge and information technology with information, drawings have moved from being design tools to be legal instruments. Consequently, drawings have lost the power of being a carrier of architectural theory. Presentation and construction drawings have become merely tools to force visual matches between buildings and drawings: graphic documents that do not belong to architectural theory but have become legal documents which through the ease of computer drafting has brought this negative condition of drawing to its extreme. The use of electronic paperless drawing boards and similar programs, far from transforming architectural practices, has rigidified the faults of the paper-based era. Drawing is faster, more precise, but in the digital mode, drawings become purely documents of description completely meaningless from an architectural way of thinking. In the computer-graphics field, the imperative aspirations are to render "photo realistic" images that do not imitate human phenomenology of perception, but rather the photographic camera, however there is conceit in describing future artifacts with a micrometric precision that no one of the building trade can actually achieve during their construction. Highly fallacious didactic and design tools, these drawings are annoying and magnify the false traits and deceitful values of graphic architectural expression by concealing in contrived likenesses and simulated accuracy the genuinely ostensive and evocative power of real architectural drawings. These digital drawings by merely mimicking the visual makeup of traditional architectural drawings can communicate only conscious intent and do not perform any mediation. However, since they can be easily altered, paperless drawings cannot be anymore regarded as reliable documents and the buildings do not need to look as the drawings and the drawings can return to be statement of architectural theory that facilitate an understanding of architectural things, concepts, conditions, processes or events in the human world. The representation techniques used can vary from two-dimensional drawings to spatial models (Filarete's disegno rilevato in legname). These representations can be derived from poetry, songs and dance, since drawings do not just reproduce physical realities, but can also transmit the nature of sacred space and the realms of desire and myth as explored by the inward eye of human imagination. Architects with their drawings will stop pretending to open the doors for the spirit to enter everyday life; on the contrary, finally they will be able again to raise the everyday to a spiritual plane, releasing the spiritual content of physical reality. Judging inference, evaluating probability, attributing causality and assigning truth values through proper electronic drawings, architects can create, or evoke the responses of the unknown others to their buildings. Included in their drawings should be an association and interconnection of culturally empowered images, ideas, situations; the contextual loading of lines, images, structural happenings and tectonic characters; plotting devices; construction markers; rhetorical structures; multi-valence; ambiguous drawings can go back to being statements of architectural theory.

Real architectural drawings are not illustrations, but pure expression of architectural thinking. They are a looking through and feeling through of future, present and past buildings. In these drawings, real architectural knowledge occurs only via the union of subject and object, in a physical-emotional identification with images rather than a purely intellectual examination of concepts. Architectural drawings are drafted in opposition, rather than in accommodation since drawings are neither expression of accession nor articulation of compromise, but something drafted using a critical sense, a sense of being unwilling to accept undemanding modus operandi or ready-made procedures, or smooth, ever-so-accommodating confirmations of what the powerful or conventional have to say and what to do. The main task is the effort to break down the stereotypes and reductive categories that are so limiting to human thought and communication.

THEORY IN CONTEXT

Moderators: Christine Macy, Dalhousie University

Key Panelist:
JOAN OCKMAN
Columbia University

Panelists:
GIA DASKALAKIS
Washington University in St. Louis

JOSÉ GAMEZ
University of Nevada, Las Vegas

MARK LINDER
Syracuse University

PATRICIA MEEHAN
University of Arkansas

Session Summary

CHRISTINE MACY
Dalhousie University

In her text written for the final issue of *Assemblage*, Joan Ockman questions the utility of the recent "theory explosion" in architectural discussions. Is it "symptomatic of modernism's end game" she asks, or must the theory industry be seen as a part of the ever-increasing "commodification affecting architecture and culture generally today"? She proposes that the architectural discipline is ready for a more judicious inquiry into the utility of theory itself. Turning to the Pragmatist philosophy of John Dewey, she proposes an investigation into how the practice of architecture can be more aware of its present condition and its real consequences. The four panelists took up various aspects of Ockman's critique — exploring the foundations of critical practice, criticizing its theorizing of publics, and exploring its effects on audiences and users.

Gia Daskalakis reminds us that the avant-garde in the twentieth century has been inextricably bound up with the notion of crisis: a criticism of basic assumptions and values, a rethinking of norm and convention. Today, she says, "with the fragmentation of knowledge, the dispersal of values and the disappearance of ideas, it no longer seems possible to construct a universal or absolute system for ... aesthetic production, experience or practice." Questioning the premise that theory can offer a foundation for practice, she suggests that architects today must "think our world" from the "impossibility of a common ground", turning instead to experimental, provisional and particular designs that aim not for intellectual understanding but "experimentation, intensity and resonance."

Jose Gamez begins by stating that architectural theory is produced within powerful institutions and reflects the biases and interests of those institutions. He acknowledges recent attempts by theoretically-oriented architectural journals to criticize "the architectural center's role in the ... maintenance of structures of marginalization," yet he points out that even these continue to reduce, historicize or in other ways marginalize the politics of race in the built environment. He proposes that by recognizing "architectures of the everyday" — places and spaces that are informally produced and appropriated — "theory may be broadened and its significance to historically marginalized communities may be strengthened."

Mark Linder reminds us that pragmatism's appeal has long been its critical stance towards autonomous theorizing. He finds that pragmatism may hold a broader appeal for architects, because it insists "that theoretical work remain tangible and that it address ordinary problems." In architectural terms, this leads him to ask "What does the architect do? and then: What are the consequences?" He proposes that the architects Frank Gehry and Herzog & de Meuron acknowledge the "qualitative background" and "ordinary experience" of architecture, but that the theoretical tack of these architects has remained unacknowledged as it derives from outside the discipline of architecture, in particular the "literalist" techniques of 1960s minimalist art.

Patricia Meehan takes a step back to explore the increasingly fragmented nature of architectural education, a process she sees as inextricably tied up with modernization itself. Using the work of Johan Fornas, she proposes that "reflexive dialogue is necessary, if the tension between making and thinking" is to contribute to a more productive disciplinary discourse. She argues that we must confront the relationship between institutions and daily lives, she values resistance and identity politics as valuable cultural processes, and proposes that art and architectural practices offer a particularly effective means for "people to invent their own imagined worlds" and "communicate with others in interpretive communities."

Theory in Context

This essay was written for the final issue of Assemblage (41) *and is reproduced here courtesy of MIT Press.*

JOAN OCKMAN
Columbia University

There can be no history without theory.

There can be no theory without history.

History without theory is just one thing after the other.

Theory without history is hubris.

The last three decades saw an unprecedented expansion of theoretical discourse in architecture. If Oppositions served to introduce theoretical sophistication into American architecture, Assemblage has been an effective and important instrument of its naturalization. Yet Michael Hays' claim in his book Architecture Theory since 1968 that architecture theory has by now "all but subsumed" architecture culture remains mystifying to me. If architectural theory is not a form of cultural production, what is it? While the evolution from Oppositions to Assemblage indeed exemplifies the ascendancy of "Theory" to an almost autonomous discipline, its production has tended to be carried out by many of its foremost practitioners defensively or in a self-congratulatory mode. Rarely have its ideological underpinnings and reception been interrogated and historicized. In this respect the "Theory" phenomenon appears more a reflection of the recent situation than a critical intervention in it. In other words, the question has yet to be posed: why the proliferation of architectural theory at this juncture? And what have its consequences been?

Andreas Huyssen suggests (in After the Great Divide) that poststructuralism, although generally associated with postmodernism, in many ways constitutes a belated form of avant-garde modernism—"the revenant of modernism in the guise of theory"—even if it is distinguished from its 1920s progenitor by an acute awareness of the latter's limitations and failures. From this perspective, the rise and fall of modernism, understood as a response to the contents of modernity, may be seen to bracket the 20th century. It is hardly surprising that this trajectory should have induced a deep sense of anxiety and ungroundedness in its latter-day protagonists, who, by the early 1970s, would find themselves polarized ideologically between nihilism and exorcism. This led Manfredo Tafuri to read the white architecture of the New York Five and the neorationalism of the Italian Tendenza as manifestations of an "architecture dans le boudoir," a last-ditch attempt to construct myths of architecture's potency and autonomy in order to ward off the anguish provoked by its increasingly apparent status as a "negligible object" and their own marginality. One may also read the production of theory in the ensuing decades as "theory in the boudoir." The elevation of theory to an independent, often arcane field of expertise, and the dalliance between architecture and philosophy at a moment when architecture was increasingly being annexed by a culture of consumption, spectacle, and entertainment, may likewise be seen as symptomatic of modernism's end-game.

Beyond this characteristically Tafurian diagnosis, however, it is also clear that the production of theory over the last three decades has reflected a profound cultural transformation. Paradigm shifts, as Thomas Kuhn elaborated in The Structure of Scientific Revolutions, are marked by periods of intellectual instability, when old explanations no longer suffice to account for new circumstances. At such moments, experimental, often rival theories tend to proliferate, with both destructive and constructive consequences. This model of intellectual change (which has nothing to do with any progress toward truth) accords with a reading of postmodernism as a response to the new contents of "postmodernity." Certainly the rise of the "theory industry" cannot be understood apart from the global forces of commodification affecting architecture and culture generally today, which are quantitatively and qualitatively different from the older dynamics of modernity. In this context, it is hardly surprising that the recent theory explosion, or implosion, has led to pronouncements of "the theory death of architecture." As a by-product, a certain exhaustion or impatience with an often ponderous and obscurantist theoretical discourse may be sensed.

At the least, the institutionalization of "Theory" as a system within the academy and the media, with its own aura, stars, and fashions, has provoked an urgent need for deconstruction. A comparable situation occurred two decades ago in literary studies. I am thinking of the polemics that surrounded Steven Knapp and Walter Benn Michael's essay "Against Theory," in which they "scandalously" rejected the entire practice of literary theory from an antifoundational, Neopragmatist position. As W.J.T. Mitchell commented at the time,

"Given the dominance of theory in contemporary literary study, it was inevitable that someone would issue a challenge to it.... 'Against Theory' may be seen as an inevitable dialectical moment within theoretical discourse, the moment when theory's constructive, positive tendency generates its own negation."

I think that after an excess of architectural theory we are now in for a "correction" of this sort. A number of recent architectural practices, from Herzog & de Meuron to Frank Gehry, already insist on their own antitheoretical or atheoretical modus operandi, for better or worse. In the intellectual arena, the recourse to theories of sensation, everydayness, or, say, analyses of shopping, is likewise indicative of a desire to reconnect architectural thought with the immediate, perceptual, matter-of-fact world. But the case for a rigorous historicization of architectural theory, on the one hand, and, on the other, a critical theory of architectural practice is, in my view, unarguable. With respect to the latter, suffice it to say that the issue is not how to instrumentalize theory—that is, how to make theory operative or practical—but rather, as the Pragmatist philosopher John Dewey emphasized, how to make praxis intelligent, how to infuse the making of architecture with a sense of its own contemporaneity and social consequences. With respect to the relation between theory and history, another statement by Dewey, from Philosophy and Civilization written 70 years ago, has never seemed more timely. Just replace philosophy with theory:

"...Philosophy, like politics, literature, and the plastic arts, is itself a phenomenon of human culture. Its connection with social history, with civilization, is intrinsic. There is current among those who philosophize the conviction that, while past thinkers have reflected in their systems the conditions and perplexities of their own day, present-day philosophy in general, and one's own philosophy in particular, is emancipated from the influence of that complex of institutions which forms culture. Bacon, Descartes, Kant, each thought with fervor that he was founding philosophy anew because he was placing it securely upon an exclusive intellectual basis, exclusive, that is, of everything but intellect. The movement of time has revealed the illusion: it exhibits as the work of philosophy the old and ever new undertaking of adjusting that body of traditions which constitute the actual mind of man to scientific tendencies and political aspirations which are novel and incompatible with received authorities. Philosophers are parts of history, caught in its movement: creators perhaps in some measure of its future, but also assuredly creatures of its past."

CIVICS

Three Continents: Four Papers

Issues of Urban Fabric

Community Building/Building Community

Alleys, Rowhouses, Squares, and Utopias

Three Continents: Four Papers

Moderator: Andrea Kahn, City College of the City University of New York

Wrestling with Angels:
On Berlin

MICHAEL STANTON
American University of Beirut, Lebanon

Building Law:
A Critical Reading of the Lebanese Case

MARWAN GHANDOUR
American University of Beirut, Lebanon

Poché Parisienne:
The Interior Urbanity of 19th Century Paris

SUDIPTO GHOSH
University of Cincinnati

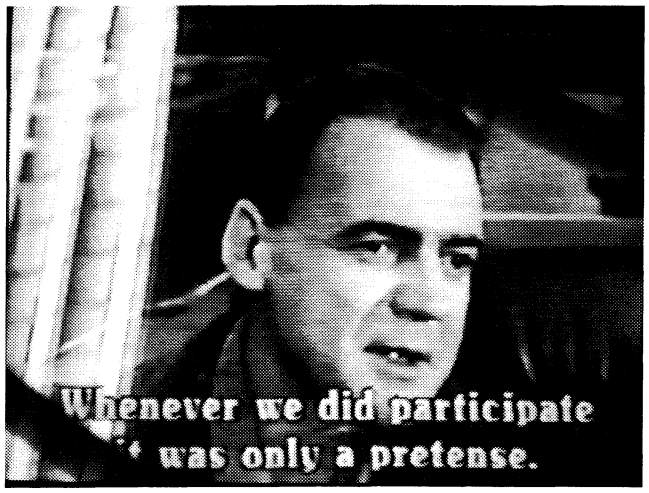
Tunnel Terrain:
The Air between Ligaments and Lights

LAURA BRIGGS
Cornell University

no manuscript available at press time

Wrestling with Angels:
On Berlin

MICHAEL STANTON
American University of Beirut



"The city is, in its structure and architectural form, the expression of the political life and the national consciousness of the people"

—"Sixteen Principles for the Restructuring of Cities," East German Ministry of Building, 1950[1]

CAPITAL

The short S-Bahn ride from Zoo station to the Ostbahnhof only hints at the scale of the lost opportunity that is the development of Berlin after unification. The train first passes the new government buildings along the Tiergarten and near the refurbished Reichstag. These structures are mostly clumsy attempts to reconcile a monumentality that is deemed necessary for the rejoined nation with an understandable national reluctance regarding the monumental. This struggle is exemplified by the Chancellery, a gigantic decorated diagram with the urbanism and scale of Albert Speer's plan for the grand axis of Nazi Berlin. The domed Reichstag itself has been converted by the office of Norman Foster to emit the sort of techno "high-shine"[3] which they are now marketing. Its massively expensive display of sustainability is rhetorical at best. The macabre James Bond orange-squeezer dangling over the parliament chamber seems too blatant a reminder of the pressure put on that body by modern history.

The ride next offers a long passing view of the equally gargantuan private-sector development around the memory of Potsdamer Platz to the south of the government center. Here, less than fifteen years ago, Wim Wenders made much of *Wings of Desire*, the epitaph to the urban void. The void itself had become the essential figure of post-war Berlin and, by extension, of the Cold War epic in general. The movie dwells on the powerful emptiness of the space between east and west that had been Berlin's bustling mercantile center before 1945. It may be a perverse nostalgia that clings to such gaps within the apparent closure of the urban figure-ground, but that nostalgia is insistent and this void's eventual transformation makes it doubly so. Since the making of the film, this resonant emptiness has been filled by a colossal fantasy. While the presumption may be that these huge buildings represent an expression of civic space at the Prussian scale of the capital, a new core to join others that serve the dispersed city, in fact it seems a generic act of macro-economics in the late-Twentieth-Century sense. The fantasy is finally that of the developer. Despite its scale, Potsdamer Platz could be anywhere that real-estate values can be crossed with demographics then properly factored against ambition.

"And so it goes. It is at this point, amid the noise of construction, that he declares himself fully alive, and hence ready to die. Even in the dark his vision and energy go on thriving: he goes on striving, developing himself and the world around him to the very end." —Marshall Berman writing of Faust[4]

The new Potsdamer Platz is an example of a global phenomenon, of the simulation of the urban in new ensembles that do not invite the heterogeneity nor the chaos that have traditionally characterized actual cities. But this is not necessarily terrible. In fact, it is both inevitable and can be invigorating, adapting to changing cultural conditions. "Faust's unfinished construction site is the vibrant but shaky ground on which we must all stake out and build up our lives."[5] Nonetheless, at the ideologically delicate center of Berlin, such configurations seem imagistic or worse.

Inside Hans Scharoun's exceptional post-war library, part of the fine ensemble that includes his Philharmonie and Mies van der Rohe's National Museum, Wenders' *großvater* meditates on the transformations accomplished, and losses suffered, in the modern era. He then wanders the derelict space around the building searching for the Potsdamer Platz. At the time of the making of the film, it did not seem possible that the non-site of his reflections would become another victim of the passing century. *Wender's* whispering absence is now gone. While Renzo Piano produced the finest works in this indifferent conclave (the towers that hold either end of the enormous development) his other building (the casino at the heart of the ensemble) imitates the adjacent Scharoun library, a building that is so insistently unique, so dramatically an object, that imitation is homicide. The saddest result of the Potsdamer Platz development has been the trivializing of the existing. The mediocrity that now towers over it has diminished the very good architecture of Mies and Scharoun, that group of spectacular, if formally contradictory, post-war structures that formed a Western response juxtaposing contrived culture (literature, art, music) to the East German gesture of paradoxical containment that eventually became the Wall.

Potsdamer Platz serves current ideology more than actual practical concerns, paying homage to politically mandated "ecological" concerns with flashy surfaces that are unlikely to work in the quasi-steppe climate of Berlin. At the Sony Center dual glass skins contort elaborately around this gigantic panoptical structure. Technologically flashy hardware gives the correct impression of luxury and environmental sensitivity. In a formula of current value, it is the pyrotechnics of technique and lavish material that matter. From Helmut Jahn this is not surprising. This is the architect who introduced decorative towers into the sublimely muscular extrusion of the grid that had been the recognized design standard of Chicago. All architects, from Louis Sullivan and Daniel Burnham to Raymond Hood, Mies van der Rohe and Gordon Bunshaft, had respected the city's diagrammatic formats, producing a varied yet extraordinarily coherent expression of the American landscape extruded vertically. Unlike his fellow-countryman Mies, Jahn did not adhere to the house rules of this intense metropolis. He imposed a series of late-Modern and post-Modern decorative skins on towers in the city center, opening the door for the imported confections by KPF, Bofill and others that have reduced Chicago to the status of another corporate terrain. Now Jahn returns to the new-old German Capital. His State of Illinois Center is imported to Berlin as the Sony Center. To invite Jahn to Berlin is to anticipate such a product. What is more surprising is that the other better architects who have contributed to the Potsdamer Platz seem to have lost their bearings in the fog of capital and scale prescribed by the site.

After a few seconds the train stops at Friedrichstraße and offers a view down the commercial axis with its new decorated blocks. Glittering edifices adhere to the 19th-century-profile that is currently required by the fast-changing ordinances that have made Berlin a study in urban fashion. A militant vehicular culture (here I include bicycles) in Berlin tends to resist the ambulatory life implied by a boulevard in the first place. Furthermore, the *flâneur*-friendly avenue that was promised is compromised by passages that link the buildings on their interiors forming a continuous shopping mall parallel to the relatively empty straße. The sprawl and weather of the city seem to dictate an urbanism closer to Toronto than to Paris, an urbanism in which the automobile will remain the predominant form of transport and promenade, augmented by interior malls like those that make the street itself redundant.

The train then passes the Alexanderplatz with its social-realist scale: vast terraces and arcades are to make way for more blocks and towers of the neo-boulevardian sort already evident in the Mitte. As on Friedrichstraße, this is another episode in the city-wide scenario dedicated to imposing a nineteenth-century image of the city on a twenty-first century culture. Berlin was the crucible of urban modernity and has less reason than most places to mourn the passing of history and more reason than most, given its scale and national position, to generate new urban configurations. Nonetheless, Alexanderplatz sits like a prisoner on death row. The appeals seem to be all but used up if they have been filed at all. And with the two Hans, Kollhoff and Stimmann, as prosecutors the defense probably has no chance. In fact, the socialist development of Alexanderplatz seems a good starting point for densification, for a pressurizing that would suit the dynamic nature of the new German-European capital. Stalinist urbanism, the excesses of scale and material that redefined Eastern Europe and Asia after World War II from Karl Marx Stadt and Leipzig to Vladivostok and Beijing, should not be condemned wholesale. In the less wealthy nations of the east their augmentation will be inevitable and exciting. In wealthy Germany, eventual erasure threatens to be total. As they replaced those of National Socialism, the gestures of state socialism will be themselves replaced by the nostalgia and cuteness of late-capitalism. While the Dutch or Spanish are frenetically redefining urbanism and accommodating change, the powers in Germany and particularly the planners of Berlin seem intent on inventing a sentimental history of dubious value for a society that desires the opposite and conducts its affairs in an extremely progressive way.

The train arrives at Ostbahnhof. In a few minutes the problems of German city planning, and by extension, of modern architecture in Germany, have been surveyed. It is not just this little bit of Berlin seen in the few minutes it takes to circumnavigate the old city

center that confirms the problem of development in the recovered capital. Its entirety is marred by urban directives, thousands of new buildings and the reconfigured image of the sutured city. This flawed attempt to eradicate the history of division produces a homogeneity - nostalgic and is implicitly conservative. The body was too badly blown apart to be reassembled anyway. In fact, this analogy is not entirely appropriate. While the dismembered human body is only a site of pain, medical research or fiction of the *Frankenstein* genre, the dismembered city is the shape of new, often exciting, urban developments. Mexico, Houston, metropolitan Paris and Barcelona: such urbanisms promise an alternative to the often anachronistic formulas embedded in the city seen as a totality. In fact, formulas of urban reassembly are not only champion the status quo but often both physically no longer viable. The dismembered city may be the living city while the whole has become moribund or redundant. As in the drawings and paintings of Georg Grosz, it is only the mutilated and incomplete who can traverse the metropolis. And now it is not just a phenomenon of war-damage or urban blight that produces mangled urbanisms. Many cities begin and thrive in an apparently deformed state. Furthermore, the operations of reconnection underway in Berlin will at best produce a mutant replica of the 19th-century city, a heady nostalgia for which seems to be determining civic choices. And Berlin is an unlikely candidate for such nostalgia. It is more a case of *Body Snatchers* rather than *Frankenstein* anyway. The difference between these two modes of horror is central here. Frankenstein is a bewildered assembly of actual human parts. The body snatchers are frigid replicas, superior to the flawed complexity of the human they replicate. The pathos of Mary Shelley's monster is not there in the replicants that have become the paranoid standard of current science-fiction. Such ultra-humans are but the latest confused symptom of the Pastoral. A simpler individual supplants the intricate and flawed citizen. Flesh is replaced with something more perfect. The danger of this form of monstrosity when addressing urban history is obvious - "body snatching" at a metropolitan scale - the new Potsdamer Platz.

Shelley warned that the reassembled body can be very destructive, even patricidal. The body-snatcher can be even more so. This seems to be the result of planning in Berlin. The bourgeois recreation of the historical city romanticizes Berlin after the Industrial Revolution, actually an overcrowded apotheosis of wage-slavery. Any argument that this 19th-century city was a healthy one seems to be a pure example of "operative criticism" of a most extreme sort. Always, as the New Urbanist recreations of a fantasized public realm in America have made evident, such simulations serve conservative political aims. The political implications of a call for "return" cannot be avoided wherever the typological results of this sort of Pastoral exclusivism appear, whether in Seaside, Beirut, or Berlin. To go back, no matter however superficially or inaccurately, is still to go back.

> *"Cities in and of themselves neither 'come into existence' nor 'exist' as such."*
>
> *"Sixteen Principles for the Restructuring of Cities" 1950*[6]

The root problem may be the almost purely political intentions of all phases of reconstruction in Berlin, IBA included. More than most, this city was and is literally the manifesto of changing dogma. A continuous history of reification makes the place both fascinating and tragic. Planning was driven before unification by the Cold War market ideologies in the West and Stalinism in the East, highly symptomatic at the level of idea and disappointing at the level of urbanism. The most compelling force in this process has been the thrust of triumphant late-capitalism encouraged by the Christian Democratic era which began altering only half the metropolis but managed, after unification, to transform its entirety. While politics and ideology are always the engine pushing the vehicle of urbanism in the case of Germany and particularly Berlin, the vehicle is more like a dragster, its huge engine attached to a spidery and endangered cultural superstructure.

CONTRADICTIONS

In the midst of this disappointing landscape certain structures distinguish themselves. The program of Daniel Leibeskind's Jewish Museum extension, of such emphatic "otherness," may automatically have freed the museum from the constraints that hobbled so many of its counterparts in the city center. But Sauerbruch/Hutton's GSW Headquarters on the Koch Straße has no such reason for being better than the rest. The architects simply resisted the prescriptions of urbanists and political image to produce a rich metropolitan statement. Perhaps more amazing, given its location and authors, is the Gehry office's dg Bank in Pariser Platz. The facade facing Unter den Linden is a study in reductive architecture rendered in glass and stone. The constraints of a position on the central axis of the old city and so close to the Brandenberg Gate seem to have revived the quality of the architects' former work. Perhaps the prescribed profile and language of the great street have given the Gehry office back what they so clearly have abdicated for the sake of sensationalism. The glass cocoon inside the dg Bank reiterates the basic outlandishness that lurks behind the hard walls of this very cosmopolitan city. It is much more successful than the same gesture at the reworked dome of the Reichstag or Jean Nouvel's pointless cone at the Galleries Lafayette on Friedrichstraße. Disappointingly, the bank's rear facade is an at-

tempt to refer, in a graphic manner, to the image of the Eastern European city. Its contorted pattern of dormers seems more suitable to a '20s German-Expressionist film, *Doctor Caligari* or Poelzig's sets for *Der Golem*, where the figure of the contorted town evokes state of mind and culture for the brief instant of its filmic projection. The architectural image is more permanent and will tarnish badly over the years, like television advertisements seen too often or billboards left up past their impact.

Of course it would be impossible to catalogue the thousands of architectural works built or projected for the new Berlin. With the exception of those noted above, the great majority appear to be mediocre. As stated, this is at least partially the fault of civic authorities and the constraints they have leveled on construction. The attempt to impose a romantic vision of the 19th century pedestrian city on a very modern one seems as misguided as the IBA attempt to impel a pleasingly generic post-modernism. The simultaneous authoritarian imagery encouraged by the latest group of planners under Hans Stimmann, its dour rationalism, is simply out-of-place in this exuberant and heterogeneous capital. In some of the projections of Hans Kollhoff's office, most notably the early renderings of the Alexanderplatz project, this vocabulary seems to reach a state of sublimnity such as to return it to the quality of his office's early work, especially the fantastic projects for Altanpole in Nantes of 1988 and the Ethnological Museum of Frankfurt of 1987 as well as his fine built housing in Amsterdam and Kreuzberg, Berlin. But it has to be assumed, as in their other recent work, that this neo-expressionist promise will be stultified when built. Kollhoff seems to have made a conservative choice that has certainly brought him projects and power, but has renounced the potential of his work when he had neither.

Berlin is one of the crucibles of Modernism. Buildings from the 20's by Mendelsohn, Scharoun, the Tauts, and many others, juxtapose to

the largely 19th century fabric, exemplified by Mies' 1921 rendering for the Friedrichstraße tower - the intentional collage of streetscape, tram lines and dark facades with his crystalline construction. The rebuilding after the Nazi period produced another batch of extraordinary projects. Again those of Scharoun and Mies stand out, but are only symptomatic of general quality. But the new work in Berlin seems to evoke the period between early Modernism and the experiment of the post-war social democratic era, the urbanism of the Nazis and their chosen language of neo-classicism. The 30's did produce some very strong work in Berlin. Tempelhof Airport and the Olympic complex of stadiums are particular examples. But generally the Nazi period produced questionable urbanism and neo-classicism that was reprehensible in its historic implications. Why this has become the statute of current development is a question that should be asked in Germany. The post-war directives for both the eastern and western sectors of the city and nation, driven as they were by various degrees of social realism and modernist progressivism seem finally so much more effective for this particular place, its scale and position with the unique amalgam that is modern Germany. Not surprisingly, by 1954 the *existenzminimum* prescriptions coming from Moscow and the force of urban capital emanating from the West, began a tragic dismantlement of the early promise of reconstruction on both sides of what was to become the Wall.

During the last decade, Germany has been unfortunately caricatured by the struggle between glass and brick. Of course, this is a gross generalization of an architectural culture that is far more intricate. But, like all such generalizations, there is a certain directness to this perception of the post-unification. And architecture, despite the fact that it is infinitely rich as a discipline, or maybe since it is so rich, tends to reduce, almost into cliché, the philosophical criteria that it adopts. Architectural theory tends to scavenge associated disciplines for a few forms to bring back to a design culture with an insatiable appetite for novelty. Architects tend to reinvest those forms with significance in a field of reference in what Celeste Olalquiaga describes as a field "Free from the restraints of a fixed referentiality, signs can travel openly through the circuits of meaning, ready to be taken up or left arbitrarily, connecting in ways that were previously unthinkable."[7] The best German practitioners have avoided the simplistic issues that attach to materials and the predictable solutions that derive from what it primarily an imagistic response to the conservative urban dictates that brick materializes and the neo-liberal clichés embodied in the use of glass.

While work is formal, as all building design must basically be, it also engages culture at least partially in the realm of economics and methodology. This is a good place for the ideas pertinent to architecture to go, for the endless mining of ideology for the scraps of form that it implies is a relatively fruitless operation. On the other hand, ideas finds a much more direct and comfortable connection to many of the other aspects of architectural making. This is particularly true of those that address how buildings are made and what forces are served by their making. Here the connections are implicit: political in the richest sense of the word, philosophical in a particularly engaged way, analytic in depth and material in implication.

"There is no abstract scheme for urban planning or for determining architectural form. The embracing of the essential factors and demands of life is decisive here."

"Sixteen Principles for the Restructuring of Cities" 1950[8]

Contemporary work in Berlin is also constrained by national concerns. The Green Party demand for sustainablilty seems to mostly lodge in image at this point except at the level of quotidian and inexpensive housing initiatives. With the Republic at the helm of the European Union, the desire to both celebrate and downplay the power that comes with this role, especially when it pertains to redefining the historic capital of a nation with a short but very tempestuous history, also tends to send mixed signals to designers. Likewise, the amnesia and progressivism that history has induced and the struggle for identity that such amnesia will always generate on a national level, a struggle which seems to suggest a backward view of those so decidedly headed forward, also makes for a difficult field in which to operate. Architects can only go so far in blaming others for the loss-of-nerve represented by their embellishment of the capital. This problem also derives from the romanticism with which most designers confront Berlin. Indeed, the city divided, the city of fragments, the ruinous picturesque, "the pastoralism of war," the insistent avant-guardism of the place, the sheer enormity of it, the Wall as metaphor and metonym: all these are seductive. But to produce something profound, these easy and anachronistic readings must be factored against new developments. Berlin is all these things, as *Wings of Desire* perhaps best stated, but it also a quotidian big city, another and an "other" city at the same time. Paris, Barcelona, Milan, London, the Rotterdam-Amsterdam corridor, the Ruhr with its continuous field of cities: many European urbanisms confront the same issues in potentially more extreme circumstances and with more committed responses. But Berlin is also the capital of the post-war psyche as such. It is the place where that German discovery of the value of alienation, the invention of the modern by Goethe, Marx, Schopenhauer, Nietzsche, Benjamin, and a host of others, is most clearly expressed. The city is split still, unresolvable, caught between east and west in a way no unification can resolve. East-Berliners remain *untermenschen*. A Russian wind blows down its Parisian boulevards. Film may finally have been the best medium to address the impossibility of closure that this city embodies, but architecture must, in its antiquated and slow way, likewise respond to the issues and connotations of this amazing metropolis without nostalgia for the city's painful development or a misguided utopian desire to eradicate the very productive results of that development.

Of course, the development of Berlin affects all quarters of the vast metropolis and projects of quality are hidden away in the existing sprawl of the city and are rising at its edges. The ambassadorial residence in a quite southern suburb or the school, Gymnasium Walterdorfer Chaussee, in Gardenstadt Rudow by Dirk Alten are good examples of smaller less stentorian work of extreme intelligence and quality. In fact, it may be here, far from the gargantuan scale and monumental implication of the centers of east and west, that the sort of action that makes good work can more easily occur. In the midst of inconclusive German battles: brick vs. glass, 19th vs. 21st century space, "green" vs. late-capitalist development, architects like Sauerbruch/Hutton and Alten seem to have kept their heads, to have registered the values of these various discussions without succumbing to the superficial imagery they imply and which has damaged so much recent German production. In the work of these young designers, a balance of concern with form as a matrix for ideas, and a continental if not global point-of-view that derives from experiences outside Germany,[9] have generated vital architectural expressions in the troubled giant (ex-Chancellor Kohl seems a perfect metonym) that is Germany after its painful and messy reassembly.

Most architecture of the last decade in Germany seems to have succumbed to the contradictions inherent in the ideologies of the period and to have reduced to extremely elementary stylistic strategies the responses to those ideologies on an architectural level. Some, on the contrary, apparently profits from the same contradictions, through a multilayered set of formal and symbolic reactions. This may be the key to this practice, and possibly to strong practices in general. They develop a "rapid response" capability that, in what may appear to be paradoxical actions at various levels, can generate rich combinations of formal reactions to the various and complex conditions that characterize modern production. Layered design formats, ranging from the most progressive, to those that at first appear almost kitsch, that range from the literary, through the technical and economic to the historical, can thus face in a way that is neither simplistic nor predictable, what Gramsci calls the "manifestations of the intimate contradictions by which society is lacerated."[10]

ARE YOU READY TO RUMBLE?

This essay began with a discussion of the context in which German practice is set: both the physical paradox that is Berlin and the ideological turmoil that is modern Germany. The former is mostly disappointing but the latter has to be perceived as at least as exciting as it is troubled. More than in most places, in Germany cultural context has to be presented at least simultaneously with any individual's work. The place is even less of a vacuum than the engaged and compromised realm that architecture usually finds itself addressing. Possibly this derives from a self-consciousness stemming from the history of the last century, but it is also simply because Germany will always put issues and production through philosophical scrutiny, will always develop a perspective that is ideological. This, after all, is arguably the place where more significant modern thought has been generated than any other in the West. Germany simply will always filter material through the sieve of ideology. This can lead to a detachment that is demonstrably dangerous, but it also produces a critical field that has been more intense than almost any other. In Germany angels look down on all action. And they descend regularly to grapple with form. It is an exciting but intimidating field for the practice of architecture. This may partially explain why the nation hasn't developed the same preeminence in the current architectural discourse as Switzerland, Spain or the Netherlands. The constraints are often too tight, defin-

ing symbology and determining planning initiatives. Germany is a ring where the lights are bright and the angels strong. A handful of architects have not won as much as thrived where so many have just gesticulated or capitulated.

How has this happened? The answer is not simple. In fact it is its complexity that matters. As stated, architects must manage to function on multiple methodological levels simultaneously. This essay has tried to clarify some of these simultaneously functioning formats, but they finally will not link together into a seamless endeavor. Then again, the culture addressed architecture cannot be assembled seamlessly either. Work must reflect the complex field it wrestles with. Finally, and historically, architects will continue to engage in a mimetic practice making unique things.

How little are the things with which we wrestle

What with us wrestles, how much greater is!

If only we would let ourselves be conquered

as things overcome by a great storm,

we would expand in space and need no names...

Whoever was defeated by an angel -

and often one decided not to fight -

left walking proud and upright, full of strength,

and greater still for having felt the power...

Rainer Maria Rilke[11] Beirut, spring 2000

NOTES

[1]Directive from the East German Ministry of Building, 1950, as published in *Architecture Culture 1943 - 1968*, ed. Joan Ockman (New York: Columbia Books of Architecture, Rizzoli, 1993) p. 127

[2]Wenders, Wim, director, screenplay in collaboration with Peter Handke, 1987

[3]Reyner Banham used this term in a lecture on Foster I attended in the late '70s at MIT. As with many cultural phenomena, Banham seemed almost clairvoyant in predicting the trajectory of Foster's practice. At the time, with the very interesting high-tech projects for Willis, Faber and Dumas in Ipswich and the Sainsbury Art Center at the University of East Anglia behind him, Foster was moving toward the imagistic mechanism that has characterized his later work. The Hongkong Bank (1979-86) seems to have been a turning point in this direction. As with Los Angeles, Modernist theory, or whatever he turned his skeptical but enthusiastic gaze toward, Banham's insight was exceptional.

[4]Berman, Marshall, "Third Metamorphosis: The Developer" in *All That Is Solid Melts Into Air*, (New York: Simon and Schuster, 1982) p. 71

[5]Berman, Marshall, "Epilogue: The Faustian and Pseudo-Faustian Age" op.cit. p. 86

[6]Directive from the East German Ministry of Building, 1950, op.cit. p. 127

[7]Olalquiaga, Celeste, in *Megalopolis: Contemporary Cultural Systems* (Minneapolis: University of Minnesota, 1992) p.21

[8]Directive from the East German Ministry of Building, 1950, op.cit. p. 128

[9]Both Alten and S/H worked and taught in England and with OMA.

[10]Gramsci, Antonio, "Historicity of the Philosophy of Praxis" in *The Prison Notebooks* (New York: International, 1971) p.404

[11]Rilke, Rainer Maria, "The Visionary" from *The Book of Images*, 1906

Building Law:
A Critical Reading of the Lebanese Case

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Building law consists of text, numbers and figures that draw the strict uncompromising line between the architecturally legal and illegal, the permissible and impermissible in space. It is a reference text that dictates the square meters of building that a land can provide and the formal boundaries within which these square meters can be shaped. In doing so it establishes criteria for existence in space such as the establishment of certain building typologies and the interpretation of rural/urban differences...etc. Thus, the understanding of everyday physical environment is generated in relation to spatial criteria determined by the text of the law. It is significant to mention that the legal text I am considering in this paper is the section of the Lebanese Building Law that defines dimensions and criteria of design; rather than Building codes such as the fire code or the code for the disabled. The former has direct implication on building form while the latter is more concerned with ensuring the possibility of certain practices in future buildings. Building law design criteria include building height limits, surface exploitation, total built up area, building volume, street and neighbor setbacks, minimum opening sizes, and so forth. The legal power given to these criteria enable them to dictate the possible shapes of our everyday spaces (from the most public to the most intimate) while they conceal its historical/stylistic specificity; that is, the conditions and preferences according to which the legal text was written. This paper is part of an ongoing research that attempts to read, on the one hand, the stylistic and historical dimensions of the text of the Lebanese building law at the point of its conception, and on the other, the social implication of the building law as a public authority document. In doing so, this work aims to activate or to make visible the paradoxical/contradictory states of the law as a text that contains universal spatial values at the same time that it preserves the authors' personal visions as well as particular social and political structures.

I will examine building law against three legally defined social bodies and the paper is structured accordingly. First, the knowing body that is the group of professionals that writes the text of the law and the political agents that assign them and approve their texts. The second social body is the 'good' body that works in accordance with the law, these are professionals and developers and users that inhabit the legal domain. The third is the criminal body specifically those who transgress the law either at small instances (i.e. they can be part of the good body and perform inconsequential criminal acts) or who transgress it in its entirety (outlaw criminals). The paper will conclude with some observations on possible relationships among these three social bodies.

WRITING THE LAW—THE KNOWING BODY

The current Lebanese Building Law was officially written in 1940 even though a 'modern' form of building legislation was already in practice since 1919. The initial writing of the current law occurred during the so-called French mandate period in Lebanon, , and was based on the French model. Since then, the law has undergone several revisions mainly in 1954, 1971, 1983, and 1992. It is significant to mention here that these revisions, as it is obvious from their dates, did not occur in accordance with specific periodical procedure, instead the Directorate Generale du Urbanisme (DGU) sensing the need for change, would assign a committee of professionals to revise the law and present its recommendation. However, the directives, principles, guidelines, visions that were to structure the work of the committee have been particular to the sensibility and understanding of the members of the committee and interests of the approval agents, the DGU director and the current minister primarily. It is important to emphasize here that the numerical figures that are enacted as law are figures drawn out of the authors' specific spatial vision, related to an actual urban scheme that they have developed in the process.

At this point I can distinguish three levels of control or limitation the face the making of the building law document. The first is disciplinary; the exclusivity of the spatial field to a specific committee of selected professionals whose social and disciplinary background sets the scope of the law while it excludes other possible 'different' interventions. The second is a formal one; the discussion, arguments and spatial schemes that the committee develops are not presented in the legal document; it is only the conclusions of these discussions that are presented as legal statements with occasional diagrams. The prescriptive format which results does not only define spatial conditions in relationship to linguistic limitations, but also present the legal items as points of truth without relating them to their original thinking. The third level of control is bureaucratic; this level includes the administrative procedures and

bodies that work on making the developed text a law. Building laws, finally, are announced as state decrees approved by ministers and state president, a form that overshadows the structural relationship that exists between the text and its authors. Practically the committee that authored the items of law has no control over revising or altering them. In what follows, I will attempt to read the text of the Lebanese building law as a representation of the author's ideological paradigms and their consequent spatial implications to identify factors and issues that articulate the social and political roles of this legal document.

One decade ago, the specification of the reference plane in relationship to which building heights were measured in Lebanon was changed from being parallel to the natural land to become horizontal. The simple shift of wording from 'parallel' to 'horizontal' has fundamentally changed Lebanese topography in all inhabited areas, as land is flattened to accommodate the multistory building designed in conformance with the imaginary abstract plane (of the law), disregarding the existing land configuration.

Fig. 1. Bsalim. Lebanon: new suburban developments that show the way the landscape is flattened to accommodate residential block in accordance with legal specifications.

I argue that at the time of writing, the committee of authors find themselves in a powerful position vis à vis the national landscape as they are handed in the mission to establish spatial order in the land. Assuming such a position, the text of the law becomes a site of construction of individualistic spatio-ideological utopias represented across and through new legal numbers and figures. The text of the law objectifies in the process of its production the consciousness of the geographic and historical augmentation of the authors' self, which brings a historical significance to the role of these professionals (architects and engineers), as it bestows on them the right to "legislate the legitimate interpretation of the world."[1] An exclusivity that dictates a paternal structure, which measures practices in space in relationship to good ones, that is, in relationship to the ones seen fit by the committee of authors. This exclusivity to 'good' practices in space is established through certification, which indulges the academic institutions, the professional agencies, and the state establishments. Such modernist elitism only confirms the hierarchical structure that positions selected professionals as state agents who institute themselves and the very system that produces them into the environment through building practices. An obvious manifestation of this phenomenon is the historical occurrence of the building law with professional certification and the introduction of architecture engineering to university education in Lebanon, hence, an establishment of a complete social system.

In effect, I would like to argue that the current Lebanese Building Law is an extension of the Modernist-Colonialist project especially as the current Law was instated during the French mandate period, and as it was written and updated by a committee of architects educated in Europe under the 'Modernist masters.' This has two main consequences for contemporary building practices in Lebanon:

First, a disjunction occurs between contemporary architectural concerns and the architectural possibilities embedded in practice. The law as it eternalizes modernist spatial paradigms in its text, exerts power generated by the past—the Modern-colonial legacy—onto contemporary practices mapped onto the national landscape. To illustrate, in the mid-seventies there was rising interest among architects in indigenous building as an expression of 'local identity'. This concern was formalized by introducing indigenous elements on building facades, while restricted any change in building volume, internal articulation, or urban interface.

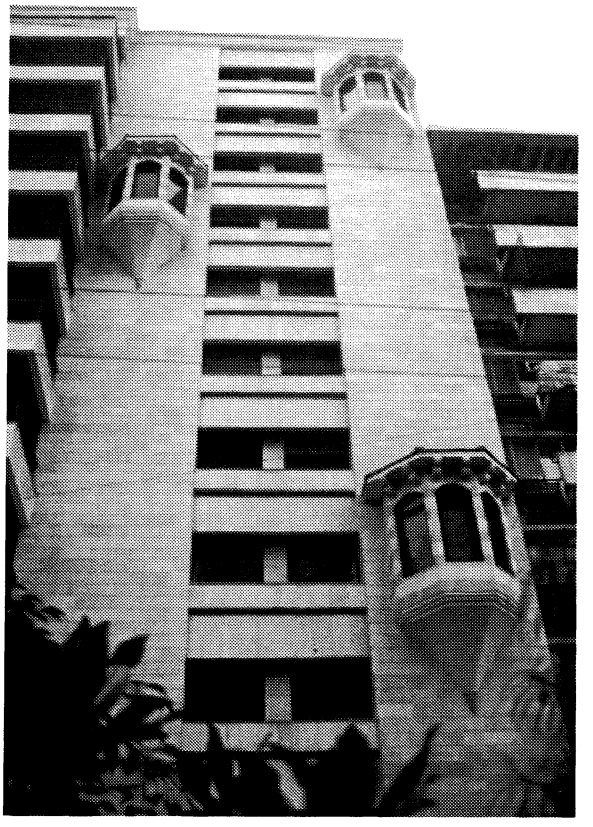

Fig. 2. Ras Beirut apartment building. Beirut: 'historical' additions to the modern residential block.

Fig. 3. Sultan Mohammad Al-Fateh Mosque and Office Building. Beirut: eclectic application of historical motifs on the building facades.

This phenomenon was largely an outcome of the law that strictly regulates the building plan and section while elevations receive scant regulations. In this context, a total re-evaluation of building design in accordance with architectural concerns of the contemporary period is impossible. New architectural elements have to be reinterpreted in the language of the law, or against the list of elements described by the law, which evidently can only be limited to the architectural vocabulary of its authors at the time of writing. Pilotis, louvers, sun breakers, ornamentation, cornice, setbacks...etc—specters of Modernity haunt the text of law that reduces contemporary architectural practices to variation on an already given spatial structure.

Second, the pioneers of the Modern Movement in Lebanon come from particular families that were socially and politically dominant, specifically feudal lords and amonied urban bourgoisie of the 19th century, which became the politically dominant families during Lebanon's 'Age of Democracy' during the first half of the 20th century. Arguably, these were the families that were financially capable and that had the aspiration to send their children to the West to be cultivated, and to thereby elevate their social status locally. Children of these politically dominant families—Trad, Khoury, Tabet, Salam, Edde...—represent the first and second generation of the nation's architects. It is also these architects who comprised the committees that came to legislate architectural practice in Lebanon. Consequently, the writing of a Building Law which eventually instated the handing in of building matters to licensed architects and engineers, hence gave preference to Western cultural practices over more indigenous modern practices such as the ones followed by local builders. Furthermore, it reinforced the dominance of certain politically dominant families over the environment. The licensing practice also preserved the association of that political role with specific groups, as 'legitimate heirs to symbolic capital', via restricted access to the mechanisms and the particularity of the knowledge embodied in the text of the Law. Law as such is a reduction of practices to certain paradigms to which only the class of its authors can access. A fact that not only marginalizes all alternative existing and future practices in space, but also displaces the practice of spatial discourse to politically allocated power positions. A subject that I will elaborate on in the next section.

PRACTICING THE LAW—THE 'GOOD' BODY

The law defines control variables according to which building practices are conditioned. It is hard to figure out why a 1:4 width to height proportion of space in-between buildings is the limit of legality, but any design in Lebanon would be compelled to work in accordance with that figure. These abstract numbers and figures, initially produced out of certain stylistic preferences, are significant in defining the limits of legality, and in that sense they act as reference figures for design acts. These figures do not only regulate setbacks, building heights, surface and total exploitation, proper natural lighting, and so forth, but they also comprise parameters through which the built environment is perceived. Through the history of their application and the habit of thinking through them, these control variables are objectified and incorporated within our social subjectivity; or rather they formulate the perceptual field of spatial practice.[2] I will try to explain the implication of legal requirements on the social perception of space by analyzing the legally required architectural drawings of the building permit document in addition to the approval procedure that these drawing have to go through.

Working on a two-floor addition for an existing residential building in a Lebanese village, the architect had to face the fact that the law has recently changed. The new building law specified a 3-meter side setback, while the existing building allowed a 2-meter setback. As a good number of the existing columns were in the 1-meter illegal zone, the new addition was designed to use the first floor to transfer the load back towards the 3-meter setback on the second floor. The building permit was denied for this design, and the various attempts to negotiate the case for eleven months continued in vain. Finally the permit was issued after the design was altered to adhere to the newly instated legal setbacks. This meant losing a good percentage of structural points; it also meant constructing structural walls on the existing slab, which is not only professionally absurd, but also structurally unsound.

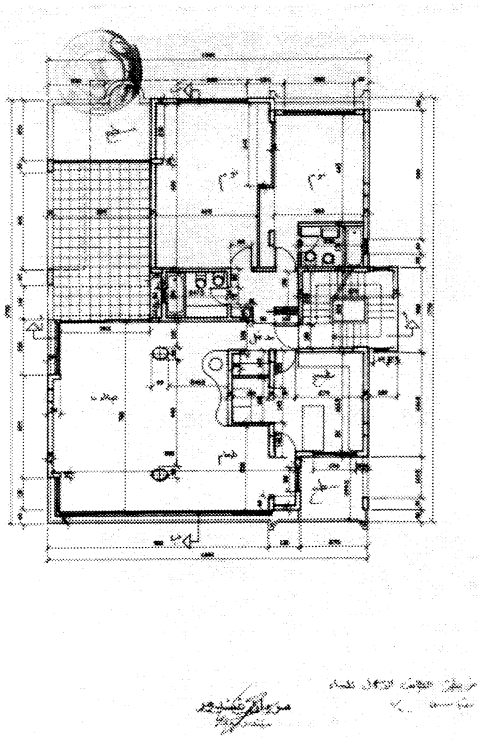

Fig. 4. Rejected building permit first floor plan — eventually built design.

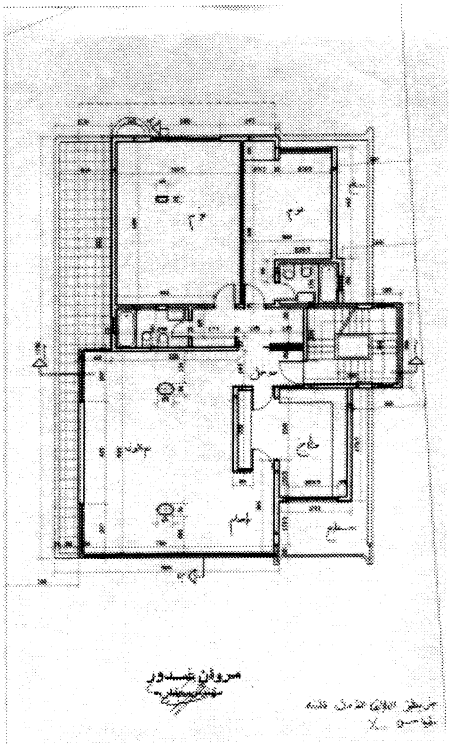

Fig. 5. The legally approved building permit first floor plan.

However, the legal bureaucratic procedure remained intact! Eventually the illegal design was constructed, made possible by the owner providing bribery money to state control agents throughout the construction period. This was done with tacit agreement of all the parties involved. The preservation of appropriate mechanisms of application and breakage of the law become the aim, where the relative social power positions are unharmed. As in most bureaucratic procedures, the passage of the building permit file through the required stages of approvals pinpoint the various power positions of the different parties involved in the process: i.e. clients, professionals, technocrats, and state agents. Hence, the text of the law acts as a pretext to an expression of authority. In that sense, the law does not serve the profession in practice, but empowers professional bureaucrats and state agents to use the built environment as space for practicing authority and producing unforeseen micro economies.

On the other hand, building designs are discussed and approved using a specific set of required visual representations: plans, sections, and elevations with a specified scale of 1:100. Evidently, certain figures specified by the law should appear on these drawings. The 1:100 drawings define the building officially and as such they are the production objects relative to which spatial designs are measured. They are the apparatus through which building space is desired, discussed, and produced. Buildings are mere representations of these objects-as-drawings to which any legal relationship to space is reduced.

Fig. 6. Shanay, Lebanon: typical rural residential development following the Building Law specifications: note the pilotis ground floor.

The representations and the control variables they incorporate do not only specify modes of professional practice but as they acquire material value, as they are socially internalized. The limits these legal control variables set are also perceived to be the scope within which interventions in space must occur. In other words, these variables set what Bourdieu calls the "universe of possibles": that is the perceived discourse (initiated by the law) onto which knowledge and pleasure are constructed (in space).[3] The history of pleasures that evolved around the items of law overwhelms and conse-

quently masks the historical specificity of the legal text. Consequently, cultural production works in view of the limits of the law, within the possibilities it provides, which furnishes what is regarded to be the 'common-sense' of the world.[4] The environment is thus seen in the logic of the control variables of the law where inhabited space is conceived through the legal administrative units (zoning), which are differentiated through the quantities of similar surfaces they yield. 'Empty' space is conceived as a lack of that prospective building, which is perceived through figures and numbers. To question legal variables is to challenge not simply 'good taste' but the fundamental elements onto which taste is structured, that is, the visual codes embedded within the social appreciation of the built environment. In that sense, the social production of the built space can be viewed against a normative construction of culture in which the subject and the object are dialectically interrelated, constantly assimilated (incorporated) and reproduced (by one another).[5] Building law provides a measuring tool and an exchange value for space. It plays a central role in bringing in a logic of visualization that precedes the domain of the physically visible. It also constructs a potential and prospective image in the built environment; an image, which acquires socially tangible attributes as space accumulates physical and symbolic value. In summary, practicing the building law works on preserving the power structures it embodies. The legal items together with legal procedures are disguised as common spatial practices, as they seem to be the only mechanism through which space can be perceived, imagined and desired.

TRANSGRESSING THE LAW—THE CRIMINAL BODY

The previous section locates all social practices in space within a field of practice that is controlled by a body of professionals and politicians and shaped by the building law. Within this approach, individual interaction with the making of space seems to be improbable without transgressing the limits set by the law. It is in the gaps of the legal text or in the procedural breaches that difference can occur—in the illegal realm. While the illegal realm can be discussed in small practices, such as enclosing a balcony to become a room adding few square meters to an apartment, I choose here to discuss it in relation to much larger gestures such as the various areas in Lebanon in which the building law is neither considered nor even consulted. These areas are mostly illegal settlement and squatter zones which have been mushrooming in Lebanon throughout its modern history, but specifically during the period of the civil war, 1975-1990. In addition to the location of labor markets, the starting points of these settlements are mostly instigated by political turmoil such as Palestinian Diaspora and forced migration or redistribution of the Lebanese people in accordance with the geographic evolution of the green lines. The following story, which is based on Hiba Bu Akar's thesis work on the Ouzaii area, an illegal suburb in southern Beirut, illustrate a different way of interacting with the built environment. The story goes as follows:

Abd-El-Rahman and his wife were among the first settlers in the Ouzaii area coming from their southern village. They rented a room amidst the green open land. This was in 1958. As the area got congested, Abd-El-Rahman confiscated land around his shack.

In 1961, Ali is born; Abd-El-Rahman added a new room to the existing one. Slowly the family started growing and so did the house. The two rooms grew into a U-shaped (semi-courtyard) house leaving an open space in between for the children to play in, a transition space between the rooms and the public alley.

When Ilham, the eldest daughter, got married, the ground floor had six rooms and construction was on the way on the upper floor. The upper floor construction was made 'neater' than the rest of the house with better finishes, since the father wanted to retire and felt he deserved a 'good' house. Ilham and her husband were given two out of the six rooms on the ground floor. Two of the others were given to Ali who got married shortly after Ilham. Finding there was ample space in the garden, Ali took part of the garden and built two new rooms for his growing family. For more privacy, Ilham and Ali then established separate guest entrances to their houses from the garden. When asked about the two other rooms, Abd-El-Rahman replied: "These are for my son Abed who is still single but who will have his family one-day, meanwhile I am leasing the rooms to two migrant workers."

Abd-El-Rahman still has Salma at home, the youngest daughter but nobody knows yet where her 'house' will be![6]

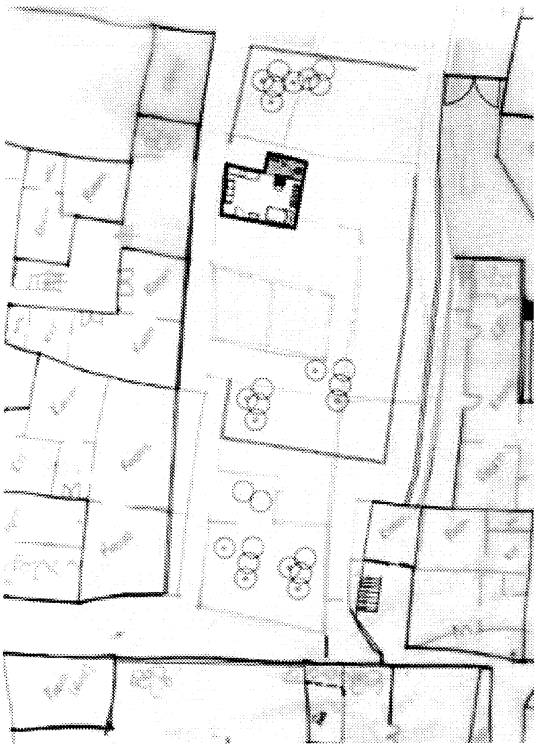

Fig. 7. Reconstructed plan of the room that Abd-El-Rahman rented in 1958.

Fig. 8. The first and second floor plans of Abd-El-Rahman house as it stands today.

What interest me about this story is the degree to which the daily life of Abd-El-Rahman family is shaped by space at the same time that it is shaping the space around them. Spatial boundaries, differences, continuities are negotiated on a daily level. Space in all its constituents is a public discourse, closely associated with the social evolution of Abd-El-Rahman family. Since Abd-El-Rahman is living within an illegal realm, a realm where no forms are to be filled, where no approval is to be drawn, where no procedures are to be adopted; space remains a social discourse that does not need to be defined in accordance with labels and architectural typologies but can rather be understood through life experiences. This quality of life constituted a condition that has been largely terminated by the establishment of the profession throughout the modernization period. But this illegal realm is also associated with poor and unkept dirty streets, due to the lack of infrastructure; with unsafe buildings, due to the lack of technical support; with closed communities, due to the lack of urban integration. In-spite of these problematic physical and social conditions, such illegal buildings show alternative relationships between people and the spaces they inhabit commonly dismissed through the field of spatial production that is dominated by laws and procedures overseen by politicians and their professional agents. It presents a condition that resists any notion of the determinate and complete model of space. A condition in which space is considered as a living social entity, a space that can be imagined one-act-at-a-time.

CONCLUDING REMARKS

In conclusion I want to discuss the dynamics existing between these three social bodies to locate architectural discourse as it relates to the social. The 'criminals' and their practices are the target of the legal process—laws are written to prevent 'criminal' practices. The makers of the law state agents or the professionals look at these 'criminals' as they are objectify them as 'other'. These same professionals and agents (the knowing body) are objectified and othered by the law itself once their text becomes a state decree. Subjects of their law and the agency that they have fabricated, the 'knowing body' has no access to revise and alter items of law as these items institute the establishment of consolidated political and social power dispositions. Furthermore, the 'good' who live under and practice the law are the ones that re-produce and further consolidate the power dispositions with every building practice, it is to this dominant body that the majority of the architects belong even those responsible for the writing of the law. What is significant to this discussion is that these architects own the exclusive right to build legally, that is, their practice is automatically 'good' as qualities of 'good space' are already inscribed in the text of the law. Architects are facilitators or agents for building practice; they have knowledge of the law and exclusive privilege to practice it. To think critically in architecture practice can jeopardize the architect's position, as such thinking is apt to conflict with legal items, hence, driving the 'good' architect towards 'criminal' acts. Building law has minimized discourse on space within architectural practice; it is precisely within the criminal body that any discourse on space and the built environment can occur even as that discourse may take shape in something other than architectural forms.

NOTES

I want to thank Richard Becherer and Karim Nader for their remarks on this paper.

[1]In discussing Bourdieu's theory of practice, Louis Pinto problematize scholarly knowledge "The academic establishment of which the scholar is the product does not merely procure legitimate knowledge, it also guarantees the legitimacy of those who are licensed to legislate the legitimate interpretations of the world." Louis Pinto, "Theory in Practice" in Richard Shusterman, ed., *Bourdieu: A Critical Reader* (Oxford: Blakewell Publishers, 1999).

[2]"[T]he dispositions durably inculcated by the possibilities and impossibilities, freedoms and necessities, opportunities and prohibitions inscribed in the objective conditions...generate dispositions objectively compatible with these conditions and in a sense pre-adapted to their demands. The most improbable practices are therefore excluded, as unthinkable, by a kind of immediate submission to order that inclines agents to make a virtue of necessity, that is, to refuse what is anyway denied and to will the inevitable". Pierre Bourdieu, *The Logic of Practice* (Stanford: Stanford University Press, 1999) p. 54.

[3]"What makes power hold good, what makes it accepted, is simply the fact that it doesn't only weigh on us that says no, but that it traverses and produces things, it induces pleasure, forms knowledge, produces discourse." Michel Foucault, *The Foucault Reader*, Edited by Paul Rabinow, (New York: Pantheon Books, 1984) p. 61.

[4][T]he conservation of the social order is decisively reinforced by what Durkheim called 'logical conformity', i.e., the orchestration of categories of perception of the social world, which being adjusted to the divisions of the established order (and thereby to the interest of those who dominate it) and common to all minds structured in accordance to those structures, present every appearance of necessity." Pierre Bourdieu, *Distinction: A Social Critique of the Judgement of Taste* (Cambridge: Harvard University Press, 1984) p. 471.

[5]"[T]he dispositions which govern choices between the goods of legitimate culture cannot be fully understood unless they are reintegrated into the system of dispositions, unless 'culture', in the restricted normative sense of ordinary usage is reinserted into 'culture' in the broad, anthropological sense and the elaborated taste for the most refined objects is brought back into relation with the elementary taste for the flavors of food." Pierre Bourdieu, *Distinction*, p.99.

[6]This story is based on the survey and text done by Hiba Bou Akar & Sirine Kalash.

Poché Parisienne:
The Interior Urbanity of Nineteenth Century Paris

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The brilliance of Haussmannian Paris, its grand planning and imposing façades, preserves the specter of an earlier time. It maintains a trace of the medieval Paris that was inherited by the July monarchy in the earlier half of the nineteenth century: a world of secret and private streets and alleyways that were part of an invisible order apparent only to the Parisian. Ironically, this was the very system that the new Paris had presumably purged. This paper is about the persistent, hidden and private spaces of Paris, which, I propose, is a ***poché*** space: at once **interior**, **mysterious**, and **differential**.

In the contemporary use of the term in architectural circles, *poché* is the technique of 'darkening in' or 'filling in' specific areas of an architectural drawing. This comes from the *Ecole des Beaux-Arts* where the *poché* referred to the blackening-in of residual areas such as the structural or service elements of a plan. In a time and place where the structural system was load- bearing masonry, the *poché* allowed the plan to be read not only in terms of mass and void, but also through a foreknowledge of the proportionality between white areas and the areas of *poché* of the plan. A larger white area would indicate a higher ceiling. *Poché* was a way of differentiating the hollow areas from the solid, the covered rooms from the open courtyard, the houses from the streets, and so on

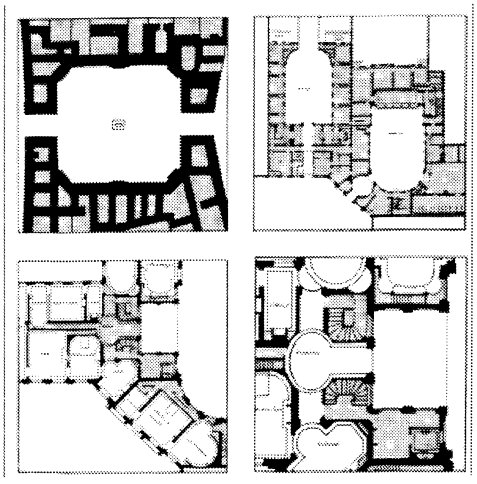

Fig.1 Poché *as a drawing technique.*

The fundamental sense of the word *poché*, according to the *Grand* ***Dictionnaire Universel***, is either something hollow (*chose creuse)* or something turgid (*chose enfleé*). The various senses of the word (a pocket, a small bag or sack, to poach an egg, to black an eye, to poke etc.) conjure up a sense of hollowness that may be perceived from any side; it is both a cavity and a protrusion. In a curious concomitance of seeming opposites, the word *poché* seems to emphasize the space that is created within the pocket or swelling and not the nature of the surface that creates the space. However, the perception of the space is, in both cases, from a position that is outside of that space. The space of *poché* embodies a scene that is completely 'interior'. Attempts to view this scene only help to intensify its interiority and externalize the viewer. Like the insides of a glove, this space cannot be objectified. Any effort to objectify the *poché* space only results in the apprehension of the limits of the probing device (in the case of the gloves, our hands). The *poché* is thus a space that is both interior and inexhaustible and one that sustains distinctions such as interior and exterior.

Poché in nineteenth century Paris is manifested in all these ways suggesting interiority, mystery, and differentiation. This paper focuses on the specific spaces of the apartment houses, the brothels, and the sewers, as *poché* and distinct from the grand, public, and 'planned' spaces of the city in the second half of the nineteenth century. These were private and mysterious pockets of space within a larger, more visible and homogenous urban space. The paper proposes that these spaces were 'interior' and resisted externalization. Attempts, such as Haussmann's grand planning and Émile Zola's socialist novels, to solve or dissolve the *poché* perceived it as contrary to their own schemes of order, hygiene, and morality. An analysis of the *poché* not only allow us to understand the thrust of these attempts, but also clarifies how it generates and sustains distinctions of interior and exterior, private and public, moral and immoral and so on.

Walter Benjamin, in his essay, *Paris, Capital of the Nineteenth Century*, wrote, "For the private person, living space becomes, for the first time, antithetical to the place of work. The former is constituted by the interior; the office is its complement...For the private individual the private environment represents the universe. In it he gathers remote places and the past. His drawing room is a box in the world theater."[1] Benjamin's essay recalls the Paris of Louis-

Phillipe under whose reign the ruling classes, pursuing their business interests, make, for the first time, a distinction between the work place and the living place. The work place allowed people to look at their homes from outside, as a pocket of private space suspended within the fabric of the city. The distinction between work place and living space thereby heralded the *poché* in Paris: a space that was viewed from outside, and embodied distinctions of interior and exterior, and private and public. The urban archetype for the Parisian home was the multi-family apartment house, and therefore the impossibility of clearly classifying it as either private or public made this distinction even more clear. The identity and privacy of 'home' became a pertinent question in the context of the standardized apartment house, itself a product of industrialization.

The population of Paris nearly doubled between 1850 and 1870, so the apartment block as a building type was encouraged. Apartment houses existed in Paris long before the intervention of Haussmann, but within this scheme, they became much bigger. The new streets were much wider, and so allowed taller buildings on the frontages. Haussmann, concerned with the need for monumental terminations to his great new thoroughfares, directed new streets towards most of the existing monuments. This caused much of the new architecture of Paris to tend towards exaggerated volumes, and striking and regulated silhouettes. The greater height of the buildings tended to obscure the proportions of the façade and any effect of width had to be sustained by the neighboring buildings.[2] The façade wall was treated like a continuous and applied strip designed to be wrapped around the urban block. There is no indication of the inherent porosity of the block that is perceivable from a birds-eye-view. The regular arrangement in bays on the façades meant that there was no direct relation of the internal disposition of the rooms to the façade.

As a building that had to be inherently porous in order to accommodate the movements of the various tenants, guests and servants, the apartment house was, surprisingly, a notably opaque structure. The opacity could be attributed to the individual apartments and the hidden service spaces, which were like pockets of extremely private space suspended within this porous framework. The explosion of scale after Haussmann's restructuring of Paris caused the apartment house façades to become less transparent as the openings on the façades did not increase proportionately to the height and width of the frontages. Certain opacity could also be ascribed to the use of draperies and blinds, as the external façades of the apartment houses were sometimes too lavish for the insides. Moreover, where it was all right for the insides to be more lavish than the outside, the reverse was not acceptable. Sharon Marcus writes, "the strong desire and easy ability to see from one building to another that had so marked the July Monarchy literature began to retract into itself to the point of obfuscation. In an 1855 apartment house romance in which a man falls in love with a woman in the building opposite, Léo Lespès devoted the most space to elaborating obstacles to the hero's vision and to detailing the instruments and techniques that painstakingly allow him to incrementally increase his visual access to the woman's apartment."[3] Architectural drawings from the period are also revealing in this regard. Typical elevations in a pattern book represent the openings on the façade as dark opaque panes that cannot be visually transgressed. In section drawings, the back wall of a sectioned room is so rendered that it appears flush with the façade wall. The architectural impossibility of flattening the space of the room into an opaque patterned surface betrays a design to conceal the activity of the spaces beyond.

The plan organization of the apartment houses displays a similar characteristic of a *poché* space. The primary movement within the apartment house is linear

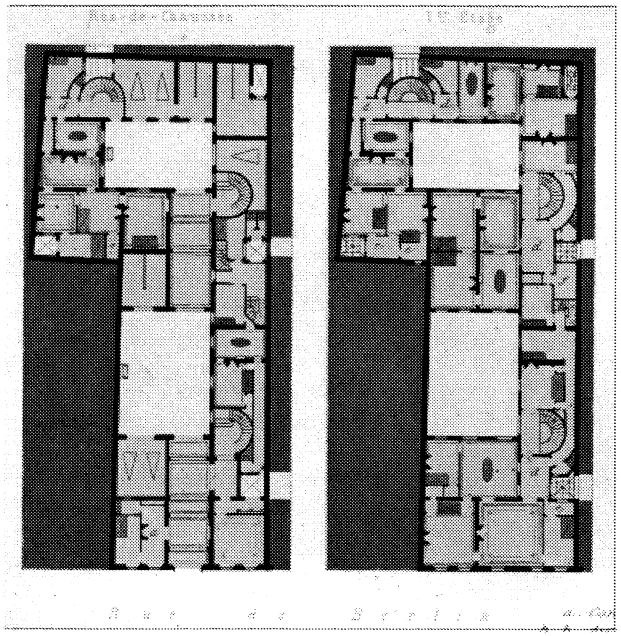

Fig.2 Plans of Apartment House. Paris. 1870.

The typical organization of the apartments' movement, the enfilade along a string of rooms, creates an experience of a series of mutually isolated scenes. There is no folding back upon a particular space as is the case with modern spaces, (one would recall Adolf Loos's Moller house and Beatriz Colomina's analysis of it). In the Parisian Apartment there is a sense of disorientation that comes along with not being able to understand the gestalt of the plan. The staircase, generally a point of reference, gets lost within the room-corridor-room schema that is characteristic of the rest of the house. Enclosed within its stairwell it becomes a vertical corridor.

The rooms of the apartment always display a bilateral symmetry that seems to be a direct influence of the rococo hôtels. It has usually been supposed that the symmetry of the rooms was a way of projecting a sense of perfection and recalling the ideals of classical architecture. However, it is also possible imagine the individual symmetries as a way of creating privacy and a self-enclosed universe: a universe that had its own center and its own independent order within a larger universe that was the house. The entrance to the private rooms is never axial, as if not to dilute the privacy and enclosure of the room. The view of the mirror above the mantelpiece, as the first sight when a visitor enters the rooms, is

always at an angle that reflects another door or window of the room. One is literally "shown the door" or reminded of the possible exit path as soon as one enters the room. The exteriority of the visitor is maintained as he finds himself outside of this pocket of private space.

Fig.3 Interior view of the apartment.

The mirror on the salon wall counters the gaze of the outside observer, as he approaches it axially, both exposing him in the act of looking and simultaneously embodying the interior world of the inhabitants.

Eugène Atget, a prominent French photographer and one of the first to record rooms without people in them, sold his album of Parisian Interiors to the Musée Carnavalet in Paris at the turn of the twentieth century. By that time, the theme of the privacy of home was a well-worked theme for painters, who seldom painted interiors without people. Atget's photographs show interiors of apartment houses, and most of them witness the wall of the salon with the mirror and the fireplace. The absence of people from these photographs makes them similar to the architectural sections of the apartment houses, opaque and lifeless, but with one difference. Almost all of them have been taken by shifting slightly to the left or right of the axis in order for the camera to escape its own reflection in the mirror. With that move, the room reveals itself as an interior and a private space seen through the eyes of the inhabitant.

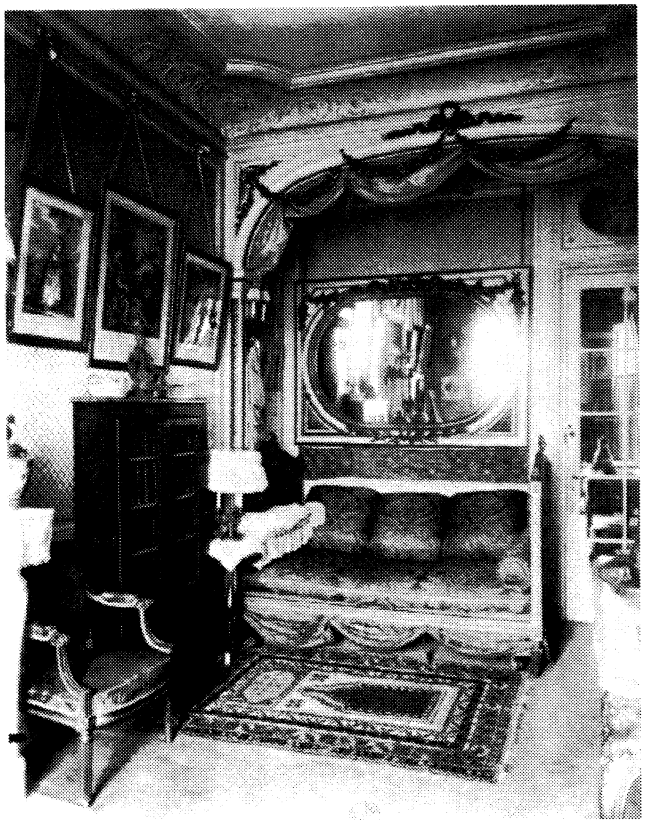

Fig.4 Photograph. Eugène Atget. 1910.

The mirrors in their multiple reflections open pockets of the various parts of the room to observer.

Walter Benjamin comments about Atget's work and observes that his photographs appear to be "...the scenes of a crime: for the scene of a crime is deserted...and the pictures that are taken of it have but one purpose, to reveal clues."[4] The arrangement of objects around the room and the concealed meanings therein remind us of our own selves as both privy to an inhabitant's relationship with the room as well as an outsider to the setting.

The movement of servants within the house was totally independent of the main movement of tenants and visitors. In many cases if the main movement of the house followed a clockwise rotation, the servants' movement would be counter-clockwise. The *degagement* or the servants' areas of house, with its own staircase and movement passages, almost works like an independent house within the main house. The *degagement* in most cases was the leftover space after the figural rooms had been carved out of the plan. More accidental than designed, one can almost imagine it as a manipulation of the

poché of the walls of the apartment. Like the wall, the *degagement* was a structural element: structural to the society, to social rituals and to the everyday life of the tenants.

The more grand the city grew in scale, the more private its houses became. The apartment house became the site where personal privacy, secrecy, intrigue, and personal experience were turned into the highest aims of life. As pockets of private spaces within the city, the apartment houses were *poché* spaces, interior and mysterious to the outside observer. Moreover, like the architectural *poché* that differentiates several spatial dimensions (the hollow areas from the solid, the covered rooms from the open courtyard, the houses from the streets, the city from the surrounding landscape, and so on) the apartment house contained within itself various different levels of *poché* in the form of the apartments, the private rooms within the apartments, the servants spaces, the walls that contained smoke stacks and heating ducts, etc. With the Enlightenment ideals of the Second Empire, these spaces, in their varying degrees of visibility and enclosure, were also interpreted as unclean, immoral, and undesirable. This emerges clearly in Emile Zola's novels, particularly in *Pot Bouille*, which is set in an apartment house in the time of the Second Empire.

Zola's narration of the apartment building conjures up images of the juxtaposed lives of its bourgeois tenants and their servants: a society's messy mishmash of moral and physical corruption concealed behind the veneer of bourgeois respectability. Not only the subject of the narration, but also its structure reinforces the spatiality of the apartment house as a profound interiority, with rooms that enclose and 'fold in' an entire world of layers and relationships. Each chapter in *Pot Bouille* is built around isolated, self-enclosed scenes. The narrator further accentuates the apartment building's inward orientation by commenting repeatedly on its enclosed, internal features: stairways and landings, the closed door of each apartment, and the interior courtyard. Through his description of the apartment building, Zola examines the political, moral, and sexual landscape of nineteenth-century Paris.

The novel begins with the arrival of Octave Mouret, a young salesman from the provinces, who comes to Paris with the hope of making a fortune. The initial movement of Octave's introduction into the apartment house is a crucial one. The cab that brought him from the *Gare de Lyon* is held-up in traffic in the *Rue Neuve-Augustine*. The '*neuve*' in the street name suggests that it is a new street and a product of the new planning after 1852 and perhaps partially blocked due to the intense construction work that affected the city during this period. Although, ironically, it is on this street that Octave is dismayed to notice that Paris is not as clean as he thought. He is encouraged, however, by the brisk business on the streets and the shops.

Upon reaching the apartment house, Octave inspects the façade of the building: "Octave, who had got out and was now was standing on the pavement, measured it and studied it with a mechanical glance, from the silk shop on the ground floor to the recessed windows on the fourth floor, which opened on to the narrow terrace. On the first floor, carved female heads supported a cast-iron balcony of intricate design. The surroundings of the windows, roughly chiseled in soft stone, were very elaborate; and lower down, over the ornamental doorway, were two Cupids holding a scroll bearing a number, which was lit at night by gas-jets from within."[5]

As is typical of Zola, he brings to light in one passage the various contradictions, conflicts, and accommodations set into play in the apartment house: the commercial space of the silk shop and the private residences, the hand-crafted female heads and the industrially manufactured cast-iron balcony, the rough chiseled stone and the elaborately finished doorway, the old design of the cupids lit by new gas jets, etc. The façade of the house is the only presentation of the house to the street, its only manifestation. Octave's "mechanical glance" divulges a lack of interest in the façade. The new urban order had rendered the city uniform to the extent that it became difficult to differentiate one building from another. The only marks of difference were the carved embellishments and the number. The identity of the house had been reduced to a number and a sign. The commonness of the apartment house's outward appearance in the novel invites a reading of it, and the plot concealed within it, as typical of any apartment house in Paris.

Octave is shown into the building by its architect, Campardon, who explains in great detail the splendid appearance and amenities of the building. The tenants that Campardon repeatedly points out as respectable and honorable seem only to complement the wholesome structure of society that the apartment building seems to embody. Octave is initially overawed by the new building and its extravagant decoration, its gilt carvings, its red carpet and heated main staircase, and the grand main entrance with its imitation marble paneling and cast iron banisters that "was in imitation of old silver."[6] Octave, however, soon learns that the building is far from being structurally sound: it is poorly constructed, there are large cracks, and the paint has begun to peel. These discoveries are analogous to his acquaintance with his neighbors who themselves are far from ideals of honor and morality.

Zola further explores the house as a symbol of society in the social relations between the two types of occupants of the building: the bourgeois tenants and the working-class servants. The separation between the two is initially described as a set of clear distinctions in manners, etiquette, morality, education, language, hygiene, and wealth. The corresponding physical areas of the house that are inhabited by the two kinds of occupants are distinguished through a narrative of differentiation. Thus the main staircase is red-carpeted, heated, grand, and brightly lit, while the servant's stair is dark, narrow, dirty, and freezing cold. The main courtyard is clean (almost sterile), paved, and has a fountain, as against the service courtyard which acts as a literal and figurative rubbish dump for the building and is compared more than once to a sewer. Octave is shown the kitchen and finds the servants exchanging raucous gossip from window to window and to the courtyard below. "It was as if a sewer had brimmed over."[7] The courtyards between kitchens are compared to the basement (the underground). "She opened the window, and from the narrow courtyard separating the kitchens an icy dampness rose, a stale odor like that of a musty cellar."[8] The servant rooms bear a similar difference to the tenant rooms. The

bourgeoisie, it seems, go to extreme lengths to maintain the difference. In fact, this segregation is created in day-to-day speech where associations are made that instantly relegate the spaces of servants and the servants themselves, to an inferior status as dirty, immoral, promiscuous, and stupid.

Zola's *Pot Bouille* reinforces the notion of the apartment house as a *poché* space. Apart from its complete interiority and impenetrability, it is also differential: the *poché* allows the emergence of two contrasting spaces, in this case the respectable, moral and hygienic apartments of the bourgeoisie and the promiscuous, immoral, and filthy servant areas. If the *poché* can also be understood in terms of the beaux-arts sense of the term, the filling-in or blackening of the solids in order for the voids to be read more clearly, then what remains hidden allows what is visible to be seen more clearly. Thus, the servant spaces, as *poché*, allow the apartments to appear as structures of morality, respectability and hygiene; and the apartment house, in turn, as a structure of privacy and opacity, allows the city to be read more clearly as public and transparent.

The city, in this sense, seems to have grown more transparent and public by making its buildings more private and opaque to the street. In a losing battle to aggrandizement by powerful planning intentions, the social qualities of the urban space of the previous era remained in only a few pockets of the city. Haussmann had specifically attacked spaces of privacy in the city and exterminated them under the banner of science, hygiene, and morality. Until the Second Empire, the sewers of Paris were a site of seditious activities performed away from the public eye. Their filth harbored not only diseases like cholera but also criminals and revolutionaries. With the construction of a large, easily accessible sewer system under the pretext of ridding the city of epidemics, these impediments were also flushed out. As Donald Reid tells us, "after Haussmann, the sewers no longer figured as a place which nurtured political radicals with characteristics associated with mire."[9] The problem of disposal involved not only notorious bodies but also dead bodies as the cemeteries of Paris overflowed during the epidemics. The notion that cemeteries inside the city were not salubrious had been entertained long before in 1786 with the removal of the human remains chaotically buried in the cemetery of the Innocents church to the better-organized catacombs. During the Second Empire Haussmann not only completed the systematic removal of remains from the more overburdened cemeteries to the catacombs, he also sponsored a scheme for an underground network of suburban cemeteries linked by train to a main terminal at the Montparnasse cemetery.

With similar "sanitary" aims, the Morals Brigade, an agency of the Prefecture of Police, was commissioned to rationalize the control of prostitution. It established municipal guidelines, registration systems, and venereal examinations, under the general heading of the *police des moeurs*, so that the prostitute could remain within the society and under its control.[10] There was a special tax imposed on registered prostitutes. The control of prostitution was in fact a control of women, and all women were vulnerable to being accused of prostitution in the city policed by the Morals Brigade. In her book *Policing Prostitution in Nineteenth Century Paris*, Jill Harsin says, "Instead of the orderly procedures envisioned by the creators of the system, the *police des moeurs* gave rise to a system of repression directed not only against prostitutes but against women of the working classes in general."[11]

Sanitation carried the promise of a controlled homogeneity for the State. The threat of the alien difference of dirt (matter out-of-place) and by extension 'dirty' people (people out-of-place) had to be, in other words, mastered. Notions of cleanliness were not only practical but also moral: control was extended across a spectrum from excrement to revolutionaries and prostitutes.

For Haussmann and Napoleon III, the image of progress was built upon the elimination of all that could not be observed, decoded, or homogenized. In attacking the *poché* as disorderly, unhygienic and immoral, the State promoted notions of progress as scientific, hygienic and moral. Zola's novels of the *Rougon Macquart* series, particularly *Pot Bouille* have been regarded as an attack on Haussmannization. Zola plays on those very characteristics that seem to constitute 'progress' for the modern city and society. Critics have claimed that Zola's writings demystify the image of the modern and progressive city by exposing the literal and moral filth that lay behind the new structures of the city and their deceptively imposing facades. Zola's primary theme in *Pot Bouille* is no doubt the opposition of contrasts that he brings into play throughout the novel: he not only acknowledges the difficulty of identifying these oppositions as clear and distinct but also demonstrates the inversion of signs of the contrasted pair. The novel earnestly sets up the oppositions of interior and exterior, clean and dirty, moral and immoral and then effectively dismantles them.

Zola's personal disposition towards a moralizing agenda in the *Rougon-Macquart* has been discussed at length by critics. His socialistic predilections drove him to examine the tyranny and falsehood of the Bourgeoisie and the struggle of the proletariat. Where Haussmann tried to master the *poché* by containing it within buildings or altogether eliminating it, Zola appears to do so by showing that there was no real difference between the hidden and the visible. For Zola, the *poché* was ubiquitous and thus absent as a pocket of space, impenetrable and differential. The sense of the *poché* as difference is absent, but its absence reinforces the sense of the 'other', the hidden and mysterious, that is constituted by it. The *poché* eludes both Haussmann and Zola, and yet we recognize the thrusts of their attempts only through their attacks on it.

A study of the *poché* resembles Michel Foucault's discourse on *heterotopia* and 'other' spaces. However, its scope is not limited to the marginal and the formal and psychological 'other'. Here the 'other' refers not only to what is outside everyday life but also what is contained, or potentially contained, within it. A study of the *poché* allows us to investigate our tendencies, paradigms, and notions of progress and the exclusions that determine them.

NOTES

[1]Walter Benjamin, *Paris. Capital of the Nineteenth Century.* (1935) in Reflections: Essays, Aphorisms, Autobiographical Writings, trans. Edmund Jephcott. (New York: Harcourt Brace Jovanovich, 1978, p.154)

[2]See Anthony Sutcliffe, *Paris: an Architectural History* (New Haven: Yale University Press, 1993)

[3]Sharon Marcus, *Apartment Stories: City and Home in Nineteenth Century Paris and London* (Berkeley, CA: University of California Press, 1999, p.146)

[4]See Marie-France Boyer, "Framed Evidence". *The World of Interiors. September 1990* (London: Pharos Publications Ltd., 1990)

[5]Émile Zola, ***Pot Luck (Pot Bouille)***, tr. Brian Nelson, (New York: Oxford University Press, 1999, p. 3).

[6]Ibid., p. 5

[7]Ibid., p. 9

[8]Ibid., p. 25

[9]Donald Reid, *Paris Sewers and Sewermen: Realities and Representations.* (Cambridge, MA: Harvard University Press, 1991, p.51)

[10]See Jill Harsin, Policing *Prostitution in Nineteenth-Century Paris*, (New Jersey: Princeton University Press, 1985).

[11]Ibid., p.xvi

REFERENCES

1. Benjamin, Walter, Paris, Capital of the Nineteenth Century in *Reflections*: Essays, Aphorisms, Autobiographical Writings, trans. Edmund Jephcott. New York: Harcourt Brace Jovanovich, 1978 (1935).
2. Cabaud, Michel, *Paris et les Parisiens sous le Second Empire / Michel Cabaud ; texte de présentation par Sébastien Loste : commentaires de l'iconographie par Eliette Bation-Cabaud.* Paris: P.Belfond, 1982.
3. Daly, César M., *L' Architecture Privée au XIX Siecle: Nouvelles Maisons de Paris et des Environs.* Paris: Librarie Générale de L' Architecture et des Travaux Publics, 1870.
4. Dennis, Michael, *Court & Garden: From the French Hôtel to the City of Modern Architecture.* Cambridge, MA: MIT Press, 1986.
5. Ferguson, Priscilla Parkhurst, *Paris as Revolution Writing the Nineteenth-Century City.* Berkeley, CA: University of California Press, 1994.
6. Harsin, Jill, *Policing Prostitution in 19th Century Paris.* Princeton, NJ: Princeton University Press, 1985.
7. Kunze, Donald, "*Poché*" in *Plumbing: Sounding Modern Architecture.* ed. D.S. Friedman and Nadir Lahiji. Princeton, NJ: Princeton Architectural Press, 1997.
8. Marcus, Sharon, *Apartment Stories City and Home in Nineteenth-Century Paris and London.* Berkeley, CA: University of California Press, 1999.
9. Mercier, Louis-Sebastien, *Panorama of Paris Selections from Le Tableau de Paris:* based on the translation by Helen Simpson; ed., Jeremy D. Popkin. University Park, Pennsylvania: Pennsylvania State University Press, 1999.
10. Olsen, Donald J., *The City as a Work of Art:London.* Paris: Yale University Press, 1986.
11. Pinkney, David H., *Napoleon III and the Rebuilding of Paris.* Princeton, N.J.: Princeton University Press, 1958.
12. Prendergast, Christopher., *Paris and the Nineteenth Century.* Cambridge, MA: Blackwell, 1992.
13. Reid, Donald, *Paris Sewers and Sewermen: Realities and Representations.* Cambridge, MA: Harvard University Press, 1991.
14. Saalman, Howard, *Haussman: Paris Transformed.* New York: G. Braziller, 1971.
15. Sutcliffe, Anthony, *The Autumn of Central Paris- The Defeat of Town Planning 1850-1970.* London: Edward Arnold Press, 1970.
16. Zola, Émile, *L'Assomoir.* tr. Atwood H. Townsend. New York: New American Library,1962 (1877).
17. Zola, Émile, *Pot Luck (Pot Bouille).* tr. Brian Nelson. New York: Oxford University Press, 1999 (1881).

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Issues of Urban Fabric

Moderator: Nan Ellin, Arizona State University

Public Space in Downtown Areas:
Parallels between North American City Centers and Friedrichstraße in Berlin

SIGRUN PRAHL

Reading and Recording the Elusive City

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Reprogramming Midtown Atlanta

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Public Space in Downtown Areas:
Parallels between North American City Centers and Friedrichstraße in Berlin

SIGRUN PRAHL

In large metropolitan areas, the value of urban open space has always been recognized by the urban population.The state of open spaces in a city reflects the complexities of the social life and of the economical situation. If one role of the open spaces in downtown areas needs reconsideration. The relationship between open space and public life, that generates an image of a dense, diverse, classless, and democratic society, has undergone a fundamental transformation.

Looking at North American and European city centers and their open spaces today, the following tendencies can be observed:

1. monostructure of functions
2. homogeneity of the open spaces and inversion of indoor and outdoor space
3. privatization and control of public space, segregation of urban population
4. transformation of downtown areas into museums
5. parallels between the mall and mains street concepts in America and Germany

PUBLIC SPACE IN NORTH AMERICAN DOWNTOWN AREAS

Modern city planning replaced networks of multi-use neighbourhoods with a model that separates living, working, production, and leisure within the city. The city is fragmented through this reduction of specialized areas to technical functions. Apartments were built in the suburbs. Places of work partly persisted in the downtown areas, but offices were also built outside of downtown, following the idea of the decentralized concentration. Shopping centers were constructed extensively in the countryside. Leisure activities were directed towards theme parks.

These fragments were connected through highways. After this development downtown areas could only be used as tourists' attractions, if they had an attractive, historic core, which concentrated monostructurally and seasonally on visitors' activities. If they did not have an interesting heritage, they were ruined by neglect and often became ghettoized areas.

There exists a tendency for the density of the city center to decrease while the density of the suburbs increases. In many cities in the USA, the suburbs have de-colonized the city. The suburbanites do not even come downtown to work, to go to the cinema or theatre, or to shop. They find all these amenities in their own or in a neighbouring suburb. This flight from downtown has led to a deurbanization of downtown areas. Important attributes of city cores such as density, mixture of functions, public transport were lost.

Following the decline and destruction of many buildings, the downtown was no longer a place with central functions and central importance, no longer a place of identification with the city. The downtown areas themselves have become suburbs of their own suburbs. The centers have been deurbanized.

Because of this development city officials and developers thought of two attempts of revitalization:

- Malls and mixed-use developments with own circulation systems
- Revitalization of the historic Main Street

In the sixties and seventies megastructures were developed to try to save the dying American downtown areas. These huge autonomous compounds contain shops, hotels, conference rooms, and restaurants. They were frequently linked through skywalks. In cities with hot climate tunnels were constructed.

1. Monostructure of Functions

Mainly office towers, some shops, and few apartment buildings were built in city centers. Fassades, that serve as advertisement screens, are an indicator of the commercialization.

Urban life was concentrated in certain locations, certain hours, and certain categories of 'acceptable' activities. After working hours and on week-ends, the center is devitalized through the functional monostructure.

2. Homogeneity of the Open Spaces and Inversion of Indoor and Outdoor Space

The mixture of types of buildings and of functions was given up. Variety was only achieved by esthetic means through use of different materials, form or color of the buildings, rather than through different functions or variety in structure.

Their main entrances are directly from the underground parking. Blank walls homogenize the streets.

The compunds do not animate the surrounding streets and sidewalks. They are self-centered, and lack direct street relation. Their inner circulation systems inverse indoor and outdoor space.

3. Privatization and Control of Public Space, Segregation of Urban Population

The mixture of the urban population to be observed on public streets is hardly possible in malls and indoor plazas, and it is not wanted. The indoor worlds are realms with special regulations. Users have to be willing to follow the rules, e.g. to consume, or they are excluded. Groups of people are thereby segregated. "The public" is divided into several "publics" of populations of the same descent, education, income, and way of thinking.

Public streets were emptied through parallel circulation systems as passages or skywalks. Moreover, streets became more and more dangerous, because they were not observed and controlled by passers-by anymore. Originally passages were thoroughfares or short-cuts between streets. However, they were developed as systems that attract their own population and divide it from the ordinary person on the street.

The indoor worlds such as shopping malls, arcades, atriums, underground cities, and skywalk systems want to substitute for the lost public space in streets or on plazas. These spaces are nearly always privately-controlled, offering privatized versions of the once public street life. The potential for these plazas to be truly public is highly dependent on the owner's attitude. Therefore, the result is privatization and control of open space and public life.

SECOND ATTEMPT OF REVITALIZATION: THE REVITALIZATION OF THE HISTORIC MAIN STREET

The construction of huge, autonomous megastructures did not lead to a livable city center. These compounds did not animate their surrounding open spaces. The cities' physical appearance became similar throughout the continent. The downtown areas therefore lack individual character.

In the eighties and nineties, the disadvantages of this development were taken into account by planners and politicians. They looked for a new strategy to revitalize the deserted and unsafe downtown areas, and they wanted to give their cities a new identity. Like in Europe, preservation of the historical heritage of small scale buildings directed towards the streets, emphasis on walking instead of driving, and a vital street life, became the new guidelines for the restauration and creation of the American downtown areas.

Where historical complexes were already destroyed, new buildings with historical appearance were erected. Naturally grown cities were simulated.

4. Transformation of Downtown Areas into Museums

These "historical downtowns" can be interpreted as theme parks of history. The functions in these new, pseudo-revitalized city centers and in the renovated areas were directed towards tourism and shopping, not towards living and working in an urban environment. Downtown areas were transformed into museums.

5. Parallels between the revitalization concepts of Malls/MXDs and Main Streets

The simulation of city life did not lead to a revitalization of the downtown areas based on real and diverse urban life, but it intensified the negative tendencies, that were already introduced in the sixties: monostructure of functions, commercialization, segregation of the urban population, privatization and control of open space. Malls and revitalized Main Streets are similar concepts.

PUBLIC SPACE IN A EUROPEAN CITY CENTER: FRIEDRICHSTRAßE IN BERLIN

The situation in the city center of Berlin after the fall of the wall in 1989 can be compared to the situation in American city centers in the sixties. The situation of Friedrichstraße in Berlin in the year 1989 resembles many American downtown areas (e.g. disperse building structure with many voids, no vital street life, deserted open spaces).

After the fall of the wall, the revitalization of the city center, that is located in the former eastern part of the city, became one of the most important directions of the urban planning in Berlin. The historical situation is different, evidently, but the dynamics and intentions for the revitalization are similar.

The leading model of the new planning was called "Critical Reconstruction" of the "European City." That meant reconstruction and maintenance of the street pattern of the 19th century, of the block structure, of the height of the buildings, of stone facades, and of the open spaces.

The building type, that was introduced to fill and to revitalize the city center, was called "mixed-use commercial building." It consists of nine storeys above ground and four below ground. The first and second floors as well as the first basement floor are to be filled with shops and restaurants. From the third to the seventh floor offices are planned. The eighth and the ninth storey are reserved

for apartments, and the remaining three underground floors contain parking.

Housing had to be 20 per cent. This was achieved with small luxury apartments on top of the buildings as well as apartment hotels. In comparison to other city centers in Germany this figure is very low. Housing occupancy in the center normally is 50 to 80 per cent.

The most prestigeous project are the Friedrichstadt Gallerias ("Friedrichstadt Passagen.") They form three blocks in the center of the Friedrichstraáe, near the legendary boulevard "Unter den Linden." (Block 207: architect Jean Nouvel, investor: Roland Ernst; block 206: architect Henry N. Cobb, investor: Tishman Speyer Properties; block 205: architect Oswald Mathias Ungers, investor: Arc Union/Bouyues). These three blocks mesure 60 meters by 90 meters each. 1400 million DM was invested for a brut floor area 99600 squaremeters, containing 35 per cent shops and restaurants, 59 per cent offices, 5 per cent apartments and 1 per cent cultural functions. The floor area ratio is 6.5. The three complexes are connected by an underground passage.

Comparing this German stragegy of downtown revitalization with the revitalization in North American city centers, several similarities are notable. What both have in common is the reevaluation of the city center, that had been neglected for decades, especially in the USA. But this return to the center is mainly a geographical one. The structure and function of a vivid downtown, that implies mixed-use neighborhoods, was not rebuilt.

Historically, the city of Berlin consisted of many similar mixed-use neighborhoods. The center is now directed towards service and business, whereas huge housing areas are built as suburbs outside of the city. Berlin is fragmented by this specialization.

The displacement of housing towards the suburbs leads to a deurbanization of the center by means of depopulation. The center is only frequented during rush hours and lunch breaks. At night and on week-ends, it is becoming a deserted area. In Germany, there is a high demand for housing in the city center. Therefore this planning means mismanagement.

1. Monostructure of Functions

The new buildings in the Friedrichstraße contain shops (mainly clothing), banks, automobile showrooms (Mercedes), offices, and hotels. The center is becoming a central business district and not an individual city center. The name "mixed-use commercial building" is a euphemism. There is no mixed use. Thus, like in America, we find a monostructure of functions in the central area of Berlin. This one-dimensional structure can hardly adapt to changing needs of different uses.

2. Homogeneity of the Open Spaces and Inversion of Indoor and Outdoor Space

The regulation of streetwidth (22 meters) and the height of new buildings (22 meters) was set up to create a homogeneous streetscape. However, homogeneity in a negative way results from monostructures. The shopping compounds and indoor galeries do not attract street life. The banks and car showrooms of the Friedrichstraße do not encourage window shopping and strolling along the sidewalk. This leads to functional homogeniety and social devaluation of the street.

The autonomous compounds of the Friedrichstadt Gallerias are directed towards their interior rather than towards the street. Private indoor plazas like the "Place Voltaire" in block 206 want to substitute for outdoor public streets and plazas. These commercial buildings lack a direct street relation, and they have direct access from the parking garage.

3. Privatization and Control of Public Space, Segregation of Urban Population

The tendency of gentrification is obvious in the Friedrichstraáe. Small shops and little trade and craft businesses, families and subcultures are expelled through demolition of old buildings or high rents. The remaining population is ranked hierarchically by its buying power and reduced to the role of passive consumers. The new trade spaces and luxury apartments are directed towards high-class shops, high-profile businesses, and high-income professionals.

4. Transformation of Downtown Areas into Museums

The regulations which have directed the design of Friedrichstraße originate in the late 19th century city (street pattern, block structure, height of the buildings, stone facades). The simulation of a naturally grown neighborhood can be found in blocks that were divided into pieces simulating different architectural styles and ages, and in the construction of new buildings that pretend to be old.

The historical tradition of Friedrichstraße as a night life area, as it was in the twenties, with many bars, clubs, and theaters is an image which the new builders want to promote in their advertising, to give the street back its historial value as an address.

PARALLELS BETWEEN NORTH AMERICAN CITY CENTERS AND FRIEDRICHSTRAßE IN BERLIN

We have found many similarities between the planning for American downtown areas and Friedrichstraße in Berlin. This is remark-

able, because the official directing ideas of the German planning were the "Critical Reconstruction" and the "European City". The reconstruction was not critical. It was partly historical, partly economical. The public discussion and the economical promotion of Friedrichstraße are hypocritical. The new downtown does not represent a European city, rather it has many components of American central business districts.

OUTLOOK

If we want our cities and their public spaces to be open, human, tolerant, accessible, and adaptable to changing causes and fashions, how can we achieve it?

Developing general guidelines for city planning is not the right direction. Efforts that are made to solve the city through developing general city patterns are questionable. They often become recipe books, that contain overall proposals for urban planning. They are based on the wrong assumption that common design guidelines can fit every city and every town. But every city has its own language, pattern, history, and requirements, and thus it has to be analized and designed individually. But some points should always be taken into account concerning planning, revitalizing, or generally dealing with cities:

The downtown area has an important role for the whole city. In economical terms, constructing in the center is desirable, because the technical infrastructure is already existing, whereas in a new suburb it has to be constructed newly. Public transport often serve the center, if it has not already been dismounted. For ecological reasons, a city should be densified in order to stop the urban sprawl.

City planning has to direct towards the urban population. Each city and each business is dependent on their users, consumers, and passers-by. A city center that is not planned according to the residents' needs and desires will not survive, neither in an economical, nor in a social way.

The planning process has to become more democratic. City planning may not be dominated by speculation.

Adaptability and flexibility are key words in city planning. Historical cities have survived because they are based on flexibility. Monostructures and the creation of a final situation of a city, as it was done in the Friedrichstraße in Berlin, contradict the adaptability of the city to changing needs.

One essential quality of the open spaces is accessibility and multifunctional use. Plazas and streets, that are only accessible to a limited part of the population, and that are only serving one function, are not truly public.

Strategies to make our cities more livable have to be developed from the actual social, cultural, and economical situation of the city. For every planner concerned with the urban environment, this presents a tremendous challenge.

REFERENCES

AIRIC, Architecture/Research/Criticism, Public Spaces, Nr. 5, 1994/95

Banham, Reyner, Los Angeles, the architecture of four ecologies, New York 1971

Brown, D.; Sijpkes, P.; MacLean, M, The Community Role of Public Indoor Space, in: Journal of Architectural and Planning Research, Nr. 3, S. 161-172

Clay, Grady, Real Places. An Unconventional Guide to America's Generic Landscape, Chicago 1994

Cregan, Michael, Open Spaces and Quality of Urban Life, in: Landscape design, Nr. 191, June 1990, S. 12-14

Davis, Mike, City of Quartz: Excavating the Future in Los Angeles, London/ New York 1990

Demchinsky, B. (Hrsg.), Grassroots, Greystones, and Glass Towers. Montreal, Urban Issues and Architecture, Montreal 1991

Donkervoet, Doralice, The Malling of the Metropolis, in: Dietsch, Deborah; Steeneken, Susanna (Hrsg.), Precis: Architecture in the Public Realm, New York 1981

Garreau, Joel, Edge City, New York 1991

Gehl, Jan; Gemzoe, Lars, Urban space in Europe - and in North America 1962-1996, in: Stadsarkitektens Direktorat, Copenhagen City Spaces, Copenhagen 1996, S. 1-6

Giedion, Sigfried, Space, Time, and Architecture, Cambridge MA 1941

Gold, Seymour M., Urban open space in the year 2000, in: Ekistics, Nr. 273, Jg. 45, Nov.-Dec. 1978, S. 447-451

Harvard University Graduate School of Design, Public Space. From Public to Social Space(s): A Faculty Discussion, in: GSD News, Winter/Spring 1984, S. 3-14

Jacobs, Jane, The Death and Life of Great American Cities, New York 1961

Lennard, Suzanne and Henry, Public Life in Urban Places, Southhampton, NY1984

Lofland, Lyn, A World of Strangrs: order and action in urban public space, New York 1973

Loukaitou-Gideris, Anastasi, Private production of public open space: the downtown Los Angeles experience, Los Angeles 1988

Lynch, Kevin, The Image of the City, Cambridge MA 1960

Mertins, Detlef (Hrsg.), Metropolitan Mutations, Toronto 1994

Newman, Oscar, Defensible Space - crime prevention through urban design, New York 1972

Opinion, Public Use vs. Private Abuse, in: Architecture, June 1995, S. 51-55

Rowe, Colin; Koetter, Fred, Collage City, Cambridge 1978

Sennett, Richard, The Fall of Public Man, New York 1974

Soerensen, Erik Christian, Urban Make, Copenhagen 1996

Sorkin, Michael (Hrsg.), Variations on a Theme Park. The new American City and the End of Public Space, New York 1992

Storefront, Post-Industrial Landscape. Detroit is Everywhere, New York 1995

Taylor, Lisa (ed.), Urban Open Spaces, New York 1981

White, William H., City: rediscovering the Center, New York 1988

Reading and Recording the Elusive City

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INTRODUCTION

Modern building has for the most part forgotten what has always been architecture's most important contribution to collective culture: the fabric and community of urban and rural landscapes which is created by connections between individual buildings and their surround. This observation was articulated powerfully by Colin Rowe and Fred Koetter in Collage City two decades ago, and has provoked the formulation of the educational method described here. This work is an attempt to reinvest modern architecture with a consideration of connective patterns and with a concern for the whole at least equal to that for the individual building as part.

The three-part interpretive process of analysis described in this paper represents an approach to architectural design education rooted in an understanding of place, and of patterns and systems operating at a larger scale than that of an individual building. Important also to this process is the teaching of craft and disciplined making, hand in hand with analysis. This process is offered as an alternative to an approach to design education wherein the site - or the ground - is often treated as unloaded and neutral: its own structure and specificity suppressed. In traditional models of architectural design teaching, the site is often reduced to a flat, mute, and abstract datum on which the architectural construct is explored. [I refer here to architectural teaching methods deriving both from the Beaux-Arts and Bauhaus traditions. Though clearly these traditions stand in many respects as opposing poles in the spectrum of methods of formal composition, they share a predilection for the ideal and the universal. This shared bias seems to involve in both cases the exclusion or diminution of consideration of the specificity of site.

While this kit of parts based teaching is extremely effective in exposing a range of compositional possibilities, the design investigation is generally devoid of a search for wisdom found in the field of the site. Architectural strategies derive only from pure geometric, proportional relationships, formal composition, and internal programmatic hierarchy. Only after the parti has achieved a degree of self-sufficiency and completion is it introduced to the site. At this point the relationship between parti and landscape can only be one of accommodation - not of mutual generation. And this accommodation is generally quite one-sided, with the building's geometry and internal logic calling the shots. The result is a view of architecture as primary - as active - as only figure - and a treatment of the ground as secondary, reactive, even residual.

In response to this prevailing bias toward the building as figural object, the emphasis upon interpretive site analysis as a precursor to design aims to encourage a student's awareness of the urban or rural landscape's figural and textural qualities. This work involves exploring analytical techniques to reveal these qualities, and to render landscape, urban, and architectural systems as integral, reciprocal, and equivalent.

A premise of this work is that in order for analytical observations of site to be able to penetrate and meaningfully corrupt the design process, the analysis must become personal, creative, subjective, and spatial. In other words, it must be undertaken as an act of design. The three techniques described here are serial and consecutive. They encourage varying methods of abstraction to render the essence of the observed landscape towards the creation of a spatial template which may be transferred and transformed. The objects of study to which these techniques may be applied are limitless. What will be shown here are works resulting from the analysis of cities, of city precincts, and blocks. I will also show this technique as applied to some well-known buildings viewed within their local and extended site contexts.

THE PROCESS

Start-up: Diagrams

An established plan-based mapping technique - the figure/ground drawing - is the point of departure. A figure/ground drawing of a city plan highlights the opposition of space (void) and mass (solid) - space is white and mass is black. To achieve this diagrammatic clarity, all evidence of topographic variation - slopes, ridges, valleys, prospects, and the mass and varied textures created by trees and other vegetation - is usually denied.

The Giambatista Nolli Map of Rome (1748) - perhaps the original figure/ground diagram - is by no means as reductive and polarized as what we have come to expect from this technique, and serves to demonstrate by comparison its potential flaws [see Fig. 1].

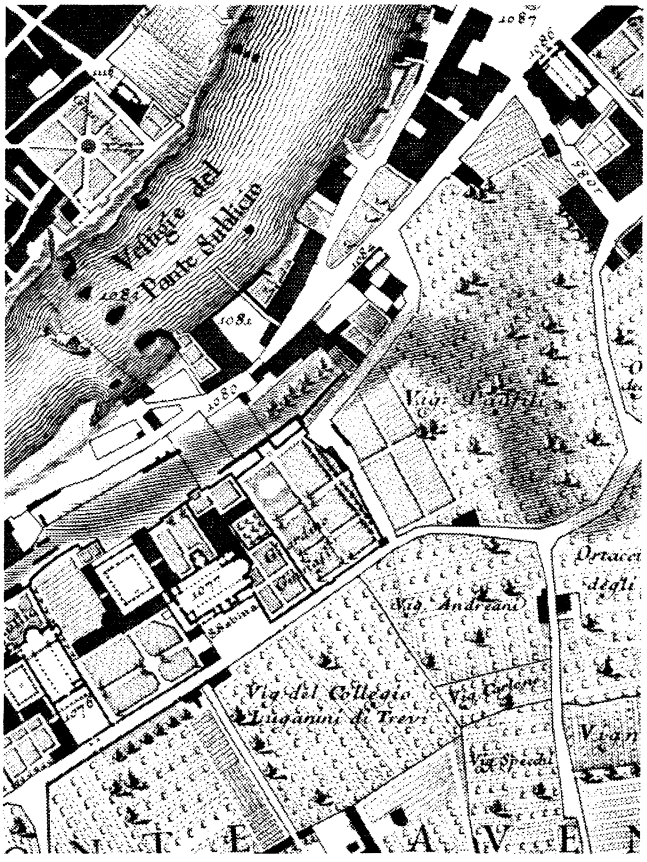


Fig. 1. Fragment of Nolli Map of Rome. 1748.

The Nolli Map reveals a variety of levels of complexity generally absent in the figure/ground drawing. The interior space of public buildings is registered as void (not solid) as if it is an extension of the public urban space defined by external streets and squares. By showing the public spaces within the solid mass of buildings, a middle ground begins to emerge.

The result is the graphic rendering of a spatial integration of public buildings with their surrounding urban landscape and the concomitant idea that neither space, nor mass, is homogenous. According to the degree to which they play a part in the public and communal life of the city, buildings are rendered either as places extending from the urban landscape, or as components of mass which create the formal boundaries of the public realm. Also, an overall impression of topographic variation, and field texture is beautifully and articulately rendered. The varied grain, scale, and orientation of agricultural fields, gardens - even of the river - are painstakingly captured. Yet, in the aspect of the Nolli which has been most influential to contemporary renderings of figure/ground drawings, ultimately the variations in figure and field fade to black and white. Both figure and field - black and white - remain homogenous, monolithic, and neutral, and in the case of the field, this becomes interpreted as no more than the "nothing" where "something" is not.

The utility of the figure/ground drawing is as self-evident as the technique is pervasive. However, it is perhaps ideally seen as a preliminary and radically reductive abstraction which performs best not in isolation, but as a base diagram capable of reintegrating layers of interpreted information regarding the site's complexities of texture and spatial character.

Technique 1: Collage

A specific form of collage is introduced to the figure/ground drawing in order to address both the third dimension - or shape of the ground - and the textural qualities of the field. Collage patterns which suggest urban and landscape textures replace the mute and definitive black and white opposition of the figure ground. In collage abstraction, a literal footprint of building form and outline is traded for an abstract pattern which favors texture and grain [see Fig. 2].

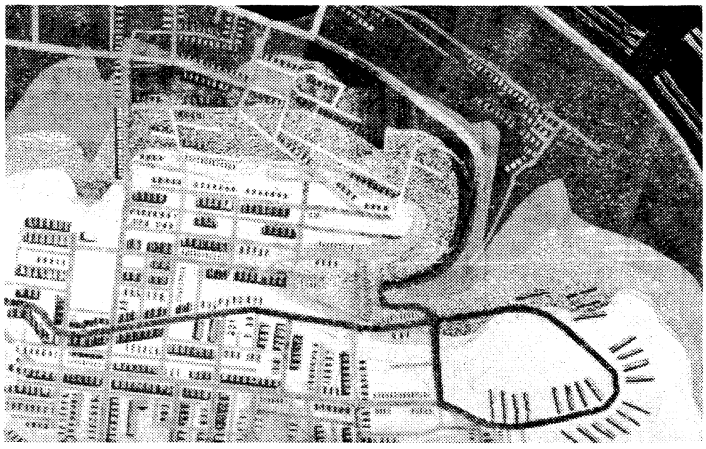


Fig. 2 Student Collage of an Urban Precinct. Pittsburgh. PA.

Collage, while a two-dimensional medium, suggests a three-dimensional reality. The careful arrangement of collage material can effectively imply variations among background, middle ground, and foreground which evoke three-dimensional relationships between built form and landform [see Fig. 3].

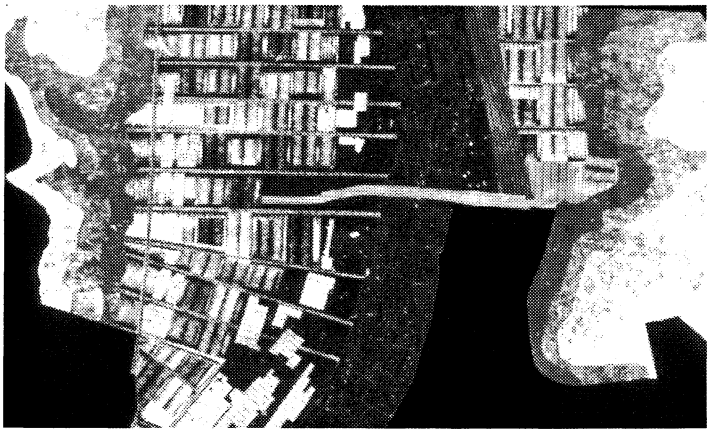


Fig. 3 Student Collage of an Urban Precinct. Pittsburgh. PA.

Through this device topographic conditions are given shape and scale equivalent to architectural structure. Applied to a series of urban-scaled studies, this technique of collage allows students to search for the synthesis of building and site giving equal value to each.

Technique 2: Drawing/Photo-Composite

Drawing as a means of construction, first in abstract plan, and then in three-dimensional projection, is introduced as a mechanism of transfer and reconstruction of the individual discoveries obtained by the student through collage abstractions and diagrams. It is the intention of this component of the process to translate the implied three-dimensional relationships explored in diagram and collage, into a precise, descriptive, and spatial understanding of the landscape subject.

The drawings are exploratory in nature, built on "hidden lines" based on alignments and guidelines [see Fig. 4].

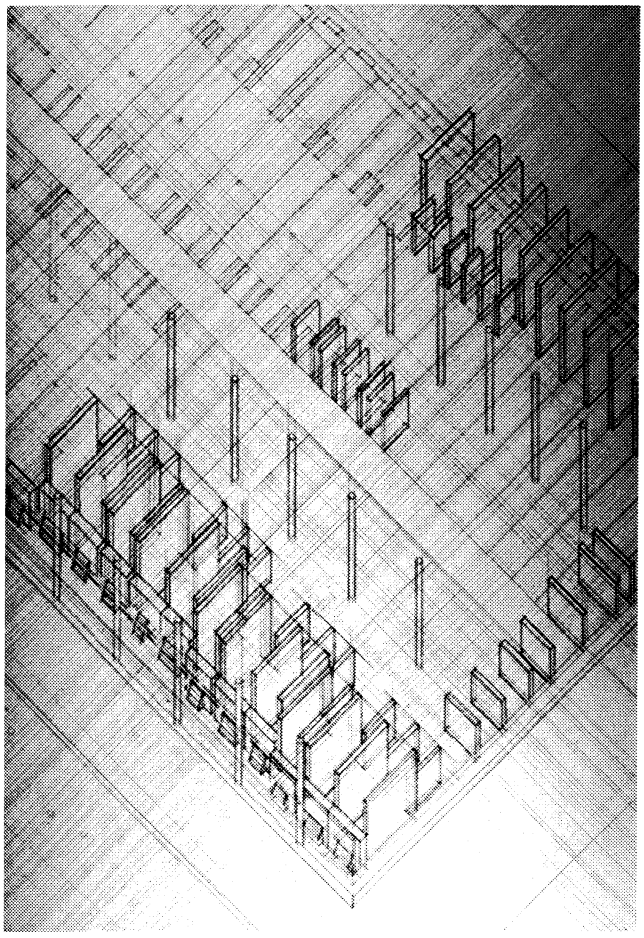


Fig. 4 Student Drawing of a City Block. Richmond. VA.

These "hidden lines" are an integral and necessary component of the drawing, not to be erased. They constitute the scaffolding which anchors the projection, and indicate the connections and relationships between elements, both of architecture and landscape. Students are asked to investigate the specific topographic form of their site and the architectural elements with which it interacts. Through this phase, there is a process of repeated returns to the site (where possible) as a means of calibrating specifically needed plan and sectional dimensions, and to correct critical oversimplifications made during the first phases of abstraction.

Interwoven with the drawing exercise is the introduction of a complementary technique of representation: the photo-composite. The photo-composite, developed originally by David Hockney, conveys a three-dimensional, spatial experience through the arrangement of multiple photographic frames taken from a fixed station point. Unlike single frame photographs, which tend to emphasize a singular view or object, the composite is able to capture relationships between elements, and in doing so begins to render the space of the subject tangible.

The student revisits the site and selects a view and matching station point based on the information that view is intended to convey. Next, multiple overlapping frames are shot (each with their own perspectival vanishing point) encompassing the intended view. Upon retrieving the developed prints, the all-important act of arranging and assembling the composite of frames takes place. The arranged view is to be biased by the student's intended communication. Because of the multiple vanishing points in the various photographic frames, some degree of distortion and fragmentation of the representation is inevitable. The student is asked to consider thoughtfully and deliberately what is to be distorted in the view, and what is to retain its clarity and continuity in the preferred arrangement. The photo-composite is the component of this process of creative analysis which represents the artifact in its full, material, and phenomenal expression.

Technique 3: Bas-relief Model

The three-dimensional projection produced in Part 2 is a working drawing for the culminating phase of this analytical process: the bas-relief model [see Fig. 5].

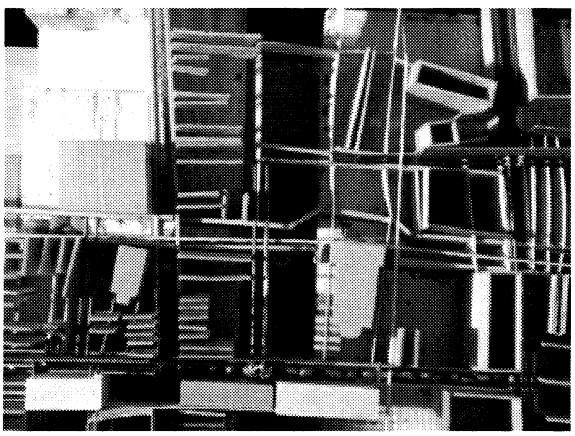


Fig. 5 Student Model of an Urban Precinct. Charleston. SC.

Based on the drawing produced, the student is asked to construct an architectural relief model which synthesizes his/her ideas about the site subject. The model may be seen as a series of two-dimensional maps interwoven into an integrated three-dimensional matrix, which portrays both the integrity of individual systems, as well as their participation in the whole [see Fig. 6].

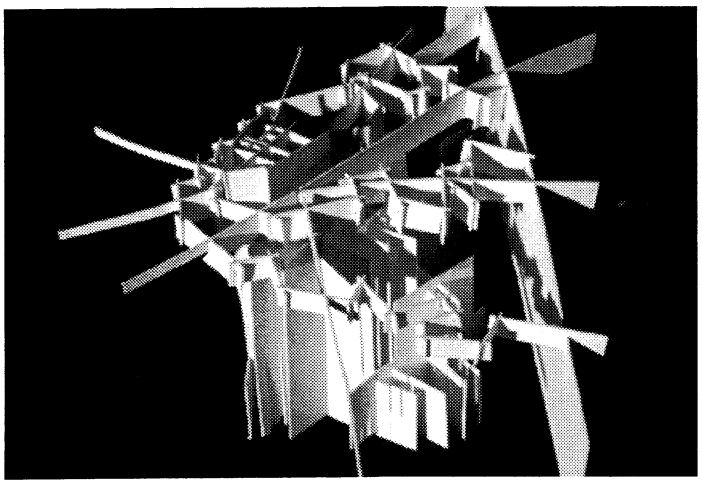


Fig. 6 Student Model of the City of Charleston. SC.

The model is meant to clarify ideas of spatial hierarchy, topography, path, and structure, using a limited palette of materials [see Fig. 7].

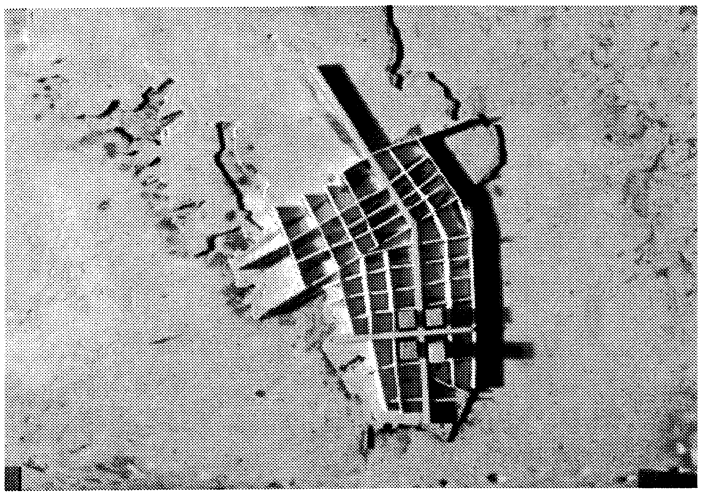


Fig. 7 Student Model of the City of Charleston. SC.

The models exploit a sculptural manipulation of planes, columns, and walls, to identify relationships and to distinguish figures from their surrounding field. The nature of the exercise emphasizes that the most important "material" to be manipulated, is the play of light and shadow made by the various depths of the construction. Figures and systems, then, are identified through their sharpness of outline in relief [see Fig. 8].

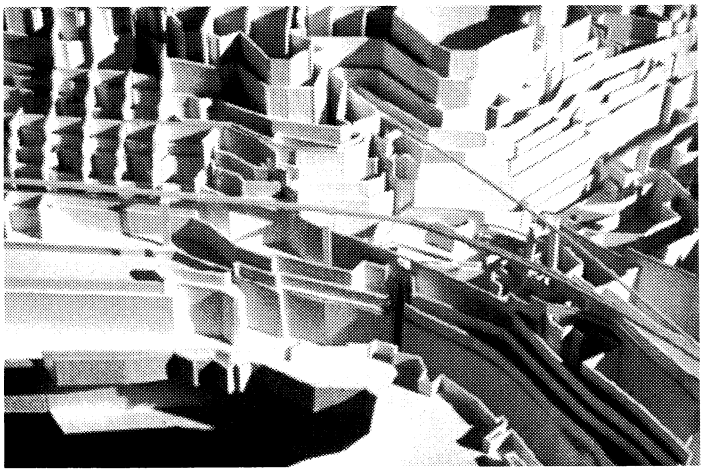


Fig. 8 Student Model of a Neighborhood in Richmond. VA.

CONCLUSION

The method of analysis described here is meant to highlight the exploratory and inconclusive nature of the designer's creative search. The challenge is to combine objective analysis - the reduction of complex ideas to abstract terms which are aspecific and thereby transferable - with the subjective search for a personal interpretation of the object of study. Through this process, students learn valuable skills of observation, documentation, abstraction, and representation which parallel a design methodology built on the use of transfer and transformation.

This pedagogy rests on the belief that design originates from shared, inherited ideas and places which have been absorbed and integrated by the individual; the designer does not begin from a tabula rasa. Only through the process of individual reflection on existing ideas and artifacts are new ones of value produced. The type of analysis here described is not a search for a single and conclusive truth, but rather for the potential of a single artifact/site/landscape to contain multiple truths which may be interpreted and filtered through the eyes of the individual designer. Perhaps Corb said it best in *A New World of Space*: "In a complete and successful work, there are hidden masses of implications, a veritable world which reveals itself to those whom it may concern - which means: to those who deserve it."

Reprogramming Midtown Atlanta

MICHAEL E. GAMBLE
Georgia Institute of Technology

. . . . markets, parking lots, highway service Stations, airports and their parking areas, transfer points between various means of transport, showroom centers along urban exit roads, residual spaces, shipping container yards, used car dealerships, auto graveyards, odd spaces between highway interchanges, unused "green spaces", junkyards, abandoned farmlands. These typologies don't offer spontaneous temporary gathering and are regulated by relentless internal laws of distribution, investment and profit. These laws have no interest in the site, theirs is no need for the site, their selling point is based on offering the illusion of belonging to a more advanced, reassuring world. In essence, they represent no sense of belonging and are non-places or voids between individual and market.

—Vittorio Gregotti

These 'terrain vagues' described by Gregotti and others, are the product of years of urban decay and suburban expansion. Once the permeate of the 'old' urban centers in such contemporary cities as Houston, Atlanta, and Los Angeles, many of these sites are under reassessment and revitalization. Ruled now by new strains of distribution, investment and profit, many questions and challenges arise as these residual spaces are re-appropriated.

This presentation addresses Midtown Atlanta, an area in the heart of the city currently undergoing rapid renewal and gentrification. *The goal of this ongoing research is to develop architectural and urban proposals that critique underlying assumptions and existing systems of value in order to re-use or retrofit neglected sites in the contemporary city.*

Architecture and Urban Planning must always be an expression of a *desire* and an instrument of *necessity* – supporting the basic needs of individuals and the collective through the resolution of multiple physical and spatial functions at various scales, and embracing our capacity to dream and imagine potential futures which over time inscribe or recondition current situations. It is this double operation, the dialectic between necessity and desire, which in many respects embodies the work of architects and urban planners.

Through the course of our research we are discovering some of the complex issues at stake as inner city neighborhoods quickly redevelop. Reasonably sound real estate values, availability of large

vacant parcels of land, historic structures in need of retrofit and preservation, tax breaks for new development, are all contributing factors. Simultaneously, one observes on the north end of Atlanta unmitigated suburban development, unprecedented sprawl and paralyzing vehicular congestion. The equation is quite simple: Midtown is situated to become a viable model for urban redevelopment, placing it's inhabitants in close proximity to their occupations, cultural and political institutions, restaurants and retail establishments.

Our assessment of Midtown and working methodology includes the following:

1. Site specific examinations of the political instruments in place, i.e. zoning ordinances, planning regulations and municipal tax structures, in order to come to know the forces that inscribe the limits of development in Midtown. Over time, these policies have arguably contributed to the demise of this once viable, central, urban environment.

2. Investigating the dynamic between predominant market forces and an evolving master plan in the cultural center of Atlanta. To identify the strengths and weaknesses of the new master plan - the 'Blueprint Midtown'. While the community has played a role in the development of the master plan, the primary audience of the Blueprint is private development. Special Public Interest (SPI) and Community Improvement Districts (CID) are to date the most promising components to evolve out of this reevaluation.

3. Attempts at alternate readings of Midtown, against that of familiar models that introduce suburban settlement patterns into the existing urban framework, promoting vehicular oriented planning which further decimates an already debilitated urban texture. Also, to challenge some of the assumptions poorly elucidated in the Blueprint regarding land use and density, and expand the framework to include the peripheral conditions of the district as and imperative to reintegrating Midtown into adjacent neighborhoods.

4. Illustrate through case studies, architectural and urban design, projects which might contribute to the economic, social and cultural viability of one of Atlanta's most promising urban environments.

What role does design research play in this current milieu? How might developers be redirected towards a larger understanding of urban redevelopment and diverse programmatic necessity? What role can architects and planners play in the development of planning and zoning documents, or the establishment of legislation regarding social and aesthetic policies?

SOME FORCES AT WORK IN THE DISTRICT

Originally planned and constructed at the turn of the century, Midtown is today home to a wide variety of Atlanta's culture and commerce - NationsBank, IBM, First Union, the Fox Theater, the Woodruff Arts Center, the High Museum, Piedmont Park, and MARTA. Though these buildings and places bring a number of people into the area, there is to date no significant urban density. What exist now, though changing rapidly, is series of nodes of activity concentrated around major thoroughfares and MARTA stations. But the neighborhood has a great system of streets and sidewalks, and is waiting intelligent retrofit and reprogramming of many of it's parcels.

As an extension of the Midtown Alliance, formed in 1978, an organization called *Blueprint Midtown*[1] was created in 1993 to oversee Midtown's impending redevelopment.[2] With the help of Consultant/Urban Planner Anton Nelessen's patented survey method, called the Visual Preference Survey™, the Midtown Alliance "actively pursued the opinions and ideas of all sectors of our community through a visual survey, a questionnaire, a workshop, and a series of follow-up review sessions."[3] As described through their website — *The purpose of the Blueprint is to stimulate new development, to provide direction for public improvements, and enhance the pedestrian environment.*

Another function of *Blueprint* is to assist developers in navigating the process of land acquisition and planning with the City of Atlanta. To accomplish this the *Blueprint* created a database of information that allows developers to see what land is available for development, details the current zoning restrictions and outlines expected uses. The *Blueprint* promotes a formal review process before any project is submitted the City Planning Authority. These are just a few parts of the *Blueprint* that promote long term changes to the physical appearances of the neighborhood.

The Midtown Alliance is active in revising the zoning ordinances for the district. Most recently, Special Public Interest zones (SPI) have been outlined to promote localized development of retail and commercial activity centered on Metropolitan Atlanta Rapid Transit Authority (MARTA) stations. Building type and use, parking, parking lots, and setbacks are some of the major elements covered in the SPI's for the Midtown district. While SPI's promote economic growth and diversity in districts, Community Improvement District (CID) allow money to be directed towards specific public improvement projects like water, public transportation, streets, parks and recreational facilities, storm water , sewage, and parking. A CID is a geographically defined district in which commercial property owners vote to impose a self tax, and then determine how those funds are spent in their given communities.[4] The *Blueprint* is currently under Review by the City of Atlanta Zoning Board, and if approved, will become the Master Plan for redevelopment.

To date, the *Blueprint* is focused on raising money and satisfying investors, in essence concretizing the interface between property owners and development. At the vanguard of this new development is luxury housing, and in some respects this already jeopardizes the long term vision of the plan. A significant challenge is to develop a strategy which demonstrates to developers how investment in Public Spaces, neglected infrastructure and Parks can increase property value. As of this draft, this crucial dimension of

the master plan has yet to be developed, and as any Atlanta resident knows, the city no longer wants to be involved in the development or management of new parks or public spaces – the ultimate goal is privatization.

PROGRAMMING

In "From the Ground Up: Programming the Urban Site", Andrea Kahn, makes the case for an approach to urban programming based on a close understanding of the site through 'site construction'. Against traditional urban planning approaches which privilege the 'veduto' or aerial view of the city as a series of objective, homogenous interwoven enclaves, which "eliminate any hint of the I/eye", multi-valent readings of site propose possible futures based upon a larger understanding of specific site forces. Conceiving of site as a compilation of urban narratives, both literal and fictive, might propose "stranger paths through the city". Site construction, through the evaluation and invention of urban narratives "proffer expansive visions to include the [not] city- that resistant space that defies reductive classification, the mobile ground that refuses to be contained."

A concern with context or site construction as outlined above is more often than not overshadowed by universal practices governed by mass communication and shapeless aggregations. Informed not by the body, but by highway infrastructure, service related terrains and voids in the urban infrastructure created by errant zoning and economic policy, such 'atopic' spaces are in need of reassesment. With regards to this conception of site and programming, Vittorio Gregotti writes in "Inside Architecture" about the phenomenon of Atopia~ the principles of settlement based on something other than the idea of place.

> *Perhaps the formal organization of these atopical typologies needs to be more radical. They do not seem to draw significant morphological materials from their own existence or from their own nature as celibate machines, or use their extraneous state as a dialectical element with regard to context. Certain products of modern engineering present poetic qualities based on their internal coherence and on a dialectic with their context. The most obvious defect is the inability to regulate vast open spaces that functionally accompany them and the inability to design such spaces so that they mediate with surroundings and with the land.*

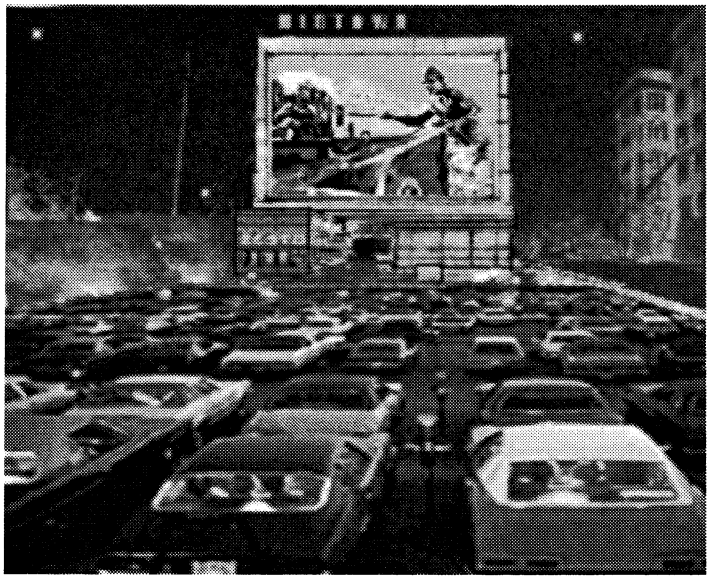
Atopicality, according to Gregotti, might be interpreted as a sign of an inevitable mechanism of international interdependence (cultural, political, economical) that has yet to find a significant spatial organization in architecture and takes the form of control and domination, against community attempts to secure traditions.

Through the specific sites examined: parking lots, brownfields, newly inscribed "special public interest' and 'community development' zones, dysfunctional gaps in the city i.e. interstate viaducts and tunnels, we are searching for poetic qualities based on an internal and external coherence and a dialectic with their context. The most obvious defect today with these sites is the inability to regulate the open spaces which functionally accompany them. We are investigating ways and means to comprehend and design such spaces so that they mediate with surroundings and with the land.

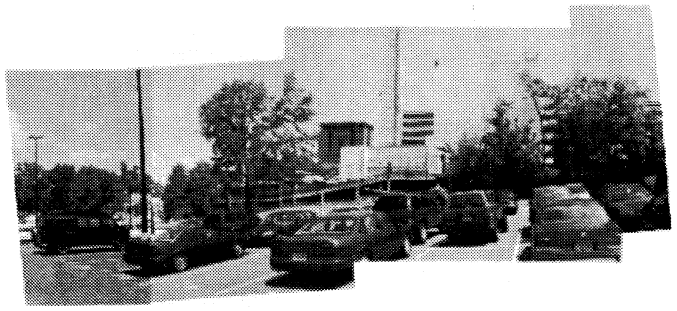
PROJECTS

The (Con) Temporary Film Institute

http://www.gg-architects.com/driveinhome.html



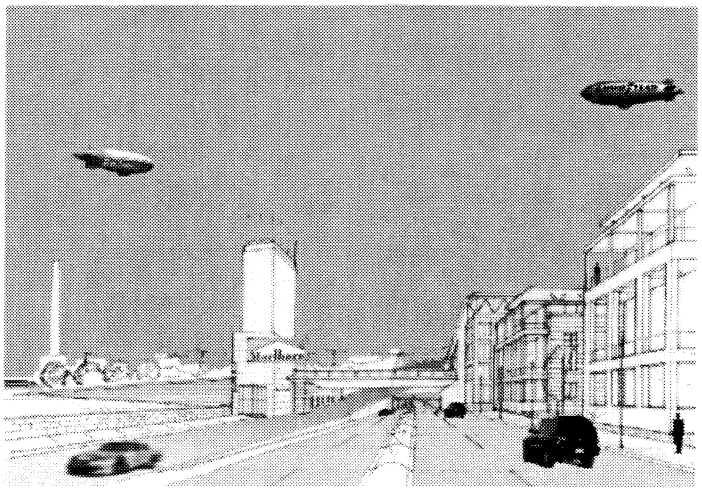
Public space is where the meaning and the unity of the social is negotiated. As 'Public Spaces' are slowly absorbed by privatization and the very definition of the 'Social' evolves, one must take stock of those spaces, public and private, which constitute a primary place of interaction. The parking lot, as many of us know, is the most frequently experienced urban space in Atlanta. As a component of a viable urban fabric, Richard Dagenhart states "Atlanta's parking lots lead to nowhere." During the day, the (Con)Temporary Film Institute operates as most other parking lots in the vicinity, accommodating the in and out of traffic. In the evening, when many of the adjacent lots have little to no occupancy, the CFI is busy, showing a double feature 7 nights a week outside and inside. Park your car, walk up and down Peachtree Street, come back, watch a film and visit with friends. Demand will be great for each of the 99 spaces in the lot. The outside seating and queuing area adjacent to the diner will be busy. The aluminum frame, based on the modular of simple scaffolding design, and lightweight skin contribute to the ephemeral nature of the project. Upon short notice, as new clients come forward with plans for permanent structures, the (Con)Temporary Film Institute can be disassembled and reconstructed elsewhere, at minimum cost and maximum reusability.



Events, large scale auto, etc. conventions, to sound affordable housing, workspace and shopping spaces, our design embraces the existing street and circulation patterns of the contemporary city. These new amenities are woven into a 1.9-mile racing loop. Multiple speeds and layers of movement overlap at numerous instances in the revitalized neighborhood. The infield of the development is open to vehicular, recreational and pedestrian circulation 24/7, while the track, the greatest 20th century sporting venue in the city, supports a variety of functions ingrained in the daily lives of Atlanta's 3 million inhabitants.

Another Atlantic Steel

http://www.gg-architects.com/atlanticsteel.html



The now defunct Atlantic Steel, America's largest brownfield reclamation project, is situated to become a model for urban redevelopment. Atlanta, haven to numerous large scale sporting facilities and the consummate auto congested contemporary city, provides the social, economic and political narrative for this proposal. From defensive driving classes, weekend NASCAR and Grand Prix

5th Street Bridge Plus

William Davis

http://www.gg-architects.com/masters.html

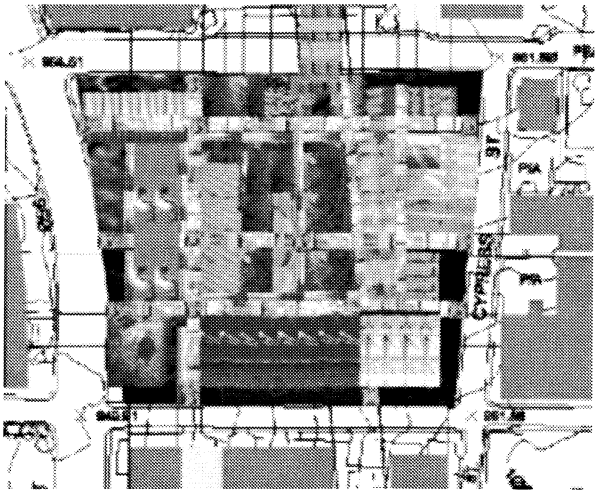
"With the conditions of the individual communities on either side of the Downtown Connector pushed to the edge that their programs will allow, a calculable space of 'inbetween' is created – a link. This project is concerned with how to engage this

limited space of infrastructure that has to date been an overlooked void, invisible. A new bridge, which is an extension to Georgia Tech's center for Literature, Culture and Communication serves to enhance both districts as well as the greater urban community."

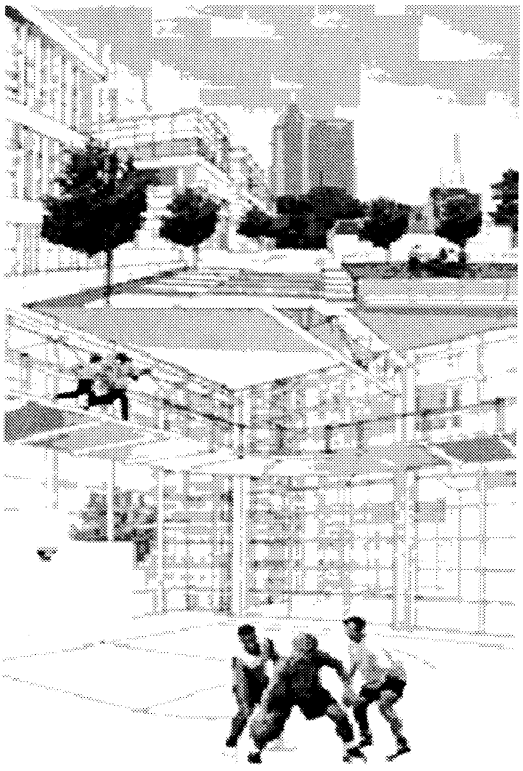
Public-Private Interface: *A New Park And Community Center At The Midtown Marta Station*

Kristen Brantley

http://www.gg-architects.com/masters.html



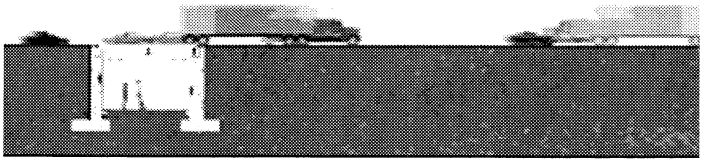
"The Midtown district in deficient in a variety of scaled open spaces. The Blueprint Midtown's approach 'public space and parks' is to date 'as yet defined' and in this respect is lacking. The issue of vicinity to development nodes has been overlooked. This specific site belongs to a Special Program Interest Zone. This investigation, defined as a Public/Private initiative, seeks to outline ways in which Private Corporations can begin to collaborate with the city in order to enhance the public domain."

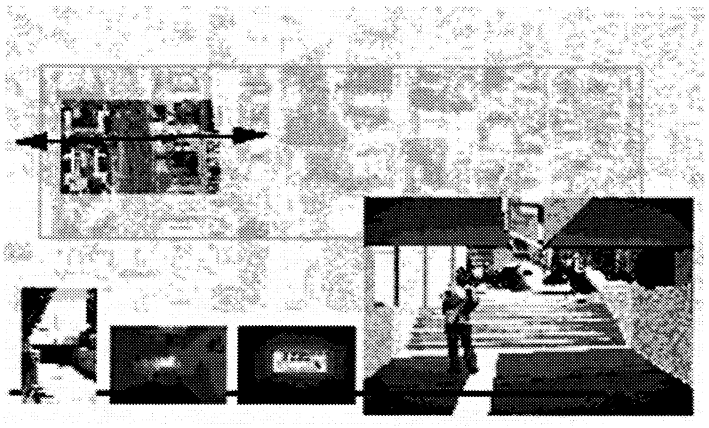


Revealing Diverse Publics: A New Market And Plaza At The 3rd Street Tunnel –Michael Reiman

http://www.gg-architects.com/masters.html

"Intentions must be diverse in order to fill the needs and desires of a wide range of individual interests. This tunnel, for decades ignored and yet used daily by hundreds, leads this investiga-





tion towards a means to retrofit, overlap and intensify programs in inventive ways to create a social space. Inherent flexibility is imperative if this new space is to have lasting meaning within the ever changing landscape of the city."

TOWARD A CONCLUSION

As we observe the dramatic reallocation of development resources toward Midtown and the efforts of public and quasi-public institutions to manage and condition this rapid growth it becomes clear that Midtown is in danger of being overwhelmed by the forces of privatization, exclusion and market oriented commodification. Without addressing the broader needs of the district, beyond luxury housing and restaurants, or investigating alternate solutions to some of these pressing problems, the forces of flexible late capitalist accumulation and standardization are poised to transform Midtown into a homogeneous landscape sanitized of the diversity which characterizes urban life.

Many of the proposals in this folio address specifically those civic and public institutions and patterns which have been slowly excluded or disintegrated from urban planning discourse, and in this sense, are aligned with the problem of memory, ethical/moral responsibility and life cycle. Understandably, these proposals have limits, however, new models must be revealed and investigated if

urban revitalization is to work to support the many functions and desires of the city.

The catalog of forms is endless: until every shape has found its city, new cities will continue to be born. When the forms exhaust their variety and come apart, the end of cities begins.

Italo Calvino

NOTES

[1]Blueprint Midtown website: *http://www.blueprint-midtown.org.*

[2]*http://www.blueprint-midtown.org.*

[3]Ibid.

[4]*http://www.blueprint-midtown.org.*

COMMUNITY BUILDING/BUILDING COMMUNITY

Moderators: Lance Jay Brown and Ethan Cohen,
City College of the City University of New York

Prospects for Community Design in the Urban Redevelopment Setting:

Weaving a Community in Fort Lauderdale

ANTHONY ABBATE
Florida Atlantic University

Community Activism in an Era of Reduced Expectations:

The Revival of Community Design Programs at Schools of Architecture in North America

THOMAS BARRIE
Lawrence Technological University

"Path to Progress":

The Road to Community Design

JOHN EDWARDS
PAULETTE HEBERT
ROBERT MCKINNEY
THOMAS SAMMONS
University of Louisiana at Lafayette

Mitigating the Effects of Sprawl and Abandonment in Two Small Southwestern Towns:

A Design Studio

JOSEPH BILELLO
URS PETER FLUECKIGER
Texas Tech University

Prospects for Community Design in the Urban Redevelopment Setting:
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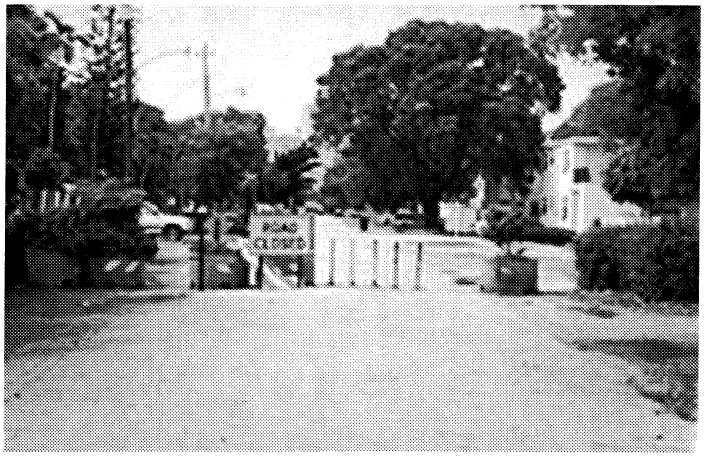

Fig. 1. Temporary street closures have been installed to stabilize residential areas of the district. Photo: FAU School of Architecture 1998.

INTRODUCTION

As the professional fields of architecture and planning transition into the new century, we are often visibly reminded of the unmet challenge of urban neighborhood revitalization. Urban professionals are haunted by the troubling notion that too many of our nation's core inner-city neighborhoods continue to deteriorate economically, socially and physically. Despite vast expenditures of federal, state and local dollars and the delivery of numerous revitalization plans and strategies only a few success stories can be cited. As inner cities continue to deteriorate, the debate on how best to aid them grows increasingly divisive.[1] The criticism has also been leveled that revitalization success stories are often urban renewal projects and extensions of the unbridled corporate investment so pervasive in Central Business Districts across the country.

The purpose of this paper is to shed new light on the enabling factors and conditions for urban neighborhood redevelopment. The issues are complex and the frustrations seemingly endless. When urban form is contemplated in urban redevelopment, the challenge then becomes one of implementation. Here the community decision-making process becomes critical as urban plans and zoning codes must reflect a clear design vision. The vision must fully anticipate the development considerations of private investors and city officials. The following case study of Fort Lauderdale's Flagler Heights neighborhood is the story of one such neighborhood. The neighborhood study emanated from a larger urban redevelopment movement in South Florida known as "Eastward Ho!" to shift development back to South Florida's older, eastern cities and away from the fragile Everglades ecosystem. Flagler Heights, a Fort Lauderdale neighborhood, is located in the geographic center of this zone. The case study provides an analysis of the physical, economic social and regulatory factors and conditions for creating infill redevelopment opportunities within a designated "Urban Village" District.

A REDEVELOPMENT PERSPECTIVE

The on-going plight of our nation's inner cities appears to have taken a back seat to another pressing and, perhaps, more vocal discussion regarding urban sprawl. Anti-sprawl and anti-Edge City writers pay homage to traditional urban centers and note how sprawl drains valuable resources from the urban core. However, the sprawl/anti-sprawl debate focuses much more on the suburban development pattern and its impacts on transportation, the environment and quality of life issues.

One can characterize "distressed" inner-city neighborhoods as areas where the economic and social fabric of community has been rent leaving little semblance of the neighborhood environment that once existed. Outward manifestations include concentrations of poverty, deteriorated properties, high levels of absentee ownership, antiquated or non-existent public infrastructure, high crime rates, poor public schools and a lack of clearly defined active and passive public space.

The complexity of urban redevelopment issues requires a systematic design and planning response. Reinvestment strategies must involve multiple stakeholders including residents, investors, and city officials. The redevelopment plan must focus on the future design of the neighborhood as well as economic, social and physical needs. While the level of citizen involvement will vary from city to city and neighborhood to neighborhood, it is important for residents to be engaged in the visioning process for what their

neighborhood will become. Residents must first become familiar with the physical elements of their neighborhood. Nodes, paths, edges, districts and landmarks are the physical elements that give form to the neighborhoods by evoking an "image" that is recognized.[2] These elements also serve as tools for designers and planners in discussions with neighborhood residents regarding proposed redevelopment activities.

Jane Jacobs' writings provided a strong case for careful observation and consideration of the physical elements of neighborhoods. Jacobs viewed the city as a living forest with a complex ecosystem in which the old growth co-existed with the new growth and were dependent on one another for their sustenance.[3] Typically, urban infill strategies involve some level of land assemblage to make projects economically feasible. The economics of a more small-scale, incremental redevelopment scheme would undoubtedly cause apprehension among private developers and city officials.

Yet a more incremental and integrative approach to urban neighborhood redevelopment is essential to the conception of urban infill. In fact, blending the old with the new should help preserve the urban integrity of city neighborhoods as they evolve through an eclectic, slowly organic redevelopment process.

The following section provides the policy background that stimulated South Florida's urban redevelopment planning initiatives whereby many cities amended their comprehensive plans and zoning codes to incorporate ideas promoting pedestrian circulation and compact, higher density development.

EASTWARD HO!: SOUTH FLORIDA'S URBAN REDEVELOPMENT INITIATIVE

Legislative Background

In the State of Florida, the Governor's Commission for a Sustainable South Florida was established in 1995 to help ensure that a healthy Everglades ecosystem could co-exist and be mutually supportive of a sustainable regional economy. A major goal of the commission was to create sustainable communities in Southeast Florida.[4] The sustainability initiative was linked to the state 's 1985 Growth Management Statute that was recently amended to further direct growth away from the Everglades and toward the older central cities to the east. The new urban infill and redevelopment legislation allows local governments to designate Urban Infill and Redevelopment Areas for the purpose of "holistically approaching the revitalization of urban centers, and ensuring the adequate provision of infrastructure, human services, safe neighborhoods, educational facilities, job creation, and economic opportunity."[5]

In its 1995 *Initial Report* the Governor's Commission for a Sustainable South Florida recommended the establishment of an Eastward Ho! study area that was delineated as the land between and around two major railroads and the interstate highway corridor from southern Miami-Dade County north to central Palm Beach County. The area includes the region's major downtowns, airports and seaports.[6] This region, originally opened up by Henry Flagler's railroad in the early part of the 20th century, has since become increasingly deteriorated in many locations with concentrations of brownfields, dilapidated housing, conflicting land uses and crime.

Redevelopment Activity within the Eastward Ho! Corridor

Economic development within the Eastward Ho! Corridor consists primarily of urban redevelopment activities within the downtown areas.[7]

A recent study of the financial impediments and solutions to redevelopment in the Eastward Ho! Corridor highlighted several key problem areas including the cost of redeveloping older communities, gentrification, lack of affordable housing, and local government inaction.[8] The study also pointed out the lack of "holistic" community plans to address the complex issues of redevelopment in the urban core areas.

FORT LAUDERDALE'S FLAGLER HEIGHTS REDEVELOPMENT PLAN

Typical of other cities within the Eastward Ho! Corridor, Fort Lauderdale's economic development activity occurs within the context of urban redevelopment. Fort Lauderdale has experienced substantial redevelopment activity both along its beachfront and in the downtown area. Despite their apparent success as predominantly economic generators they contain minimal infrastructure to support transit, mixed uses, and unprogrammed public activity.

Fig. 2. Aerial view of the Flagler Heights area north of the Fort Lauderdale Central Business District. Photo: the City of Fort Lauderdale

The Flagler Heights Neighborhood, immediately north of downtown Fort Lauderdale, is part of a larger Community Redevelopment Area known as the Northwest Progresso Flagler CRA. The city's 1989 Comprehensive Plan designated the neighborhood along with other adjacent downtown neighborhoods as a Regional Activity Center (RAC). The purpose of the RAC designation is to nurture a functional downtown containing an employment center, major governmental offices, cultural facilities, housing and retail; shopping. To achieve the objectives of the Comprehensive Plan, the RAC was divided into five distinct zoning districts including City Center, Art and Science, Urban Village, Transitional Mixed-Use and Residential and Professional Office. The Flagler Heights neighborhood received the Urban Village designation, intended to support the City Center by providing a mix of housing, mixed uses, office, commercial, and institutional uses.[9]

The vision of Flagler Heights as a functional "urban village" was substantiated by two prior community design initiatives organized by the local chapter of the American Institute of Architects and Florida Atlantic University and funded in part by the City of Fort Lauderdale. The former plan, *A New Vision for Flagler Heights /Progresso*, by Christopher Alexander and the Center for Environmental Structure, was intended to help city officials and neighborhood residents visualize a pedestrian friendly, urban village environment, while establishing a process for incremental transformation. The latter, Charles Euchner's *Toward an Urban Village in Flagler Heights*, helped build neighborhood consensus concerning identifiable problems and solutions. Both studies provided an optimistic assessment for the future redevelopment of Flagler Heights.

The Alexander assessment exercise consisted of a three-day process that included an all-day workshop with neighborhood residents and community leaders. The process acknowledged that while Flagler Heights was not perceived to be a positive place to live or create a new business, there were hundreds of good and useful things present in the general area including homes, businesses, parks, and small communities, that must be preserved in any future redevelopment. To this end, Alexander proposed the creation of two essential structures: 1) a pedestrian environment of public spaces and walking paths, a network that would become the "living room" of the neighborhood and 2) a process of transformation and "piecemeal growth" through which Flagler Heights could gradually reinvent itself as a vital and living place.[10] The incremental redevelopment approach espoused by Alexander is significant as it clearly deviated from the neighborhood master planning process that South Florida was more acquainted with. To implement the community's vision and goals Alexander recommended that Flagler Heights be designated a mixed-use "Urban Village" with a special zoning district backed by a special development process. The implementation plan also recommended initiating a special planning process for the Flagler Heights Urban Village. The special planning process included establishing a collective vision of the landowners, residents and local businesses; block-by-block and lot-by-lot diagnosis of the neighborhood; identification of five concrete small-scale construction projects that would jump start the redevelopment effort; and a larger scale plan of open space, and as a matter of immediate priority, a physical master plan of pedestrian space. Alexander did not recommend a specific zoning density believing that this should be left to the domain of the special planning process.

The Euchner Plan focused on four primary areas: 1) community centers or focal points, 2) the circulation system, 3) the periphery or edges, and 4) outside relationships or linkages. For each focus area, neighborhood potential and problems were identified along with solutions, their rationale and, finally, implementation strategies. An example within the plan of both a community center and a circulation improvement is the "Boulevarding of Third Avenue." The identified problem was that Third Avenue does not fulfill its potential as a gathering place for commercial activity and community life. The potential for Third Avenue is that of a street with pleasant paths with viable businesses fronting upon a "memorable" boulevard. The suggested solutions to the problem included reducing the space available for traffic, widening sidewalks, installing medians, extending sidewalks into key intersections, installing brick crosswalks and constructing public art, special lighting and other markers along each block of the boulevard. From an implementation standpoint, the plan recommended the use of a proposed $30 million bond issue for improvements to parks for "linear green spaces", the city's five-year capital improvement program and tax increment financing funds from the larger Community Redevelopment Area.[11]

Despite widespread community support, the proposed incremental improvements and redevelopment strategies advocated by each plan were not implemented in the years to follow. Changes in the organizational structure of the city's government, redevelopment focus on beachfront and downtown improvements, and general apathy toward inner-city neighborhoods were several reasons commonly cited by neighborhood residents and property owners. Subsequent ad hoc actions, such as the closing of three through streets (Fig.1), despite their rough and temporary impression, have led to a perceived stabilization of the neighborhood's residential core consisting of predominantly single family and duplex dwellings.

In order to reinvigorate development interest, the city's Downtown Development Authority requested the assistance of the Department of Urban and Regional Planning and School of Architecture at Florida Atlantic University to devise an implementation plan for the redevelopment of Flagler Heights. The deliberative nine-month collaboration focused on neighborhood consensus building and the development of a working relationship with city officials. The plan, entitled A *Call for Action*, recommended a three-year Targeted Improvement Program that built on the neighborhood's prior planning and community design initiatives. The key components of the plan included a recommendation for working partnership agreement between the various redevelopment agencies and the City Commission to ensure the plan's full implementation; a neighborhood stabilization and targeted infrastructure improvement plan including street, sidewalk and drainage improvements, land assembly, concentrated code enforcement, and right of way and urban design guidelines; regulatory and programmatic revisions including substantial amendments to the neighborhood's Urban Vil-

lage zoning code, organization of the city's Urban Land Development Regulations, improvements to the local permitting process, and targeting of federal, state and local economic and community development funding programs; and a management and performance evaluation plan that would measure the timeliness and effectiveness of the plan's three-year implementation schedule.[12]

The creation of the implementation plan for the Flagler Heights Urban Village faced certain obstacles and impediments including property deterioration, a fragmented land use and ownership pattern, aging or non-existent public infrastructure, absentee ownership and crime. Exacerbating these distressed conditions was a growing level of land speculation that threatened the vision of a Flagler Heights Urban Village. Inflated land costs also impacted the city's ability to acquire and assemble properties for potential mixed-use projects. But perhaps the most exasperating impediment to plan implementation was the Urban Village zoning code itself. It became abundantly clear after several neighborhood meetings that neighborhood pioneers - new property owners and small investors, had become completely frustrated with the new zoning code and with the city's zoning administrators.

The study team began with a survey and analysis of the physical aspects of the Flagler Heights Urban Village (see Figure 3). The survey considered the neighborhood's existing land use and transportation pattern, condition of private property, and the quality and extent of public infrastructure. The study team contemplated the "action-driven" nature of the neighborhood plan in performing the land use analysis component. As such, a market perspective was applied that considered the "competitive advantage" of Flagler Heights within the local economy. The assessment indicated local economic capacity with respect to the neighborhood's strategic location and proximity to the downtown, principal roadway access, land availability and zoning flexibility. However, the assessment also indicated economic shortfalls in terms of street infrastructure, property maintenance, neighborhood appearance and zoning compatibility. While the neighborhood demonstrated obvious strengths and advantages, the fragmented land use pattern and lack of public infrastructure have created real economic disadvantages that effectively negate the neighborhood's redevelopment capacity.

A strong correlation appeared to exist between the level of public infrastructure investment and private property conditions. The quality of the streetscape suddenly became a clear, identifiable issue. What became apparent was that where public infrastructure was in place and private improvements were made there was a better chance of success. Public infrastructure was not perceived as a guarantee that physical improvements in the private sector would occur. However, where a clear streetscape, sidewalk and drainage system was in place, private investment appeared to enjoy higher property values.

The study team sought to engage various scales of architecture and urban design in the participatory community workshop process utilizing a technique for establishing a community inventory of opportunities and priorities. This system was based on *Design Michigan*, a model developed by the University of Michigan and the Cranbrook Academy.[13] The residents were given choices of how new redevelopment activity could be integrated into the fabric of their existing neighborhood environment utilizing visual representations of environments supporting similar urban densities and activities and the previously adopted vision and plans developed by Alexander and Euchner.

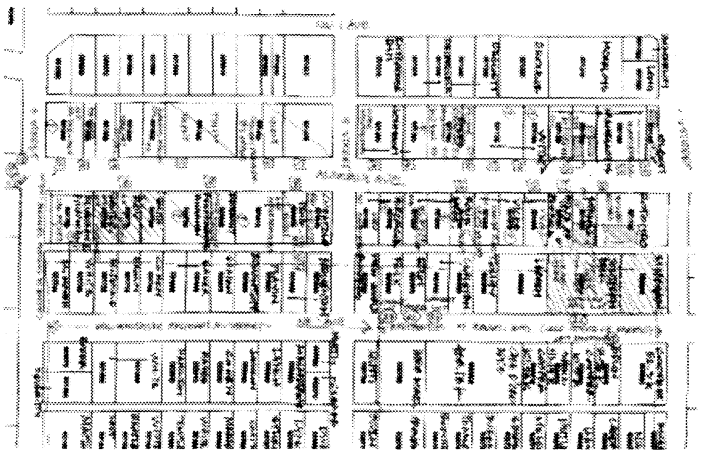

Fig. 3. Portion of physical survey of the Flagler Heights Urban Village Zone. Drawing prepared by David Benjamin PhD MNAL. and Anthony Abbate.

A critique of the newly adopted Urban Village zoning code was performed as an on-the-ground assessment using several different development scenarios. The study team proposed various mixed-use developments for typical parcels within the neighborhood. The assessment also included a market analysis to determine the economic feasibility of each development scenario. While the intent of the zoning code is clear, its application has proven problematic. For example, while the ordinance- clearly describes development and uses consistent with a community vision for an "urban village", it does not specifically provide for mixed-use development as a permitted use. The study team recommended that the zoning code be sufficiently clear so that a conceptual plan could be prepared without ambiguity as to how various sections of the code might apply to the project. A stand alone, fully self-contained Urban Village code was recommended that would anticipate and facilitate both incremental and large-scale mixed-use projects. All parking, landscaping, signage and compliance issues in particular would be included specific to and consistent with the intent and purpose of the Urban Village District.

In order to test the utilization of the existing Urban Village zoning code, the study team prepared a development plan for a selected parcel of assembled land with 200 feet of street frontage. The particular development scenario consisted of a 40-unit multi-family apartment complex. The resulting schematic plan was driven by the requirements for on-site parking and setbacks. The plan graphically portrayed the difficulty in meeting the intent of the code to design a positive pedestrian environment. It was determined that the standard requirements for parking and landscaping had a significant impact on the project's design. Even with a reduction in residential parking requirements to 1.2 spaces per dwelling unit, the specific parking and landscaping requirements for on-site ve-

hicular use areas offered no flexibility or opportunity for creative design that would promote or produce development consistent with the stated intent, purpose and vision of the Urban Village District.

Also problematic was the zoning code's lack of attention to existing nonconforming structures. One of the most promising and exciting redevelopment opportunities identified by the residents of Flagler Heights was the reuse of abandoned warehouse buildings along a railroad corridor skirting the western boundary of Flagler Heights. The warehouse district provided a real test for the type of incremental development first envisioned in Alexander's study and subsequently supported in the Euchner and University plans. It was soon learned that the Urban Village zoning code did not anticipate adaptive reuse plans for nonconforming structures. This forced the owners to go through an expensive and time consuming permitting process for even the smallest incremental property improvements such as window replacements, awnings, and signage.

The university's plan built on the citizen participation process began by Christopher Alexander and further enhanced by the summer long planning study led by Charles Euchner. Indeed, an eclectic community had evolved with an active neighborhood association comprised of new property owners and small investors. This breed of urban pioneers purchased small cottages in the neighborhood and one-by-one gradually improved whole city blocks. The pace and scale of Flagler Heights redevelopment has suited the neighborhood association. They have also endorsed the incremental, pedestrian oriented development pattern recommended by Alexander and Euchner. The challenge for the University's study team was to devise an action plan that would bring their urbanized village dream to reality while preserving the community mosaic.

Ultimately, the success of *A Call for Action* would require the political will to move the recommendations forward through the local decision making process. The fact that the neighborhood has logistic proximity to the larger downtown area was a clear advantage. However, its proximity had already induced a discernible level of speculative land assembly that could compromise the integrity of a functionally integrated urban village. Political leadership would be needed to approve the regulatory, programmatic and public infrastructure recommendations intended to inspire the implementation of the neighborhood's vision of an urban village environment.

Each of the plans evolved from a continuous and open participatory process with community design issues serving as the focal point of discussions. From these various workshops, tenacious neighborhood residents created an eclectic tapestry of mixed-uses and assorted architectural preferences sewn together by a network of paths, sidewalks and neighborhood parks.

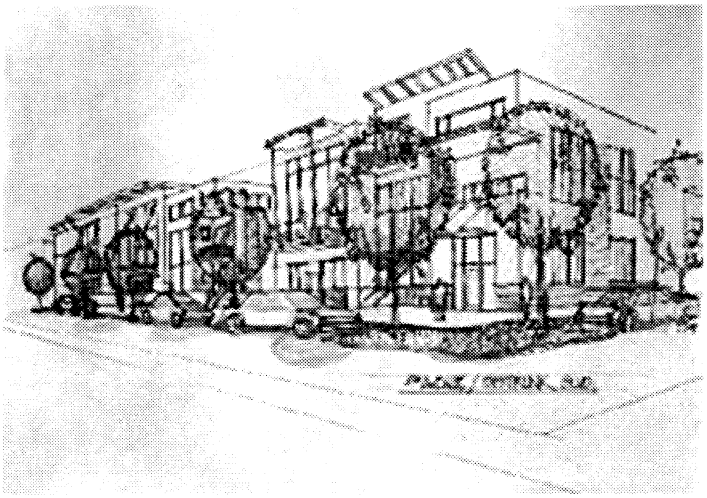

Fig. 4. The Urban Village Mixed used development. Drawing by Douglas Mummaw. 4th year student. School of Architecture. Florida Atlantic University.

LESSONS LEARNED

Policies and strategies for inner-city neighborhood redevelopment need to consider the existing built environment along with any emerging investment pattern that will ultimately need to be integrated into the larger redevelopment theme. The level of community engagement is critical. Capacity and consensus building will require patience and a long-term planning commitment. There are no quick-fix solutions for distressed inner-city neighborhoods. And, as in the case of Flagler Heights, it may require several over-laying planning studies to ultimately create the impetus for change. After all, neighborhood disinvestments did not occur over a period of months but rather during a span of several decades.

In Fort Lauderdale consensus building concerning the redevelopment of Flagler Heights has been on going for several years. The redevelopment of Flagler Heights as an urban village district will eventually provide the opportunity to create higher density and mix of new jobs and affordable housing for inner -city residents. The redevelopment of a neighborhood CRA could also serve as a model for other CRA activity within the Eastward Ho! Corridor which to date has primarily benefited downtown central business districts.

Neighborhood leaders including new homeowners and small investors spurred the redevelopment potential of Flagler Heights who coalesced around issues such as crime, traffic, and the general blight attributed to absentee property owners. The political development of the neighborhood was enhanced with the appointment of neighborhood property owners to the Community Redevelopment Agency Advisory Board. Neighborhood representatives are also politically active, regularly attending Downtown Development Authority and city commission meetings.

On an ongoing basis the community participates in regular design workshops and reviews of graduate level design studio projects at the School of Architecture.[14] This involvement developed increased awareness and fueled discussion about the role of architecture and design in the community vision for development and urban infill.

The university's plan revealed that having resources, programs and regulations do not guarantee redevelopment activity. It also demonstrated that the roles of municipal planning and the design professions are more effective when inflected toward a broader, more transparent design process. Sustainable neighborhood redevelopment will require working public/private partnerships involving key stakeholders, user-friendly land use regulations, carefully crafted funding mechanisms, professional management, built-in performance measures, and a clear articulation of the urban design structure and opportunities for design education and public participation.

Physical solutions alone will not solve economic and social problems, yet economic vitality and community stability cannot be sustained without a "coherent, legible" and "supportive" physical framework. The question then becomes whether an organic and incremental redevelopment plan open to diverse design tendencies could be defined as a coherent and supportive physical framework. It just may be that the concept of a diverse, mixed-use, pedestrian-oriented Urban Village District can effectively be achieved through an appreciation and understanding of a woven tapestry.

NOTES

[1]For a more detailed discussion of the economic advantages of the inner city and the shifting role of government see Michael E. Porter, "The Competitive Advantage of the Inner City," *Harvard Business Review* 73 (May-June 1995): 55-71

[2]See Kevin Lynch, *The Image of the City* (Cambridge, MA: M.I.T. Press, 1960)

[3]This perspective was in keeping with her criticism of urban renewal practices that replaced 'blighted' areas with new development. See Jane Jacobs, *The Death and Life of Great American Cities* (New York: Random House, 1961)

[4]South Florida Regional Planning Council, "Eastward Ho! Revitalizing South Florida's Urban Core." 1996.

[5]State of Florida, *The Growth Policy Act*, 1999.

[6]*Eastward Ho! Revitalizing South Florida's Urban Core.*

[7]Florida cities are enabled pursuant to Chapter 163 of Florida statutes to designate certain "blighted areas" as Community Redevelopment Areas (CRAs). The city's Community Redevelopment Agency (often the city commission) then prepares a redevelopment plan for the area detailing proposed redevelopment activities that might include transportation improvements, housing, office, retail and capital improvements. Land assembly through site acquisition is one of the more common practices of Community Redevelopment Agencies. Tax Increment Financing (TIF) is the principal financing tool for public infrastructure projects within CRAs.

[8]FAU/FIU Joint Center for Environmental and Urban Problems, *Eastward Ho! Financial Impediments and Solutions to Redevelopment*, 1998.

[9]City of Fort Lauderdale Ordinance C-97-19, 1997. *Unified Land Development Regulations, Volume II.*

[10]Christopher Alexander, "A New Vision for Flagler Heights/Progresso." The Center for Environmental Structure, 1996.

[11]Charles Euchner, "Toward an Urban Village in Flagler Heights." 1996.

[12]Anthony Abbate, and Edward P.Murray, "A Call for Action: The Flagler Heights Target Improvement Program." College of Architecture, Urban and Public Affairs, Florida Atlantic University, Fort Lauderdale, FL, 1999.

[13]Jack Williamson, "Community Design Management." Design Michigan, Cranbrook Academy of Art, 1995.

[14]Anthony Abbate and Margi Glavovic-Nothard, Design IX Studios, School of Architecture, Florida Atlantic University, Fort Lauderdale, FL, 2000.

Community Activism in an Era of Reduced Expectations:

The Revival of Community Design Programs at Schools of Architecture in North America

THOMAS BARRIE
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"Perhaps never in history have the talents, skills, the broad vision and the ideals of the architecture profession been more urgently needed. The profession could be powerfully beneficial at a time when the lives of families and entire communities have grown increasingly fragmented, when cities are in an era of decline and decay instead of limitless growth, and when the value of beauty in daily life is often belittled."

—Building Community, A New Future for Architecture Education and Practice *by Ernest L. Boyer and Lee D. Mitgang*

BACKGROUND

The formative period of community design in North America was the 1960's. During this time a confluence of grass-roots activism, the civil rights and anti-war movements, and increased civic and political engagement, produced the first wave of community design centers. Some were independent groups, such as the Architect's Renewal Committee founded in Harlem in 1964; some professional such as the AIA's R/UDAT program; others where university affiliated such as the Pratt Institute Center for Community and Environmental Development founded in 1963.[1] Whitney Young's address to the 1968 AIA National Convention in which he chided the profession for its lack of civic engagement added additional impetus to the movement.

Community design centers and programs continued to be developed throughout the 1970's, but by the next decade they were in decline. The 1980's was a decade, in part, where the profession shifted to professional and business concerns, and academia retreated to arcane formal and theoretical emphasis'. These professional and academic prejudices were set in a larger cultural context distinguished by a loss of faith in the value of collective efforts and an emphasis on personal and corporate autonomy. As Christopher Lasch argues, it was a time when those with the most power to effect positive change "seceded not just from the common world around them but from reality itself."[2] It was in this context that Amitai Etzioni in his communitarian manifesto called for a renewed commitment to an engaged social agenda and revivified community.[3]

The 1990's brought a renewed commitment to the public realm and to proactive social responsibility by the profession and academia. Many new approaches to community design, programs and initiatives have been created in recent years at schools of architecture in North America. It was in this context that the ACSA Board of Directors founded the Architects in Society Committee in 1997 and conducted a national survey to document community design programs at schools of architecture in North America. The Source Book of Community Design Programs at Schools of Architecture in North America, published by the ACSA, was the result of the survey and the ongoing work of the committee. It includes an astonishing array of programs and approaches but which all share the overall goal of serving students and society.

Community design programs provide numerous opportunities for students, faculty, schools, community and the profession. As outlined by Anthony Schuman in the introduction to the ACSA Sourcebook, they are "proving grounds for creative work, where students and faculty must meet tight budgets and code constraints without compromising design intentions." For students "real world" projects provide a potent setting for multidisciplinary teamwork and engagement with the public in a setting where their work is taken seriously and the outcomes valued. For faculty, community-based projects provide opportunities for field and applied research and, if properly funded, the projects can facilitate expanded educational and outreach opportunities. Additionally, colleges and universities benefit from the high profile of community projects and design centers. Lani Guinier argues that universities can fill a critical niche in today's political setting. As she asserts, "The real domain for leadership in the 21st Century is the universities because the political arena has abdicated its responsibilities." The public gets information, resources, and often a useful product at an affordable cost. The profession also benefits from the positive community outreach of the projects and the commissions they often create.

University-affiliated community design is not without its risks and problems, however. Of primary concern is the balancing of educational standards with community service. At the onset of any community design project , and throughout its duration, the educational goals of the project need to be clearly stated and reinforced. There are also concerns that student produced projects will under-

cut the profession and lower standards. There is also the danger of setting unrealistic goals and inflating community expectations. However, I would argue that if the educational focus and goals of the project are stressed throughout the process many of these concerns are minimized.

Most university affiliated community design centers emphasize the educational benefits of service learning. The Centre for Environmental Design Research and Outreach at Carleton University considers "information dissemination as an essential role," and The Design Center for American Urban Landscape at the University of Minnesota states that its mission is "to educate public and private decision makers, professionals, and citizens about the value of design... and expand the definition and field of urban design study." In this context, centers such as the Small Town Center at Mississippi State University intend to "influence public policy," and the Urban Community Improvement Program at the University of Nebraska encourages "more people to become active in the betterment of their neighborhoods." The outreach emphasis of the Urban Design Workshop at Yale University provides "the setting for lecture series, seminars, colloquia, and publications."

Some design centers emphasize research, such as the Architectural Research Center at Texas Tech which "promotes interdisciplinary research activity." At the Special Interest Group in Urban Settlements (SIGUS) program at MIT, there is a particular emphasis on housing. Accessibility is the focus at The Center for Inclusive Design and Environmental Access at the University of Buffalo, as it is at the Center for Universal Design at N.C. State University. Historic Preservation is one of the services that the City College of N.Y. Architectural Center provides for Harlem, and The Urban Technical Assistance Project at Columbia University "envisions advanced technologies as playing an ever-increasing role in the generation of new knowledge concerning the urban environment."

Most programs consider working in the community to be an essential component. The Community-based Projects Program at Ball State University asserts that "a realistic understanding of urban problems can be best gained through a 'hands-on' approach," and their Mobile Assistance Studio — a 34' Coachman bus outfitted as an office — travels to small towns and cities to conduct workshops similar to the R/UDAT process. The Community Design Center at the University of Arkansas offers a summer program where students live and work in a small town for eight weeks.

Many centers serve to bridge the gap between the academy and the profession. The Tejido program at the University of Arizona pairs professionals with students in their service projects. At the Student's Design Clinic at Carleton University, architectural services are provided by students for a fee, and at Yale University there are paid internships available for students. The SIGUS program at MIT offers a "Visiting Practitioner's Program" which is a "2 - 3 month self-motivated program" at the university.

Some programs are extensive and well-established, such as the Pratt Institute Center previously mentioned, which has a staff of thirty-three and produces over eighty projects a year, or the Asian Neighborhood Design Center in Berkeley, CA, where most of the services are provided by staff. Some are more modest. All share a commitment to education and service, and of providing a two-way connection between the university and community.

THE DETROIT STUDIO

Lawrence Technological University's Detroit Studio is located in a storefront space in central Detroit and works primarily in Detroit's neighborhoods. It was founded in 1999 by the College of Architecture & Design to provide students with an enriched educational experience through community-based architectural, urban design and community development projects. It provides the setting for interdisciplinary collaboration and team-work through projects that address real needs, problems and potentials for communities in Detroit, Wayne County and Southeastern Michigan as part of the mission of a local university. The studio's location also provides urban design research opportunities.

Lawrence Tech is the first school of architecture in Michigan to establish an off-campus community studio in central Detroit.[4] The College of Architecture and Design has a long history of design studios working with communities that have earned the program a national reputation as a place that offers students real-world experience while engaging the public and serving the community. The Detroit Studio provides facilities for 35 Junior, Senior and Graduate students. Six full and part-time faculty are based in the studio.[5] The goals of The Detroit Studio include: expanded educational opportunities for students; a setting for field and applied research; and collaboration with, and service to, the public and the profession.

The Youth Village Urban Design Project

During spring semester 2000 the Youth Village Urban Design Project was conducted at The Detroit Studio. The project's emphasis on collaboration and engagement with the community illustrates many of the goals of the studio. Moreover, the educational goals of the project reflect some of the benefits of community design. Its primary goal was the education of the students through a "real world" project." However, its educational goals also included engaging residents, the public, government officials and other stakeholders. The Mission Statement for the project articulated the goals of educating "students about urban design, architecture, and community input, through a real-world project," and providing "useful urban design and housing information to the city, public and residents, so that they can be articulate about their city and neighborhood, and thus can participate in its future effectively and successfully."[6]

The project was produced by senior and graduate students enrolled in the Collaborative Design Studio, a for-credit course that undertakes projects in urban and architectural design for cities in southeastern Michigan. Additionally, two students from the Community and Economic Development Program at Michigan State University conducted demographic research and provided an economic development feasibility study, sixteen LTU architecture students in a

landscape architecture course provided landscape designs, and seven LTU photography students documented the project area. The project was funded by the Northern Area Association, a consortium of community-based organizations supported by the W. K. Kellogg Foundation as part of its Kellogg Youth Initiative Program.

The project included the urban design of an approximately sixty acre area in central Detroit. It is a mostly residential area that is distinguished by Woodward Avenue, Detroit's symbolic central avenue. Like the city itself, the study area has a rich and varied history. And like the city this history is partially obscured by the loss of buildings and by banal new developments. It is an area long established as a black community,[7] and because of its large number of significant churches, some of which date from the early twentieth century, it was known at one time as "Piety Hill."[8] At its peak, businesses, apartments, hotels, and civic institutions lined a vibrant Woodward Avenue, which was the center of an affluent community of gracious single family houses[9] that included significant examples of architecture.

By the 1950's, however, the area began to change as people moved to the suburbs. The 1967 civil disturbance is particularly significant to the study area which was directly impacted by the looting and arson that took place throughout the week.[10] Many of the histories, either personal or institutional, seem to either begin or end in 1967. By the 1970's most of the middle class had left. Now the study area is perceived as a poor area wracked by neglect and disinvestment, and often characterized as one of Detroit's many dangerous and undesirable neighborhoods. The demographics of the study area reveal a poor, aging population, with the full range of challenges typical of distressed urban areas. Deterioration and criminal activity, and the lack of city and community services are seen by residents and outsiders alike as daunting and dominant concerns. However, the area is also known as the "Kellogg Youth Village" and described as a model of neighborhood initiative and revitalization.

Project Process and Scope

The project included working closely with the Northern Area Association, neighborhood groups, the City of Detroit, local businesses and developers, and other civic, municipal, and community institutions. Guest critics provided a national context to the project. Each worked with the students individually, participated in critiques, and presented lectures.[11] The process included community input through a community design workshop, and a number of public presentations and forums.[12]

Over 200 people attended a week-long Community Design Workshop conducted at The Detroit Studio. The workshop comprised a kick-off presentation, a series of workshops that were open to all residents, and numerous special focus sessions. Throughout, the goals of educating both the students and the public were reinforced.[13] In the context of working with the residents, we adopted William Morrish's argument that "neighborhood planning is primarily a process to learn about where you live... how to shape it for the better... and how to sustain it for the long term,"[14] and John Forester's assertion that "when city planners deliberate with city residents, they shape public learning as well as public action."[15]

The urban design study had a particular emphasis on Woodward Avenue, housing, neighborhood shopping, blighted areas and open space. Issues such as community identity, multi-use development, civic buildings, pedestrian accessibility, public transportation, streetscapes, parks and public space were addressed and documented by the urban design plan.[16]

The Urban Design Plan

The Urban Design Plan is built around the concept of the Youth Village — an "urban village" centered on the high school and its adjacent civic institutions. It is envisioned as a hub that connects neighborhoods on either side of Woodward Avenue, and as a center that establishes the identity of the Youth Village community. Like a typical village, the Youth Village would include a range of businesses, civic institutions and services surrounding a prominent town green. Woodward Avenue is conceived as a grand avenue which links the village with downtown Detroit. Neighborhoods surround the village, each distinguished by its own unique blend of homes, corner stores, and green spaces.

The plan also includes proposals for new civic, educational and commercial buildings, single and multi-family housing prototypes, parks and greenways, and public transportation. It aims to establish create a coherent physical environment where residences, shops, workplaces, civic buildings, and parks form a compact unified whole. Pedestrians, bicycles and automobiles are appropriately accommodated by a non-hierarchical network of neighborhood streets and linked greenways and green spaces. Clusters of commercial and civic buildings contribute to the community's identity and serve its business and social needs.[17]

CONCLUSION

When successful, community design programs and projects can effectively bridge the gaps between the academy, the public, and the profession. Students, faculty, colleges, universities, the public and the profession can all benefit from the educational and collaborative nature of the work. This is an essential issue. As John Forester asserts "practitioners without insight will be callous, barely competent, if not altogether ineffective; students and theorists of planning without the moral perception — the appreciation — of what is pressing in real cases will be naive and irrelevant, of not unwittingly condescending and disrespectful too."[18]

The process and final plan of the Youth Village Urban Design Project will be published in a 76 page handbook. Every participant, affected institution, appropriate city official, potential funding source, and interested resident will receive a copy.[19] The publication focuses on the process of community input and strategies for guiding positive change in the project area. Resources are docu-

mented to aid in the process. It clearly states that it is not the final plan — which should be developed by professionals — but a means to create one. In this context, it aims to empower local institutions, organizations and residents.[20]

Throughout the project the educational orientation of The Detroit Studio were reinforced. Its primary goals are to educate students about urban design through projects that include many of the challenges faced by cities across America; and to educate residents and city officials about the process of community input, and the value of good urban design. It is our hope that the students will bring to the profession a broader context to their work and a renewed social conscience, and that the public will be able to understand the physical features of their neighborhoods, and participate in their future substantially and effectively. In this context, university affiliated community design programs such as The Detroit Studio can provide an essential means of community activism to students and faculty in an era and a profession that has reduced expectations about the value of social engagement.

NOTES

[1]See Rex Curry's "History of Community Design" in the ACSA Sourcebook of Community Design Programs at Schools of Architecture in North America for more information.

[2]Lasch, Christopher. The Revolt of the Elites and the Betrayal of Democracy, New York, W.W. Norton Co. Inc., 1995, p.20

[3]Etzioni, Amitai. The Spirit of Community, The Reinvention of American Society, New York, Touchstone Books, 1994

[4]The University of Detroit Mercy has their nationally recognized Collaborative Design Center housed in the School of Architecture.

[5]Courses offered at the Detroit Studio include: Integrated Design Studios 3 & 4 (a Junior Year, team-taught studio comprising architectural design, urban planning, building systems and landscape architecture); the Collaborative Design Studio (a Senior-Graduate urban design studio); and photography. Thesis students also utilize the Downtown Studio, and courses completed there satisfy requirements for the Area of Concentration in Collaborative Urban Design. Other faculty and students utilize the studio on an informal basis. The studio is fully equipped with dedicated work stations, two in-studio computer labs, meeting and classroom spaces, an exhibition area, and a darkroom.

[6]The rest of the Mission included the following:

- Community Input
- To include community participation in the planning process as an essential component — because it is valuable, necessary, and the right thing to do.
- To insure that everyone who has a stake in the project is invited, but to proceed with those that attend.
- To listen to all views and respect all opinions.
- Planning
- To produce an Urban Design Plan for the project area that builds upon its strengths and mitigates its weaknesses.
- Product
- To document the project's process and results with a high-quality publication.
- To provide a foundation for subsequent professional design development and implementation.

[7]Beginning in the 1920's the area also developed into a significant Jewish community

[8]The Youth Village area was also at one time a home to Detroit's gay community.

[9]Including Henry Ford's house on Edison Avenue built in 1909.

[10]Also, one the most symbolic and troubling events of the riots happened at the Algiers Hotel at the corner of Woodward and Virginia Park. Here, during a morning raid following suspicion that a sniper was in the hotel annex, three black men were killed by Detroit police officers. The three men killed on July 26, 1967 were Carl Cooper, Auburey Pollard and Fred Temple. For a complete account of this event see Hersey, John. The Algiers Hotel Incident, New York, Alfred A. Knopf, 1972.

[11]They included: Eric Hill FAIA, Manager of Urban Design and Planning at Albert Kahn Associates; David Gamble, Assistant Professor at Syracuse University; Thomas Dutton, Professor at University of Miami, Ohio; and Lillian Randolph, Director of the Center for Urban Affairs, Community and Economic Development Program at Michigan State University.

[12]The project was guided by a ten member Steering Committee comprised residents of the study area. An eighteen member Advisory Committee composed of representatives from the city and county provided additional input.

[13]At the kick-off meeting and presentation, the research and analysis were presented including the assets and liabilities previously outlined. One of the goals of illustrating the characteristics of the project area to residents was to help them to recognize the physical features of their homes and neighborhoods. By helping residents to understand the local and regional context of the site, practical and appropriate ideas in response to the context can be generated and needs established based on assets not liabilities. Also at the kick-off meeting, preliminary ideas, strategies and visions were presented in the context of building upon what works, and mitigating what doesn't. Additionally, urban design principles and examples of successful American urbanism were shown.

[14]Morrish, William R. and Brown, Catherine R. Planning to Stay: Learning to See the Physical Features of Your Neighborhood, Minneapolis, Milkweed Editions, 1994

[15]Forester, John. The Deliberative Practitioner, Encouraging Participatory Planning Processes, Cambridge, MIT Press, 1999,

[16]The study included the following:

- A review of the existing land-use, circulation, transportation, open space and zoning codes;
- an inventory and grading of existing housing and building stock;
- an inventory of city owned land;
- an analysis of the physical characteristics of the study area;
- a study of the history of the area;
- research on contemporary urban design theories and precedents;
- the urban design of the project area including guidelines for increental and phased development;
- specific architectural proposals for selected sites;
- urban design principles, overlay zoning, and architectural codes;
- the city approval process for urban design plans; and
- an Economic Development Feasibility Study.

[17]Adapted from the "Traditional Neighborhood Development District, Metropolitan Dade County, Florida, April, 1991," by Duany Plater-Zyberk.

[18]Forester, John., p.243

[19]All libraries at accredited schools of architecture in North America will also receive a copy.

[20]It also asserts that urban design is only one component necessary for community revitalization. A full range of community, economic and social programs are also necessary.

"Path to Progress": The Road to Community Design

JEAN EDWARDS
PAULETTE HEBERT
ROBERT MCKINNEY
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University of Louisiana at Lafayette

INTRODUCTION

A Community Design Workshop that operates under the auspices of the School of Architecture is addressing the very questions posed by this conference. It has been working collaboratively with city government and community neighborhoods to confront real problems in real communities. Recognition of the need to improve the lives of people, the health of cities, the condition of the environment, and the quality of architecture is fundamental to the mission of the Workshop. As such, it actively seeks responses to community diversity that are both politically sensitive and architecturally creative.

The basic commitments of the Workshop are: 1) to rebuild neighborhoods and downtown areas, 2) to establish clearly defined public spaces, such as streets, squares and parks, 3) to integrate the pedestrian world into the urban fabric, and 4) to create a greener and more sustainable environment. The specific ways in which these commitments are met vary with each project.

Community Design Workshop

Workshop members include School of Architecture faculty of different disciplines and areas of expertise working with fourth and fifth year architecture students. In addition to establishing an "office" in the project area, the Workshop engages in a "charette" process that is the heart of the Community Design Workshop. This process invites and encourages active participation by the constituent communities in the act of defining "progress" for each specific context and then incorporating that definition into specific design proposals for future development. The transparency of the Workshop's design process also ensures that solutions it develops are in direct response to the concerns and desires of those most affected. Through this process of on-site, hands-on, cooperative engagement, the Workshop has gained credibility with government agencies and with community groups in project neighborhoods.

Our "charette" process is essentially educational - all of the collaborators serve both as teachers and as students in our effort to discover effective real world solutions. The result is a dynamic sharing of knowledge, experience, and empathy among all of the collaborators. The traditional academic roles of teacher and student, and practice roles of designer and client have become transformed. The involvement of government agencies also contributes to the economic viability of proposed solutions.

Historical Context of Lafayette's Urban Condition

The urban development and growth of the city of Lafayette provide a case study of both the promise and the threat that 20th century progress has brought to neighborhood communities and to the city at large. The success of Lafayette's original settlement in the early 19th century established a pattern of piecemeal development, whereby additions to the original settlement grid were each independent and separately identified While enhancing the economic viability of the city, "progressive" interventions, such as the railroad line (established in the1880's) and major arterial roadways (constructed throughout the 20th century), have continued to separate one neighborhood community from another, and have stymied community identification with the larger city context. Economic expansion, along with its promise of greater economic opportunity for the city's residents, has brought with it commercial development and speculation in what were essentially residential areas.

These challenges have contributed to the continued fragmentation of the city and its difficulty in identifying itself as a unified urban community.

Also contributing to the Lafayette's fragmentation is its division into predominantly African-American neighborhoods on the northside and predominantly white neighborhoods to the southwest. The historic racial divide has been reinforced by the presence of the railroad tracks and a major north/south thruway running parallel to them, both of which separate the original downtown city center from the northside neighborhoods and create in between an almost impenetrable zone or no-man's-land. While the downtown area has been undergoing a significant revitalization in the last five to ten years, economic expansion and growth during the same period has been focused on the southwest side of the city and away from northside leaving those neighborhoods even more disadvantaged and divided. Now, at the beginning of the 21st century, planned development of the north/south thruway into a major interstate highway connector threatens to further fragment the fragile stability and community identification of the northside neighborhoods.

I-49 INTERSTATE HIGHWAY CONNECTOR PROJECT

Project Context

The interstate connector project represents the largest capital construction project in the history of Lafayette, and its physical and economic impact on the city will be evident for a very long time. The social impact, while perhaps less self-evident, will also be immense. The integrity of the neighborhood communities immediately adjacent to the project and their relationship to the city of Lafayette are the issues at stake. Given the potential that a project of this magnitude presents for both positive and negative consequences, Lafayette's Metropolitan Planning Organization is attempting to work comprehensively and cooperatively with the state's Department of Transportation and the Federal Highway Administration to design and build this facility. Each of these entities naturally has a different agenda. Their combined efforts have revealed various attitudes toward the development of this project. These attitudes run the gamut from support for an underground "cut and cover" strategy that would have the least negative impact on the existing neighborhoods to the idea of "just pour six lanes of concrete" and let the consequences be the consequences. The first strategy is unworkable for both economic and topographical reasons, and the other, what one might call a "20th century 'slash and trash' solution," is unacceptable, particularly to the city of Lafayette, given the negative impact on the citizens and the neighborhoods of northside and downtown.

Seeking new strategies, the Lafayette's Advisory Committees of the Metropolitan Planning Organization hired the Community Design Workshop to investigate ways to weave the project into the community fabric. The investigations were to explore two different alignments for the elevated interstate along the existing thruway and to suggest urban design strategies for each.

Community Design Workshop Methodology

As the most comprehensive project to date undertaken by the Workshop, this connector project has allowed the collaborators, including the faculty and student participants, government officials and community groups, to redefine the "paradoxes of progress." The first step in the process was to demonstrate to federal, state and local officials, along with the public, that highway design could become more comprehensively integrated into the materiality of the city. The Workshop began by conducting an extensive series of charrettes and public meetings bringing all the constituencies together.

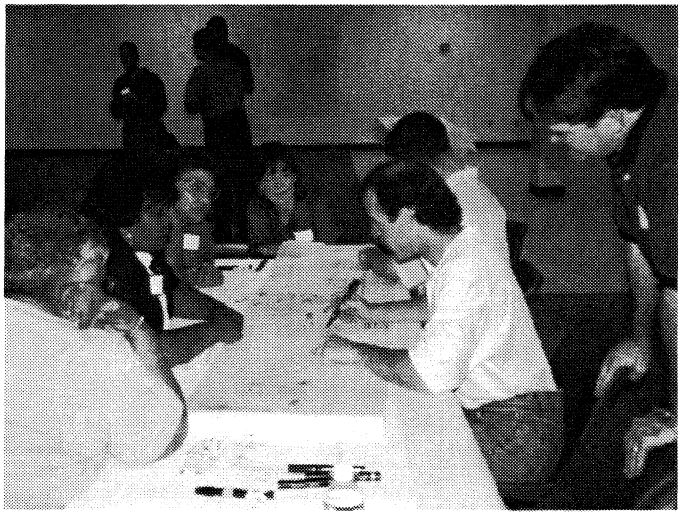

Fig. 1. Community residents and architecture students collaborate during a design charette.

In these meetings the Workshop members presented international examples of contemporary transportation infrastructure design. These examples demonstrated that successful interventions were possible and suggested ways that landscape, neighborhood amenities, and various community facilities could be integrated into roadway design. Various government groups shared their concerns about land use, policies and procedures, and structural necessities. The neighborhood organizations brought their interest in economic development and their concerns about residential displacement and relocation to the table. The result of this process was a consensus regarding the importance of planning, architecture, and landscape.

The next step, growing naturally out of the first, was the transformation of the project's challenges into opportunities for design. The Workshop identified three major challenges that required the intervention of design expertise: 1) the challenge to maintain and enhance urban revitalization efforts already underway without sacrificing the welfare and integrity of the residential neighborhoods on northside, 2) the challenge to maintain strong social and cultural links within the community in the face of the removal of residences located in the path of the roadway, and 3) the challenge to ensure that the economic benefits generated by the project are not gained at the expense of the quality of life for the citizens around and near the project.

Green Space, Urban Connections, and the Architectural Wall

The Workshop exploited the opportunity to use green space to connect rural landscapes at Lafayette's northern and southern edges. It proposes a linear park extending along the six-mile length of the proposed roadway providing a threshold into the city. Gate pieces at either end of this linear park would signal entrance into and exit from the city. While the gateways would provide greater identification of the city to travelers on the elevated roadway, the green space below could impact the city on territorial, urban and pedestrian scales.

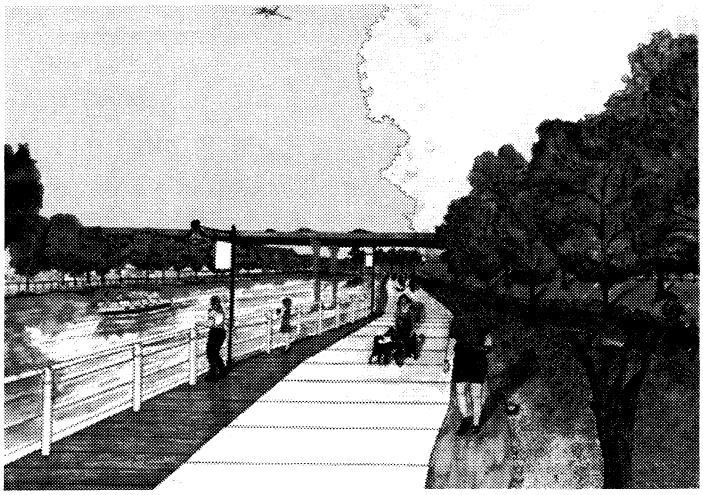

Fig. 2. A park system with bike and walking trails share right-of-way with light rail transportation and the elevated highway.

At the territorial level, the cloverleaf at the intersection of I-10, running from Jacksonville, FL to Los Angeles, CA, and I-49, a NAFTA highway, eventually connecting Winnepeg, Canada with New Orleans, LA will locate the city of Lafayette at this pivotal intersection. On an urban scale, the linear park would become a green corridor marking a transition from the highway to the city. At the pedestrian level, the view of the park and gardens can be experienced on foot, at a slow pace. The area offers opportunities for community gardens, a farmer's market, walkways connecting the residential neighborhoods to downtown and a riverwalk with bike paths and recreational facilities.

Opportunities for connection were also explored in the form of special entry spaces defined by terraces and landscaping, and the redesign of major arterial roads and local streets into boulevards connecting to the green space and to the downtown area. The Workshop has also proposed that a local and regional light rail system share the same right of way as the interstate and be integrated into the infrastructure. This rail system could help to alleviate much of the traffic congestion in Lafayette and provide an alternative connection to the city for people in outlying communities.

The Workshop's architectural proposals sought to make a clear distinction between the urban field of the city and the linear green space. The proposal for an architectural "wall" not only delineates the city's edge, but also provides a buffer between the elevated highway and the neighborhoods. The buffer would include a 30-foot setback of green space from a service road. In the downtown area, the "wall" consists of a commercial district with a three-story height minimum and a maximum of four for new construction. This requirement allows the architectural edge to become a visual barrier as well as a sound deflector. Future commercial development would be encouraged along the corridor further defining this edge and buffering the residential areas beyond.

Neighborhood Redevelopment

Perhaps the most intractable challenge of this project is how to minimize the social and cultural damage that construction of the elevated highway will necessarily do to the northside communities and their residents. The new interstate means the destruction of houses in its path and the displacement of their residents. As viewed by many residents, this project is simply the latest assault by the "progress" of transportation on an area of the city that has been historically fragmented and disadvantaged. Culturally, the population of these neighborhoods is predominantly African-American, Creole and Acadian. Given the unique cultural and racial mix of these neighborhoods, each has a distinct identity and its own specific needs.

Some housing problems, however, are common to the project area as a whole. These include a significant number of substandard structures due to the age and size, and relatively low percentage of home ownership among the residents. These problems were illuminated in a housing survey developed and conducted by the Workshop at the beginning of the project, and were reinforced by information gained in the charrettes.

The housing study also revealed housing types common to the project area and the use of a porch as a primary living space in 95% of the existing housing stock. The consistency of the vernacular vocabulary, in fact, provides an overall coherency that ties the neighborhoods together. Porches, wood construction on piers, and composite roof profiles were identified as common house features on such vernacular house types as the shotgun, the Creole cottage, and the Craftsman bungalow. Based on this vocabulary, the architecture faculty and students developed housing prototypes to serve as models for new construction in the area.

To minimize the impact of displacement on neighborhood residents, the Workshop's first proposal to address housing issues is to move existing homes to vacant lots in the neighborhood. Three major benefits are achieved in this way: 1) family connection to home is maintained, 2) existing housing stock is preserved, and 3) vacant areas in the neighborhoods are in-filled. In some cases the possibility exists to move long-term neighbors to adjacent vacant lots, thus preserving more of the social fabric. The survey revealed that this relocation of existing housing, however, will accommodate only 30 to 40 percent of the housing need in the area.

The Workshop's second strategy involves the construction of new housing that is both affordable and responds to the character and

scale of the existing neighborhoods. Using the vernacular house types already present in the neighborhoods, the architecture faculty and students designed prototypes for one- to four-bedroom houses.

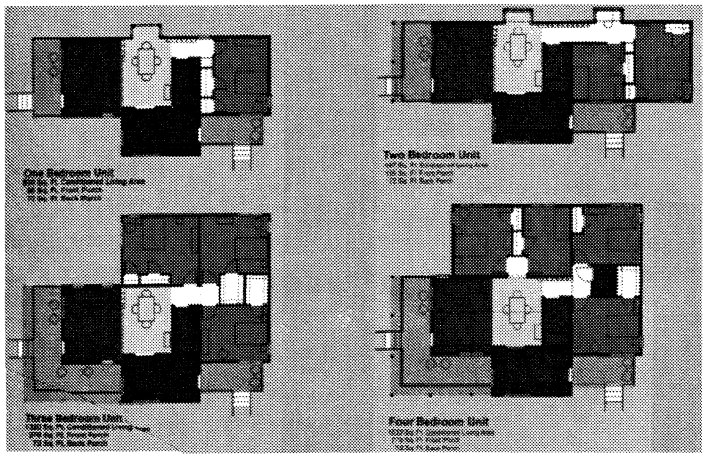

Fig. 3. Housing prototypes for affordable new construction: one-, two-, three- and four-bedroom houses.

Each house consists of a common living core (including a kitchen, dining room, family room, and bathroom). Variations from house to house occur based on number and location of bedrooms and size of porches. Research into the federal definition of "equal and comparable" when replacing a residence shows that given the prevalence and usage of porches in the project area, the porch could be considered an essential component for all replacement houses in the project area. This element expands the size of the house physically, and fosters a greater sense of neighborhood identity by bringing residents out of the house and providing a space in which to interact with neighbors.

The Workshop has proposed three different development strategies to address the need for transitional housing: 1) row houses between the commercial district adjacent to the roadway, 2) mixed-use housing in the central business district, and 3) micro-neighborhood developments on larger vacant lots. These three different housing types present opportunities to address other concerns in the project area.

Three-story townhouse structures can effectively reduce sound levels, and thus serve as both a sound buffer and a transitional zone between the commercial district and the existing residential neighborhoods. Mixed-use development provides in-fill in the central business district and introduces a residential element into the downtown area that can further stimulate its development. By employing zero lot lines and linear footprints, the micro-neighborhood developments can provide economical, transitional housing that can serve later as housing for the elderly or as starter homes for first-time home buyers.

Quality of Life: Light, Sound and Public Art

Illumination and sound abatement studies conducted in the context of this project necessarily went beyond a mere calculation of required foot candles and decibels-to- distance ratios. The overriding goal for both of these studies was to address "quality of life" concerns raised by the project area residents in the charrettes and public meetings. Images of harsh and ugly highway lighting, along with fears of unpleasant and unwanted highway noise in the neighborhoods were issues at the forefront of discussion by the residents and their representatives in city government.

The illumination solution proposed by the Workshop includes a system of "lighting layers," that would be realized through the use of several different fixture types, various lamp sources, and a variety of mounting heights and styles. Essentially, the solution employs two distinct layers: "over" and "under" the roadway. While the need to meet federal highway safety and security standards would dominate the lighting choices made for "over" the highway, lighting adjacent to and visible from the highway can be used also to create visual events that enhance the identity of Lafayette and help define it as a "place." Areas of special significance and interest, both to the residents and to visitors would be enhanced through a variety of light sources and fixture types. More gentle illumination is suggested for pedestrian paths, signage and fountains found in the park areas "under" the facility. At street level, the proposal recommends a closer-to-the-ground, lower level of illumination from lighting fixtures that reflect the character of the architecture.

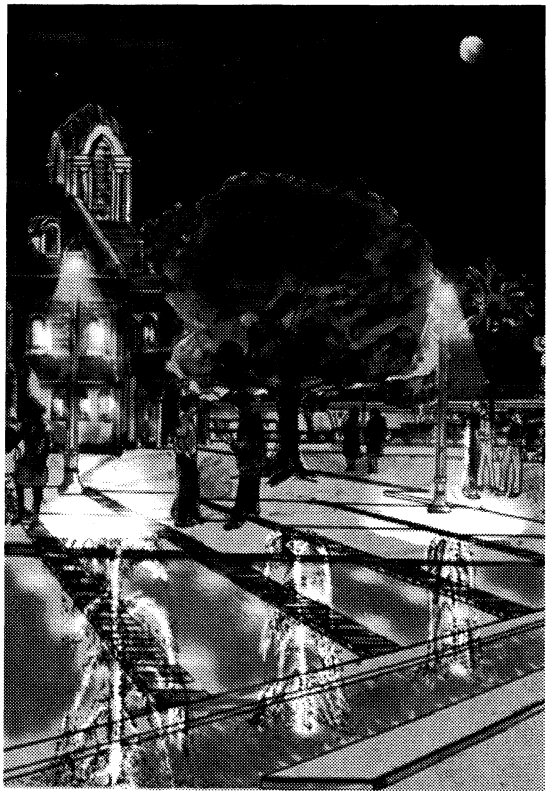

Fig. 4. Significant architecture and special features, like fountains, under and near the roadway are enhanced by multiple, low-level lighting fixtures.

Administrative and physical noise-reduction techniques form the basis of the Workshop's recommendations for sound mitigation. Zoning and other legal restrictions are administrative techniques often employed by local governments to control noise levels. Physical techniques involve four methods of masking or minimizing unwanted noise: 1) acoustical site planning, 2) acoustical architectural design, 3) acoustical construction techniques, and 4) construction of noise barriers.

The Workshop has recommended that any new development or construction in the project area employ both administrative and physical sound mitigation techniques. For example, the recommendations for the location of new housing and for the development of a commercial zone reflect employment of the site planning strategy. Design techniques are seen in the details of proposed new three-story townhouses that include the placement of storage, laundry and restrooms on the side adjacent to the road, and the reduction of the number and size of windows on that side. Details such as building heights, room arrangement, window size, number and placement, and balcony and courtyard design can contribute to the minimization of unwanted noise. Increasing building mass and the rigidity of materials, and providing air spaces in walls, floors and ceiling are all construction techniques that can "soundproof" a building.

Finally, in some instances actual noise barriers must be constructed. These barriers may take the form of berms made of sloping mounds of earth or walls and fences. Berms require a lot of land if they are high, while noise walls take less space and may be built from a range of material that can be visually appealing and blend with the surroundings. Some noise-sensitive sites in the project that are within 200 feet of the roadway will require these noise barriers. The Workshop suggests that these barriers may become opportunities to introduce symbols of local or regional identity through the manipulation of materials, form, surface treatment, and color. The structural system of the roadway itself also provides the opportunity to explore structural support alternatives in relation to these types of manipulations. Working with a structural engineer, the Workshop designers studied a variety of forms and materials that offered variations of color and texture to enhance their aesthetic appeal.

Lighting and the sound mitigation proposals as well as structural elements of the roadway provide opportunities for the direct incorporation of architectural or place-making elements that might also be described as public art. In the charrettes and public meetings, community participants expressed a desire for the integration of art into the overall design proposals for the area. A review of precedents revealed that public art, when supported by the community, helps to establish and define the identity of a place. It can provide both cultural and historical orientation as well as spatial orientation. Art also can humanize public space that might otherwise intimidate and overwhelm. By providing opportunities for tactile, visual and metaphoric interaction between people and place, public art allows for moments of surprise, revelation and aesthetic pleasure. These experiences have the potential to promote a higher quality of life, and engender greater economic success for the community.

The1980's controversy over Richard Sera's *Tilted Arc* in Federal Plaza, New York City increased awareness of the need to more effectively engage the affected community in the generation and/or selection of public art. This awareness has lent support for a more integrated planning approach to public art, as opposed to the "plop" art approach where individual pieces are simply planted in a space without regard to context. An integrated planning approach requires the meaningful participation of the community.

The Workshop has identified the following strategies for eliciting community participation in the development of public art: 1) Involve area artists, residents, and students through participation in existing programs sponsored by the Arts Council of Acadiana, 2) through the Arts Council, its constituencies, and community groups develop criteria for the selection of art to be used in the project, 3) locate funding sources to sponsor an art competition based on the established criteria, and 4) promote interaction with neighborhood and community groups throughout the design and implementation phases. Community involvement in the process of selection can also help to ensure that the art will be maintained and respected rather than vandalized.

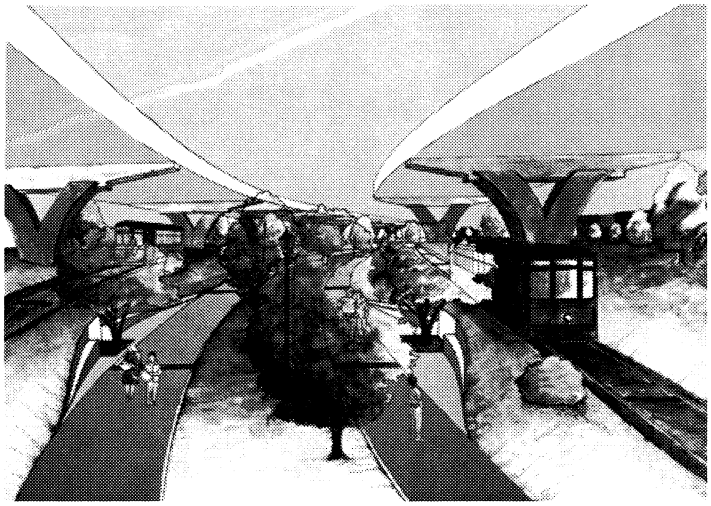

Fig. 5. Green-space walkway: sites where public art could invigorate the pedestrian's experience of place.

CONCLUSION

The process of building consensus for the Community Design Workshop's proposals has transformed the major challenges confronting the project into opportunities for community renewal and development. The identification and public discussion of each of the challenges have empowered the community with a greater sense of the positive potential that the interstate connector holds. With this power comes an evolving perception of the project as a "front door" and "living room" extension of the community. Public involvement in setting the priorities for the project has increased the likelihood of greater public support for the project, especially when funding initiatives are presented. At this stage in the project the

measurement of progress might be the degree to which this collaboration has changed who is asking and answering the questions.

BIBLIOGRAPHY

Anderson, Stanford, editor. *On Streets.* Cambridge, MA: The MIT Press, 1978 (paperback edition, 1986).

Ashdown, I. "Emerging Technologies." LD&A, reprint. December 1993.

Boyer, E. L. & Mitgang, L. *Building Community: A New Future for Architecture Education and Practice.* Princeton, NJ: The Carnegie Foundation, 1996.

Cooper Lighting. *Specifiers' Toolkit* [computer program]. OH: Cooper Industries, (nd).

Design Team and the Lafayette Areawide Planning Commission, The. *Lafayette North-South Corridor Study: "Path to Progress."* Lafayette, LA: Lafayette Areawide Planning Commission, September 1993.

Dismukes, J. Philip. *The Center: A History of the Development.* City of Lafayette, LA, 1972.

Federal Highway Administration, Office of Environment and Planning. *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* Washington, DC: Government Printing Office, June 1995.

Federal Highway Administration, Office of Research and Development. *The Audible Landscape: A Manual for Highway Noise and Land Use.* Washington, DC: Government Printing Office, 1992.

Fleming, R. L. & Tscharner, R. V. *Place Makers: Creating Public Art That Tells You Where You Are.* NY: Harcourt Brace Jovanovich, 1987.

Garvin, Alexander. *The American City: What Works, What Doesn't.* NY: McGraw-Hill, 1996.

H.T.N.B. Consulting Engineers, prepared by LA Department of Transportation and Development. *Environmental Impact Study.* first draft. (publication pending).

Illuminating Engineering Society of North America. *Lighting Handbook Software* [computer program]. NY: IESNA, 1996.

Miles, Malcolm. *Art, Space and the City.* NY: Routledge, 1997.

Moore, Charles W., Mitchell, William J., & Turnbull, Jr., William. *The Poetics of Gardens.* Cambridge, MA: The MIT Press, 1988.

Osram Sylvania. *Automated Product Catalog* [computer program]. MA: Siemens Co., 1996.

Rea, Mark, (Ed.) *Illuminating Engineering Society of North America Lighting Handbook*, 8th ed. NY: Illuminating Engineering Society of North America, 1993.

Rowe, Peter G. *Making a Middle Landscape.* Cambridge, MA: The MIT Press, 1991.

School of Architecture Community Design Workshop, The. *Lafayette I-49 Connector Project.* Lafayette: University of Louisiana at Lafayette, 2000.

School of Architecture Community Design Workshop, The. *The Simcoe Street Corridor Project.* Lafayette: University of Southwestern Louisiana, 1998.

Simonds, John Ormsbee. *Garden Cities 21.* NY: McGraw-Hill, 1994.

Mitigating the Effects of Sprawl and Abandonment in Two Small Southwestern Towns:
A Design Studio

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MITIGATING THE EFFECTS OF SPRAWL AND ABANDONMENT IN TWO SMALL SOUTHWESTERN TOWNS

Small cities and towns of the American southwest are faced with differing challenges associated with either diminishment or encroachment onto rural lands:

- diminishing population with out migration and/or changing demographics as they are newly populated by retirees and vacationers
- vacillating employment opportunity and/or the need for new skills retooling
- de-stabilized transitional economics or the rampant speculation that accompanies rapid growth
- town infrastructures with deferred maintenance and/or new capacity demands
- eroding soils and soil capacity from deferred maintenance or uprooting native vegetation for development, and compromised water resources as demands change.

This bifurcating set of challenges to American rural lands and small towns is accompanied by the disappearance of architects, designers and planners with community abandonment or their ineffectiveness in the face of sprawl. In the small towns of West Texas, population is declining as the population in the remainder of the state increases. In contrast, small towns in the southernmost mountains of New Mexico, the opposite is true. Ruidoso, New Mexico is experiencing a 25% per year growth rate. Population declines are accompanied by demographic changes from young to old (West Texas), old to young in Ruidoso. In West Texas, the shift is toward a Hispanic future majority. Again, the opposite condition is true in Ruidoso, where there is a surge of second homebuyers and retirees in search of relatively low cost southwestern living. The region is fragmenting into several population types, most notably the aged, particularly pronounced in the poor counties of West Texas. Some rural counties in West Texas are characterized by increasing poverty levels that accompanying increasing economic downturn signaled by depressed cotton, oil and gas, and beef prices. The other counties suffer from deep-rooted long-term poverty. A surprising number of counties have no hospital and in many cases only a single physician. In rural Texas and New Mexico, as in other rural parts of the country, this is a time of small town and rural triage-some places irretrievably abandoned, some economically healthy though sprawling aimlessly destroying the environment and others hanging in the balance (Figure 1).

Through interdisciplinary design inquiry, this studio sought to address design opportunities for the American architect in southwest urban settings that are potentially declining, like Plainview, Texas CBD or alternately, that are emerging with unplanned growth, like Ruidoso, New Mexico. In both cases, the focuses of study were to discern appropriate architectural and urban designs for each area that would lead to their preservation, transformation and sustained vitality.

PROJECT 1. MITIGATING SMALL TOWN CBD ABANDONMENT. PLAINVIEW, TEXAS.

Texas Tech University and Health Sciences Center have embarked on a comprehensive region-wide rural assistance initiative to provide interdisciplinary technical assistance to communities. One project within the initiative has sought to make the capital and human resources of rural communities known globally to potential business relocators via the Internet. First, faculty and student researchers completed a building inventory of available commercial and industrial buildings in Hale County with support from the State of Texas Economic Development office. That data was subsequently posted on a website maintained by the Hale County Industrial Foundation.

Subsequently, seven students and three faculty members studied the central business district of Plainview, Texas, county seat of Hale County. Critical to the development of the work were initial presentations by business and community experts who apprised students on small town redevelopment particular to desirable commercial and institutional uses of space. Individual site analyses of factors pertinent to the specific adaptive use design problem followed. Then, each student selected a particular vacant building, wrote a schematic design program for its adaptive use, and pre-

pared a design that was reviewed by faculty from three disciplines, business and civic, and community leaders. Selected appropriate uses included:

- Nursing education facility—a dire need as the nursing shortage deepens with dependence on bringing in nurses from afar;
- Downtown restaurant and club—none presently exists and downtown occupants need to drive to get to alternatives to a diner;
- Rural business incubator—emerging typology that promotes new community entrepreneurship at home via e-commerce;
- Downtown live/work environment—meeting the community housing shortage with CBD apartments above offices/ shops at street level challenging the drift toward mobile homes;
- Downtown health club with racquetball and exercise facilities—none in town and cardiovascular health problems pervade community;
- E-business center—an e-lancers technology center, leaseable office space, with shared facilities like the rural business incubator (Figure 2-6);
- Law offices—across the street from County Courthouse investigating varying spatial requirements of traditional and emerging forms of practice (e-based). With the exception of law offices, none of these facilities currently exist in the central business district.

Students collectively prepared building models with streets, building massing, and details of existing structures. Individually conceived architectural designs as well as three-dimensional modeling followed describing design concepts in detail. The final presentations were copyrighted, made Internet-ready and turned over to the Northwest Texas Small Business Development Center and Hale County's Economic Development office and posted on their websites. In addition to studio based reviews of work, consultant and community reviews occurred mid- and post-project. Architectural critique followed each in the form of written communications to the students indicating strengths and weaknesses in the design from an architectural view—spatial organization, details of design, strengths/weaknesses in drawing and design requirements, and so forth.

Community reviewers strongly affirmed the suitability the designs for proposed business uses in meeting or anticipating community needs and opportunities respectively. The affirmations were particularly pronounced in the final review in which eight community and downtown business leaders showered students with laudatory feedback, in some cases, even playing down inevitable cost concerns and offering gratitude for the vision presented as well as the building type ideas. Plainview, Texas has no architect. The last one retired in 1999. Even when it had an architect, no one was providing the community a vision of itself that these students and their work offered. At their request, the drawings were kept and displayed at the Hale County Industrial Foundation. Business organizations, civic and community groups and citizens of Plainview pored over them. Letters of thanks were written to the COA and to the University President's office. New project opportunities have been spawned in the community. New students are working on architectural features for a five-mile bikeway through the streambed meandering through town (skateboard park, shelters, information kiosks, graffiti park, sculpture park, PAR course, scaled solar system model, etc). The COA was approached to have a design studio work on an assisted living center. And on the last day of the regional conference, Jimmy Dean (home town hero) Day in Plainview, a charrette will be conducted, once again bringing students, faculty, and community leadership together to re-envision a built future for the downtown. Plainview leaders have been invited to present their experience of technical assistance from the university to an interdisciplinary regional forum on rural issues, the first of its kind ever held at the university.

PROJECT II. MITIGATING UNPLANNED GROWTH: RUIDOSO, NEW MEXICO

The second half of the studio focused on Ruidoso, New Mexico (population16,000) a rapidly growing recreational mountain resort community. Describing Ruidoso to one who has never been there is not an easy task. Currently, the rapid growth of Ruidoso and its surrounding environment is largely "first come, first served." No architectural landmark identifies its center. The midtown area on Sudderth Drive, where most of Ruidoso's townscape is located, is a modest version of Venturi and Scott Brown's "Strip City". Ruidoso's citizens call their town a village, however, is anything but what a French villager would recognize as a *village*. Instead of a small sleepy community town, away from the latest trends and innovations, Ruidoso has become a bustling environment with visitors from all over the nation. Like many resort towns in the southwest, rural scale, low density, and casual lifestyle were responsible for originally attracting so many people. Now, in contrast, Ruidoso needs to address urban issues to maintain that which made it attractive. Real estate prices and land values in Ruidoso and vicinity have doubled each year since 1994. As new homeowners have arrived from both coasts, the village has had to construct additions to its health facility, a new post office, and enlargement of the interstate and other major roads. The new Spencer Theater (by Predock 1998) brings internationally known actors, musicians, and dancers to Ruidoso and attracts a large audience interested in cultural events. Economically prosperous times have not necessarily led to better urban planning. With the growth of this small city intimately bound with the economy, politics, and technology of the world at large, current urban planning practices offer no definitive solution for urban development, particularly during these times of unprecedented growth. No strict zoning regulations or infrastructure planning control the multinodal town's growth. Alto, one of the fastest growing residential communities in the Ruidoso area, has no zoning, master planning, or centralized sewage system. Most

single-family residences, the dominant type of new construction, have only septic tanks with ten-year life expectancies.

By encouraging a critical approach to understanding the region in all of its diversity, students identified individual characteristics and for design projects in the center of Ruidoso. They sought meaningful urban design concepts that could help set guidelines for community growth and prosperity and concurrently preserve the historic values of the region. Ruidoso town planning officials with whom discussions were probably the most insightful for the outcome of the projects welcomed students. Town officials of Ruidoso were very aware of growth problems and stated their resolve to initiate comprehensive urban planning, including social and political issues.

The studio approached two problems: (1) Redesigning the main street and public-ness of Sudderth Drive at the commercially based midtown (where most ski rental, clothing, and other retail shops are located), including the problem of village entrance that this street provides; site selections for future public space and public buildings; and circulation, vehicular traffic, pedestrian accessibility, parking on/near Sudderth Drive and a covered parking structure; and (2) CBD housing-in-residence community for visiting performing artists of the Spenser Theater, including a small café, classrooms for seminars in music, and a kitchen with dining hall. By successfully landmarking the main street with a multi-use facility that added people living at the center of town, students envisioned the rapid accretion of related support facilities, increasing property values, and the creation of a true urban core for the town.

CONCLUSION

In the first project, through research-based design, students created programs and designs whose vision and scope enabled them to directly address community concerns for alleviating problems in the increasingly abandoned downtown core. It is premature to know that the intervention produced the long-term goal of stimulating economic revitalization of the downtown area. There is ample evidence to suggest that this initial small perturbation has set in motion a whole series of economically regenerative moves that could not have been predicted without the intervention. We know this through the reports of participating business leaders with long-term interests in the community. In addition, a forty year old master plan for a bike trail has been dusted off and given to the COA to present additional new visions for facilities through which city leaders can approach state and federal funding entities for financial resources. Similarly, community design faculty have been asked to design a new downtown community center in a nearby park

In the second project, students learned that economically prosperity does not necessarily lead to better urban planning. Indeed, unplanned growth may induce stresses whose long-term effects are yet to be fully understood. Discussions with planning officials were most useful in leading to project outcomes that may effectively mitigate the unchecked sprawl of the strip street. Strategic site selection for a new midtown node attempted to energize a dispirited core dominated by an accretion of small scale marginally associated commercial establishments.

The bifurcation of small town transformations, and the related planning and design problems presented here are international phenomena. Population redistribution related to the economics of making a living and leisure time shape built environment decision-making in ways that erode prior economic investments and environmental endowments. In the resulting environmental triage, architects and architectural education can play instrumental roles in mitigating undesirable consequences through providing re-centering visions through location specific design that links to economic sustainability and spiritual renewal. For rurally based architecture programs, accessible projects such as these offer a multitude of learning possibilities.

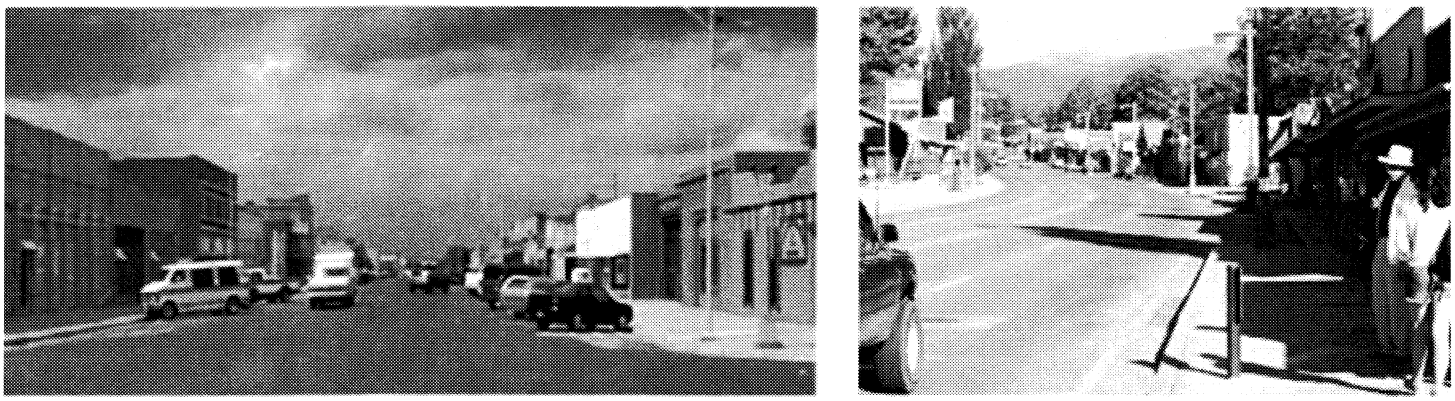

Fig. 1. Main Streets – Plainview (left) Ruidoso (right)

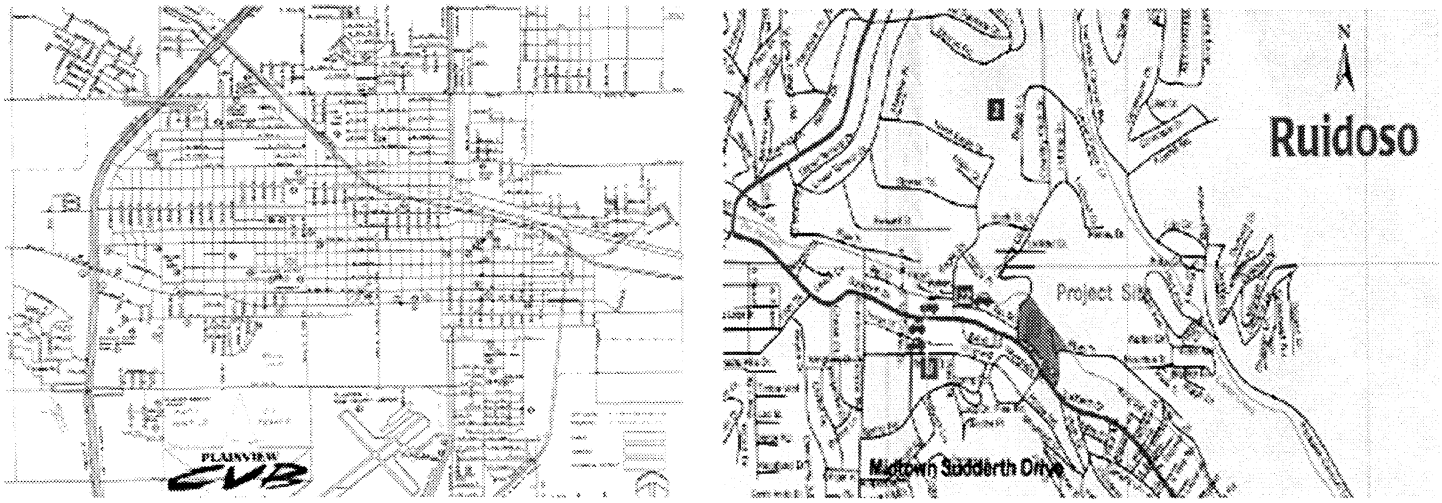

Fig. 2. Town Maps – Plainview (left) Ruidoso (right)

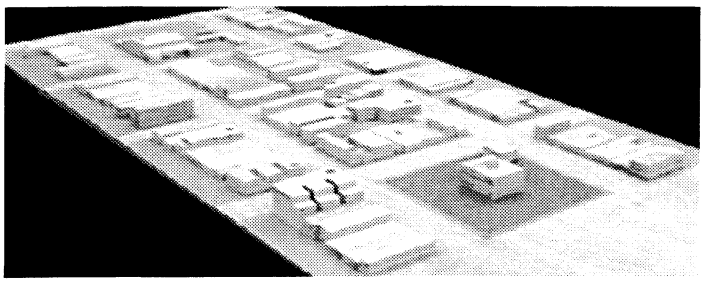

Fig. 3. Central Business Site Model – Plainview

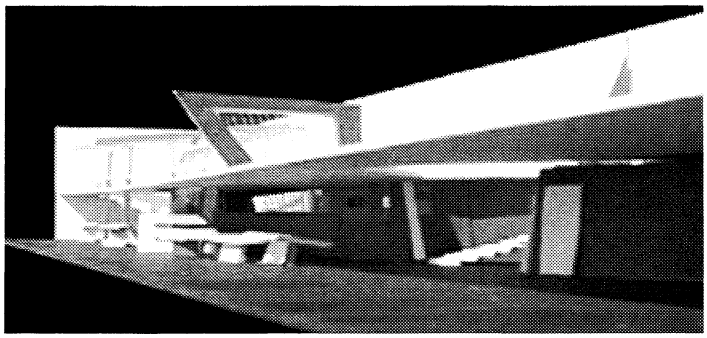

Fig. 4. New restaurant in abandoned boot shop – Plainview CBD

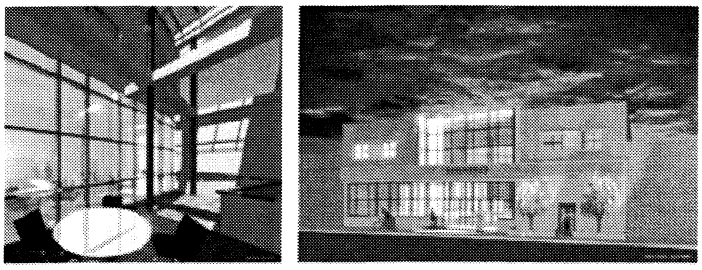

Fig. 5. Rural business incubator in abandoned department store – Plainview CBD

Fig. 6. Students presenting to civic and business leaders – Plainview

Fig. 7. Redesigned main street (Sudderth Drive) at CBD. left and right.

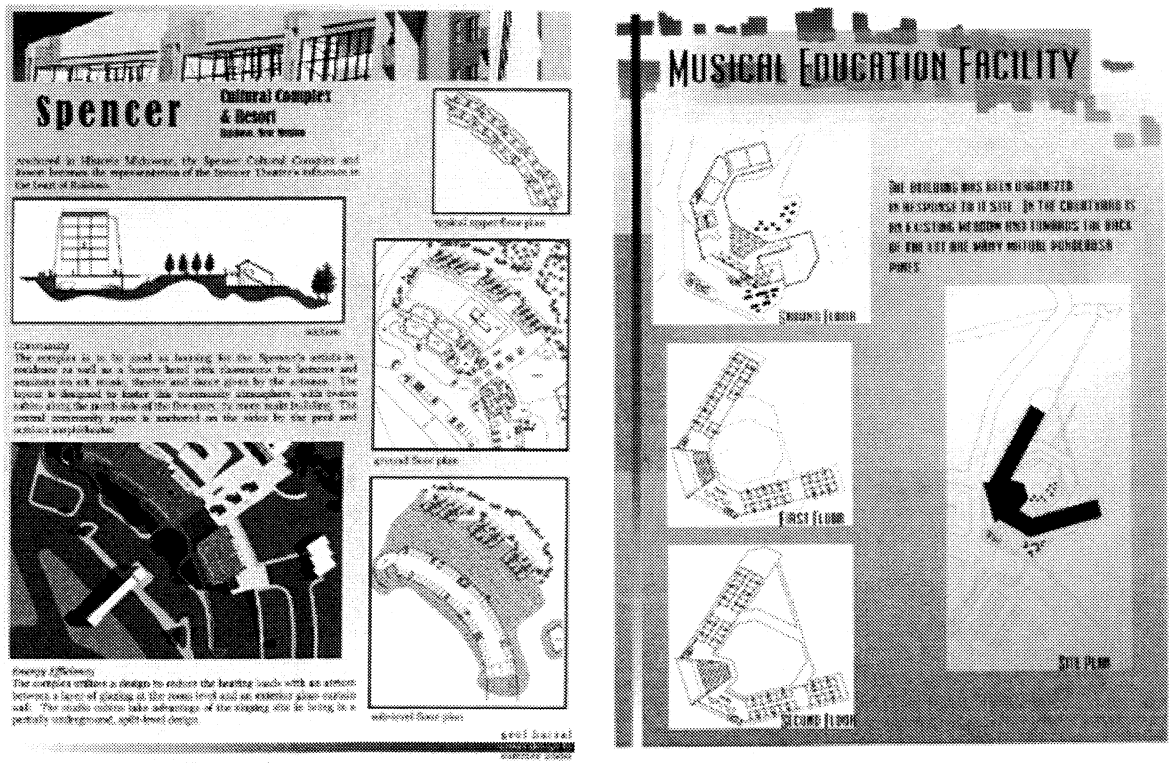

Fig. 8. CBD housing-in-residence community for visiting performing artists. left and right

ALLEYS, ROWHOUSES, SQUARES, AND UTOPIAS

Moderator: Andrew Chin, Florida A&M University

Narrow-Front Rowhousing Affordable Communities:

An Alternative to Urban Sprawl

AVI FRIEDMAN
DAVID KRAWITZ
ADRIAN SHEPPARD
McGill University

Slumming in Utopia:

Protest Construction and the Iconography of Urban America

2000-2001 JAE *Award Winner*

LANCE HOSEY
Charlottesville, VA

Nostalgia and Change:

Residual Urban Space in the Alleys of the Art Deco Historic District, Miami Beach, Florida

MARILYS R. NEPOMECHIE
Florida International University

I. The County Seat Courthouse Square:

Civil Regionalism

II. Road Trip:

Same as it ever was?

A Paper in Two Parts

CHRISTOPHER L. CALOTT
University of New Mexico

Narrow-Front Rowhousing Affordable Communities:
An Alternative to Urban Sprawl

AVI FRIEDMAN
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THE TRANSFORMATION OF THE SOCIO-ECONOMIC LANDSCAPE

A combination of economic constraints, socio-demographic changes, and attention to environmental issues has led to increased interest in the narrow-front rowhouse as the elemental building block in the design and construction of affordable, sustainable communities. The restructuring of the Canadian economy away from resource-based activities and heavy manufacturing industries has resulted in a greater population concentration around urban centres whose economies are primarily service- and information-based. Since land and infrastructure costs have steadily increased as a percentage of the total price of a new home, the housing industry and policy makers have re-evaluated the current housing market to ensure that affordable housing is made available to future home owners near the city, especially to low- to moderate-income families and first-time home buyers. These vulnerable purchasing groups are subject to an "affordability gap," a phenomenon whereby the rate of increase of median new house prices has since 1972 surpassed the rate of increase of median family incomes; higher real interest rates, a scarcity of serviced land, higher infrastructure and construction costs, and increased speculation in real estate are some of the causes commonly advanced to explain this widening gulf in home ownership affordability (Rybczynski et al. 1990). At present, over 57% of housing stock in Canada is composed of single-family, detached dwelling units, the least dense of housing options and the most consumptive in terms of land, energy and water (Statistics Canada 2000a). Detached houses consume from 15 to 67% more energy than other common ground-oriented housing options and they accommodate 60% fewer people per net hectare than rowhouses (CMHC 1991). Reduced house size and increased density achieve savings in the cost of land and infrastructure, building materials and energy consumption. With such economic advantages as these as incentives, home builders are beginning to redefine their expectations in their choice of narrow-front rowhousing as an increasingly efficient type of affordable accommodation (Friedman and Cammalleri 1992).

Recent demographic trends have also influenced the types of housing responsive to the new configuration of the market. Several significant changes in the socio-economic composition of society have contributed to the need for diversity and flexibility in available housing types, i.e. for housing designed to adapt to the life-cycle and lifestyle requirements of its users and which provides all the necessary amenities on both the unit and community level. The traditional image of the family of two married parents with the father working and the mother at home with the children represents only 21% of all families, a drop from 27% in 1980 (Statistics Canada 2000b). Household size has decreased to an average of 2.6 persons, while 56% of all households are made up of only one or two people (Statistics Canada 2000c). In 1971, the average size of a husband-wife family was 3.8; today this figure has shrunk to 3.1 (Statistics Canada 2000d). Single-parent families have increased from 11% of families with children in 1980 to 14% today (Statistics Canada 2000e). Later marriages, the tendency of divorced or separated people to remain in separate households, and a steady rise in the number of elderly people continuing to reside in their homes has increased the proportion of single-person households to 24% (Statistics Canada 2000c). Two-income families with children now represent 64% of all households, an increase from 43% in 1980 (Statistics Canada 2000b). A significant increase in the number of elderly in Canada also affects affordable housing trends; from 1976 to the present, the proportion of Canadians aged 60 years and over increased from 13% to 17% (Statistics Canada 2000f). Heavy time pressures combined with reduced available time for home maintenance have created the need for multiple-use spaces such as kitchen/activity centres and home offices; the demand for smaller, easily-maintained houses is stronger now than ever before.

Since builders are the final decision-makers in the home building industry and are ultimately responsible for the implementation of new ideas in housing development, and as their decisions are based on market-driven forces and return on investment, it is advantageous to both designers and users that they be convinced of the economic advantages of increasing community density. The majority of housing construction is undertaken by small companies who build 25 to 100 units per year, making it more convenient to build simple, low-cost units (CMHC 1988). This convenience, combined with the generally conservative attitudes of the industry, imply that standardization and an ease of construction which fit in with established building practice are the key to successfully introducing any kind of innovation. Architects and planners succeed with new ideas when they demonstrate to builders the relative ease of imple-

mentation, the potential for market acceptance, and the economic viability (smaller units in a denser community translate into a higher number of potential buyers per builder). The American town planners Andres Duany and Elizabeth Plater-Zyberk work directly with private land developers, zoning officials and traffic engineers: "Using marketing devices familiar to the real estate developer, Duany and Plater-Zyberk lure them with potent imagery into the realm of planning principles [...] Such salesmanship earns them much respect from their developer clients who sense that this pair are not naive theoreticians, but pragmatists with a vision" (Krieger 1991). In addition, planners and architects who target a certain range of buyers who will be able to afford the housing provided create a market demand for a given design type.

As society becomes more aware of the depletion of the earth's natural resources and becomes increasingly willing to pay for its restoration, housing which uses resources efficiently both in the construction and operational phases and which responds favorably to basic design principles to create pleasant and environmentally-sound living spaces can become an essential concept at the initial design phases. The improved and more efficient use of existing infrastructure such as sewers and roads as well as community infrastructure such as fire and police departments and schools not only relieves pressure on otherwise renewable resources but lowers development costs. Peter Calthorpe, in The Next American Metropolis (1993), advocates responsible patterns of development which recognize long-term maintenance, resource supply, replacement expense, and clean-up and demolition costs; with an awareness of such factors, planners will include in their community-based designs such considerations as land-use patterns, transit systems, solid-waste technologies, water treatment, recreation and schools. As he succinctly states, "An ecological urban pattern will be economically sound, and a truly economic metropolitan structure will be ecological." Environmental combined with social and economic factors contribute to the viability of the solution of increased development density using the narrow-front rowhouse as the basic, flexible housing unit.

THE NARROW-FRONT ROWHOUSE

In the range of available housing forms offering affordability and sustainability, the narrow-front rowhouse is the option which comes closest to providing the prospective owner with the commonly preferred characteristics of home ownership (a single-family home with a private entrance and direct access to a yard) while at the same time extending the benefits of affordability and sustainability resulting from increased density. Other housing options include: medium-rise wood-frame walk-up units, duplexes and triplexes (two or three units, stacked), and maisonettes (two two-storey units stacked in one townhouse), where in all three cases the majority of owners do not possess a private ground-level entrance or a private yard. The option of a detached or semi-detached single-family house with a small footprint (800 square feet) offers the owner the advantages missing from the preceding three options but raises the price and lowers the benefits of sustainability due to the larger size of the lot required for such a housing type.

The various forms of tenure suited to the narrow-front rowhouse community include freehold, co-ownership, and condominium. In freehold tenure where each individual resident owns his unit and lot, and in co-ownership tenure where a group of residents enters into an agreement to share ownership of their units and lots, the public space accessed by all residents is owned by the city. In condominium tenure, however, the residents own only the structure of their respective units while the lots and common open spaces are owned in unison. Where the access routes of a rowhouse development are narrower than the standard required by municipal zoning, they are designated as private roads and owned conjointly by the residents: an arrangement suited to condominium tenure. Strong community identity and an equitable shared use of common open space are frequent results of condominium tenure in a rowhouse development.

The narrow-front rowhouse (alternately called a townhouse or terraced housing) is a form of housing which is built on a narrow plot (14 to 20 feet wide) and which shares its side walls with neighbouring structures. There are no interior load-bearing walls, which allows for flexibility in the partitioning of available space. The rowhouse possesses many of the advantages of the detached house, such as a private front door, easy access to the ground, a clear definition of a public street side, and a private rear garden; its chief constraint is the narrow width between the shared walls, and since only two facades are available for windows, its width governs its depth as well as the number of rooms that can be positioned against the exterior, windowed walls.

In medieval England, where a high value was placed on trading-street frontage, narrow and deep plots often had a ratio of width to depth in excess of 1:6. In Chester, a medieval city built on Roman ruins, merchant houses called The Rows contained the shop in front, a hall and courtyard in the middle, and a kitchen in the rear, all linked by a long side passage; bed chambers connected by a gallery occupied the upper level (Schoenauer 2000). During the Industrial Revolution, the rowhouse became the main housing form in cities in both Britain and America; nineteenth-century rowhouses in London were classified in four categories according to width, with the 20-foot and 18-foot houses capable of subdivision into two rooms, while the 16-foot and 15-foot houses contained only one room across the width (Muthesius 1982). Societies have tended towards the efficiency of denser housing types in general for a variety of reasons: defense, social interaction, shared resources and facilities, transportation, and tradition (Van der Ryn and Calthorpe 1986).

The Siedlung Halen project, designed by Atelier 5 and built five miles from the centre of Bern, Switzerland in 1959-61, was envisioned as an alternative to the uninteresting and sparse nature of suburban housing and to the high-rise urban buildings which were deemed unsuited to families. While it is a dense, repetitive, communal and multi-story project, it provides a picturesque setting in the woods and offers individual privacy and private ownership: the supposed amenities of suburban living. Halen is composed of 81 rowhouses in two staggered rows; the unit types offer a great variety, from studios with small gardens to seven-room houses. Practically

every bedroom and living area opens onto a private outdoor space. The Siedlung Halen project has been regarded as a model of high-density, low-rise housing because it offers dense, individual homes in a communal setting without sacrificing individual privacy; the standards of privacy so often associated with suburban sites derive from careful unit design and arrangement. Furthermore, as a link with tradition, the community is a modern interpretation of the housing design of medieval Bern, the typical urban Swiss building form which occupies a long, narrow slot of space (Sherwood 1978).

In their design of Marin Solar Village on the site of the former Hamilton Air Force Base in California, Sim Van der Ryn and Peter Calthorpe (1986) stressed that all aspects of the community design were to be interdependent with the housing: transit, retail space, employment types, land use, energy demand, recreation, even food production. Rowhouses were chosen for the reductions in heating and cooling demands and for the lower costs associated with denser forms of housing resulting from smaller land areas, reduced roadways and shorter utility lines. They calculated that each rowhouse consumed 66% less land than typical lot sizes, and that such area savings provided a rich variety of open spaces that could be used for courtyards, squares and community gardens. Calthorpe (1993) has repeatedly advocated a style of housing that is less consumptive and wasteful than most North American design approaches: "The soaring costs of services, infrastructure, road improvements, land, and housing all raise questions about the viability of a land use pattern which has become dysfunctional." The inherent dangers of current practices, Calthorpe warns, are that the "costs of sprawl cannot be met by the average new home buyer, by local governments, or by the environment."

LeBreton Flats, a 300-unit development (32 units/acre) initiated by the Canada Mortgage and Housing Corporation and undertaken in the early 1970s in Ottawa on a site originally settled as a lumbering community, is a narrow-front development designed by Ian Johns. Land parcels were sold to private builders and non-profit co-operatives, with the co-ops allowed input into the design process. Three-bedroom units, some with living rooms one and a half storeys tall, sold initially for $60,000 to $65,000. Every unit was provided with a garage in front, a large outdoor area, and street frontage. The multi-level style gave rise to a townhouse plan which became popular amongst developers in Ottawa as well as in Calgary and Vancouver. In a subsequent development designed by Johns and built in 1979-81, Cathcart Mews in the Lowertown section of Ottawa, 63 units were constructed, each 16 feet in width. Residents were very satisfied with the openness of the design which provided a sense of greater space than the actual 1,000 square feet. Screens, terraces and gardens provided necessary elements of privacy. Site planning and the positioning of each unit were design priorities for Johns, ahead of the narrow width which at no point became an issue either at the design stage or for city zoning (King 1990).

The Grow Home, a 14-foot-wide rowhouse designed by the author and his colleagues in the School of Architecture at McGill University, was created with cost and resource reduction in mind. Intended as an affordable and adaptable urban dwelling, with 1,000 square feet of space, the Grow Home has a kitchen, bathroom and living room on the ground floor and an unpartitioned second floor which can be modified to include two bedrooms and a second bathroom. It was aimed at sensitizing the public to an alternative form of housing more suited to the changing demographic profile of the household and more attainable for the average first-time buyer. Following its introduction as a demonstration model, within one year over 1,000 Grow Home units were built in Quebec at a cost of between $70,000 and $85,000, a house price accessible to a combined household income of as low as $23,000. Some 10,000 units have been built to date across North America. Labour and material costs are reduced by simplifying the construction task and by standardizing the dimensions of the structural and cladding elements. In our approach to cost reduction, we carefully considered the three factors of area, complexity, and quality: floor area and architectural complexity were reduced in order to lower costs, but a high quality of materials and finishes was maintained.

The implications of the Grow Home on land use and on housing and operating costs are significant. Compared with a one-story bungalow on a 60'x100' lot (gross density of about five homes per acre), the two-story rowhouse on a 14'x100' lot (gross density of 24 homes per acre) can accommodate over four times as many people. An acre of land can house approximately 20 people in bungalows, but the same amount of land with the same number of roads, sewers, waterlines and storm-drains can accommodate over 80 people living in narrow-front rowhouses. The grouping of units into clusters of two or more provides significant savings in construction and energy: grouping four detached units as semi-detached reduces the exposed wall area by 36%, and grouping all four units as rowhouses reduces exterior wall surfaces by a further 28%; heat-loss reductions of 21% are achieved when two dwellings are attached, and a further 26% in savings result for the middle unit when three or more units are combined as rowhouses (Friedman 2000).

The design challenge for affordable narrow-front rowhouse developments is to make these communities, with "squeezed space" by North American standards, pleasant and livable environments for all inhabitants. The social stigma attached to this type of housing – NIMBY, not-in-my-backyard (Dear 1992) – especially in established communities where the single-family detached home predominates, may be overcome if the denser communities (often associated with barren and sterile surroundings) are designed with forethought, care, and particular attention to factors which have been identified as important in achieving pleasant environments: parking and vehicular circulation, private and public open spaces, and unit and community identity. The author has developed patterns for planning and designing rowhouse communities (six of these developments are outlined in Figure 1) which address these three crucial factors.

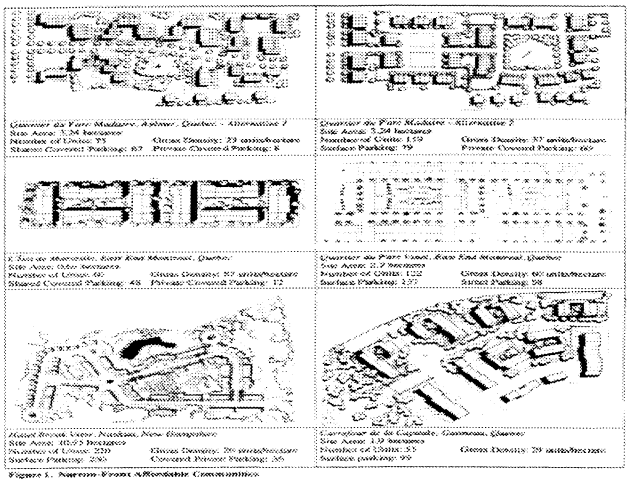

Figure 1: Narrow-Front Affordable Communities

PARKING AND VEHICULAR CIRCULATION

The extensive ownership and use of the passenger car along with the vast network of public roads has promoted the phenomenon of "leapfrogging," a pattern whereby builders, because of lower costs, develop land which is increasingly further from supportive facilities (Brower et al. 1976). New affordable communities are almost always located on or beyond the urban fringe: the potential benefits of such developments are lower home prices due to reduced land costs and the relocation of the labour force closer to employment centres which have been moved out of the city cores. The disadvantages, however, include urban sprawl, higher transportation costs resulting from increased commuting distances, and a greater dependence on the car which aggravates the associated problems of automobile emissions, traffic congestion, and parking. Whether in an urban or suburban setting, the car is an inescapable reality in affordable communities. Parking in a project of 45 to 60 units per hectare can account for nearly 50% of the total site area. The higher the density of a development, the greater will be the impact of parking and vehicular circulation; it is therefore of utmost importance in high-density developments to treat parking in an efficient and unobtrusive manner.

The visual impact of the car (i.e. very wide roads, expanses of asphalt in large parking lots, long series of repetitive garage doors) can be reduced when parking is integrated into the landscaping to diminish its apparent presence. Several smaller screened parking areas result in less of a visual presence than one large parking lot, as can be seen in the site plan for a development in Nashua, New Hampshire, where parking was relegated to the rear of the units in a number of small lots surrounded by landscaping (Figure 2). Depressing the parking areas or berming their perimeter, combined with appropriate landscaping, are effective methods of concealing them. When sites for affordable communities are marginally located, parking areas can be used to separate the housing from unattractive adjacent elements, as in the case of the Gatineau development where shared surface parking was located at the edge of the property which bordered a busy traffic artery (Figure 2). The strategy of paving with textured blocks instead of asphalt not only increases the visual effect but it absorbs storm water, thereby reducing the infrastructure required for storm runoff. Van der Ryn and Calthorpe (1986) advocate the centralization of parking in an underground facility in order to reduce visible paved surfaces with their inherent construction costs and storm drainage and also to enhance the pedestrian quality of the neighbourhood by discouraging the use of the car within the development. Cooper Marcus and Sarkissian (1986) suggest that determining the level of parking per household is an essential element in the initial design of the community; this level is estimated according to such factors as current rates of car ownership, the life cycle stage of the potential inhabitants, their socio-economic status, the quality of public transport, and the general availability of the site area for parking.

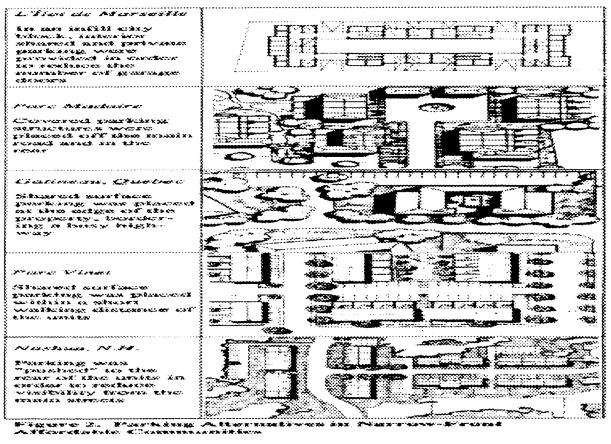

Figure 2: Parking Alternatives in narrow-Front Affordable Communities

Vehicular circulation in high-density communities often creates conflicts with pedestrian circulation and play areas for children. Narrowing street width and establishing a clear hierarchy of priorities not only reduces costs but can improve safety by slowing down automobile speed. Designing parking areas on the periphery of the developments leaves the core of the site vehicle-free (Cooper Marcus and Sarkissian 1986). The use of speed bumps, cobblestone segments and highly-textured driving surfaces such as stamped concrete and the emphasis of entryways by the placement of gateways are useful strategies for controlling vehicular speed. In the Quartier du Parc Vinet project (Figure 2), the City of Montreal allowed narrower street widths which contributed to lower unit prices as well as to the level of safety; the shared surface parking at Parc Vinet was concentrated in a number of small areas, screened with fences and landscaping, and was located within short walking distance of the housing units.

PRIVATE AND PUBLIC OPEN SPACES

When personal space is diminished in a rowhouse community, communal space takes on an added significance to the visual and

functional stimulation it already provides. Some of the essential elements to achieving successful public spaces which accommodate a variety of activities are established levels of privacy, a clear demarcation of edges, benches, landscaping and hardscaping. The clear distinction between private and communal open areas is of the utmost importance; Kevin Lynch (1990) maintains: "Careful manipulation of the edge and the access system is the key to design." Cooper Marcus and Sarkissian (1986) stress the delimitation of the private from the public in high-density developments, emphasizing that differentiation is "especially necessary where private open spaces abut onto a communal landscaped area."

The front yard is significant in the rowhouse community since it provides both a transition zone between the private and public realms of the house and a link with the social fabric of the neighbourhood; a clear definition of front yard ownership combined with its status as a location where residents can interact with their neighbours embodies this transition zone and link. Even when the building is "pushed" forward to accommodate a larger backyard space, the identity of the front yard can be maintained with defining landscaping and/or fencing. The demarcation provided by the front entrance of the home can be achieved with a step, porch, or other carefully selected detailing. Where private open space in the front of the property is highly limited, balconies affixed to staggered (i.e. terraced) units provide valuable outdoor areas. In the backyard, the importance of visual privacy is achieved with hedges, fences, screens and trellises which offer a sense of enclosure for personal activities and domestic chores. Where patios or decks are available, sliding glass doors provide a direct link to and extension of the kitchen or living rooms. The backyards themselves, although small, are enhanced by the variety obtained through creative landscaping and covered patio space, integrated with an available facility for the storage of outdoor equipment. Microclimate is another consideration in the design of backyards: shelter from the wind and snow and a careful balance of sun and shade provide orientations that extend seasonal use. The Parc Vinet project was designed so that each unit would have its own fenced private backyard in addition to a communal landscaped area; the L'Îlot de Marseille community offered a similar benefit, with fences marking the border between private and semi-public domains (Figure 3).

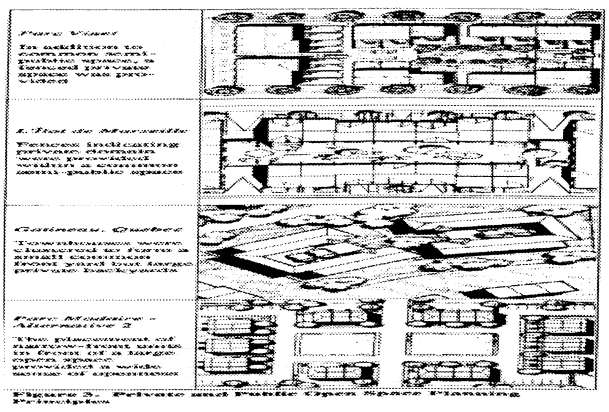

Figure 3: Private and Public Open Space Planning Principles

Any reduction in private open space can be compensated by large public open areas. Shared spaces such as neighbourhood greens, squares, and community gardens provide social gathering points and contribute to community identity (Van der Ryn and Calthorpe 1986). The proximity of public open space to the rowhouse units is important: "Access is a matter of psychological, as well as physical, connection. An open space must seem to be close and easily reached, which is very much a matter of design" (Lynch 1990). Larger public areas can serve to alleviate the apparent pressure caused by the concentration of taller structures, as in the second alternative of the Parc Madaire community (Figure 3); when such a strategy is not required, a series of interconnected smaller spaces of varying appearance and shape is often preferable to one large open area (Cooper Marcus and Sarkissian 1986). Where rowhouses with larger private backyards are clustered around a common front area, as in the Gatineau project (Figure 3), the provision of extended personal space in the rear compensates for a smaller public area in front.

UNIT AND COMMUNITY IDENTITY

In order to lower costs in high-density communities, builders rely on the ease of repetition to which the narrow-front rowhouse type lends itself. The ensuing risk of bland environments resulting from the monotony of such repetition can be avoided if the designer conceives of and provides identities for both the unit and the community in the initial design. If adequate provisions are made in the primary phases of design, the desired objectives can also be achieved economically; moreover, if the built community is appealing, increased sales and buyer satisfaction will prove to be profitable for the builder.

The high degree of repetition required for economy to be maintained at the level of the individual unit can be alleviated by ensuring that a fixed number of variable elements can be combined in interesting ways in order to create the impression of diversity and personalization. In the Parc Madaire project in Aylmer, unit identity was enhanced by varying the dormers, porches and facade materials (Figure 4). In the L'Îlot de Marseille project, the facades were carefully articulated to achieve variety and to admit a great deal of natural light into the units; several plan options were proposed within the building shell to provide diversity for different household types and in order to accommodate the needs and tastes of future buyers. Even though the designer may be restricted for reasons of economy to a limited number of exterior components, the rearrangement and combination of these features in a creative manner can lead to novel variations in the appearance of the individual units. At the unit level, a traditional approach is well suited to the design of modest, comfortable rowhouses. Tradition as a central concept in community design is essential to the "neotraditionalists" Duany and Plater-Zyberk; their philosophy involves the reuse, revitalization and improvement of existing forms (Krieger 1991). In the case of the Grow Home, a classical style does not require the designer to use odd materials or unusual shapes (which are generally expensive) and it allows for an aesthetic element within the context of straightforward construction. The positioning of open-

ings and the choice of pleasing proportions and decorative elements "can lend even a simple dwelling a satisfying air" (Rybczynski et al. 1990).

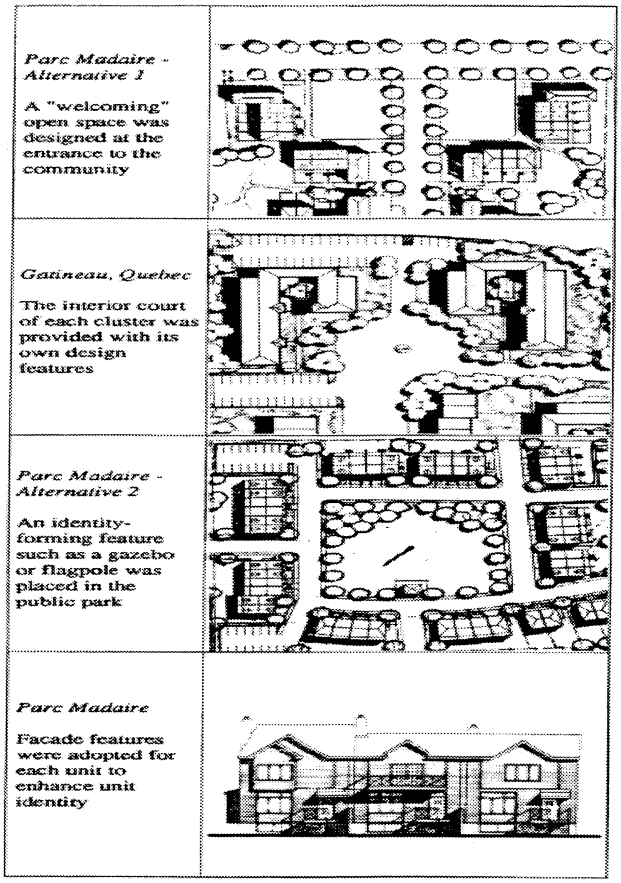

Figure 4. Identity-Making Features at the Community and Unit Scale

Figure 4: Identity-Making Features at the Community and Unit Scale

Community identity is eventually established through evolution and a slow process of accretion, but the conditions for such a process to occur can be provided in the initial design. Cooper Marcus and Sarkissian (1986) maintain that the general exterior impression of the community "significantly affects how residents feel about their homes, sometimes even how they feel about their own worthiness as human beings;" their approach allocates a considerable proportion of the design budget to landscaping and site amenities, even at the expense of limiting the budget on interior finishes, in order to provide "a quality milieu." The locating of trees and variation in communal outdoor areas are vital considerations, while the sequencing of views creates interest at the scale of the overall site by punctuating the design to avoid dullness. In the Parc Madaire project, where the goal was to create a high-density affordable community with the amenities found in suburban low-density areas, neighbourhood identity was emphasized by the placement of two entrances at the ends of the central boulevard; a connection with the existing community was underscored by this axial boulevard (Figure 1, Alternative 1). In the same project, the houses were designed in cluster form, each grouping with different colours and facade designs. Housing types of various footprints were arranged in the Parc Vinet project to create a well-articulated and interesting street-scape as well as to define outdoor living areas. The amount of attention to be paid to the overall community aspect of the rowhouse development cannot be overemphasized; as Peter Calthorpe (1993) writes, "A strong sense of community, participation, identity, and conviviality is important to support a sense of safety and comfort within a neighbourhood."

CONCLUSIONS

Changes in the economic, socio-demographic, and environmental landscapes of Canada have raised issues in relation to housing affordability which can only be answered by cost-effective, energy-efficient solutions which will satisfy the requirements of designers, planners, decision-makers, regulators, builders, and a diverse range of potential home buyers. The narrow-front rowhouse has been advanced as the flexible building block for affordable communities which rises to the challenge of accommodating the three primary issues to be addressed in the design of any high-density development: parking and vehicular circulation, private and public open spaces, and the sense of identity at the unit and community levels. The balancing of these three vital elements ensures the provision of pleasant and desirable housing as opposed to the type of neighbourhood which home owners strive to avoid. The future of successful and affordable rowhouse communities resides in the thoughtful treatment of all the design factors which contribute to the creation of environments where people happily choose to live.

REFERENCES

Brower, D. et al. *Urban Growth Management Through Development Timing.* New York: Praeger Publishers, 1976.

Calthorpe, P. *The Next American Metropolis: Ecology, Community, and the American Dream.* New York: Princeton Architectural Press, 1993.

Canada Mortgage and Housing Corporation. *CMHC's Healthy Housing Design Competition. Guide and Technical Requirements.* Ottawa: CMHC, 1991.

Canada Mortgage and Housing Corporation. *The Housing Industry: Perspective and Prospective. Summary Report. The Changing Housing Industry in Canada. 1946-2001.* Ottawa: Public Affairs Centre, 1988.

Cooper Marcus, C. and W. Sarkissian. *Housing As If People Mattered: Site Design Guidelines for Medium-Density Family Housing.* Berkeley: University of California Press, 1986.

Dear, M. "Understanding and Overcoming the NIMBY Syndrome," *Journal of the American Planning Association* 58: 3 (1992).

Friedman, A. "Design Secrets for Affordable Efficiency," *Home Energy* January/February (2000): 24-27.

Friedman, A. "Redefining the Term 'Sustainable,'" Proceedings of the 1993 Conference of Energy Efficient Building Association (EEBA) and Northeast Sustainable Energy Association (NESEA), *Building Solutions.* Boston: March 3-6, 1993.

Friedman, A. and V. Cammalleri. *Evaluation of Affordable Housing Projects Based on the Grow Home Concept.* Montreal: McGill University School of Architecture, 1992.

King, A. "Narrow Minded: Montreal Takes a Second Look at Impressive Housing Idea," *Montreal Gazette,* June 21, 1990.

Krieger, A. "Since (and Before) Seaside," *Andres Duany and Elizabeth Plater-Zyberk: Towns and Town-Making Principles*, A. Krieger and W. Lennertz (eds.). New York: Rizzoli, 1991.

Lynch, K. "The Openness of Open Space," *City Sense and City Design: Writings and Projects of Kevin Lynch*, T. Banerjee and M. Southworth (eds.). Cambridge, Mass.: The MIT Press, 1990.

Muthesius, S. *The English Terraced House*. New Haven: Yale University Press, 1982.

Rybczynski, W., A. Friedman, and S. Ross. *The Grow Home*. Montreal: McGill University School of Architecture, 1990.

Schoenauer, N. *6.000 Years of Housing*. New York: W.W. Norton and Company, 2000.

Sherwood, R. *Modern Housing Prototypes*. Cambridge, Mass.: Harvard University Press, 1978.

Statistics Canada. "Private households by structural type of dwelling," 2000(a), *www.statcan.ca/english/Pgdb/People/Families/famil55a.htm*

Statistics Canada. "Husband-wife families, distribution and average income by number of earners," 2000(b), *www.statcan.ca/english/Pgdb/People/Families/famillabor02a.htm*

Statistics Canada. "Household size," 2000(c), *www.statcan.ca/english/Pgdb/People/Families/famil53a.htm*

Statistics Canada. "Census families, number and average size," 2000(d), *www.statcan.ca/english/Pgdb/People/Families/famil40b.htm*

Statistics Canada. "Census families in private households by family structure," 2000(e), *www.statcan.ca/english/Pgdb/People/Families/famil51a.htm*

Statistics Canada. "Population by sex and age," 2000 (f), *www.statcan.ca/english/Pgdb/People/Population/demo10a.htm*

Van der Ryn, S. and P. Calthorpe. *Sustainable Communities: A New Design Synthesis for Cities. Suburbs and Towns*. San Francisco: Sierra Club Books, 1986.

Slumming in Utopia:
Protest Construction and the Iconography of Urban America

Abbreviated and adapted from published version

2000-2001 JAE *Award*

LANCE HOSEY
Charlottesville, VA

In the summer of 1932, 25,000 World War I veterans and their families marched into Washington, D.C., to petition the government for relief from the Depression. They called themselves the "Bonus Army" and demanded the early release of payments promised to veterans. Throughout the city, they built crude shelters out of scrap material and camped for eight weeks. The shacks had a conspicuous presence in the city, and the Hoover administration called them a humiliation. The president vowed to end "defiance of civil authority" and sent in the military, which forcibly removed the squatters and set fire to the camps. [FIGURE 1] Four people died in the process. MacArthur, who led the troops, called the veterans "insurrectionists" who had "severely threatened" the institutions of government.

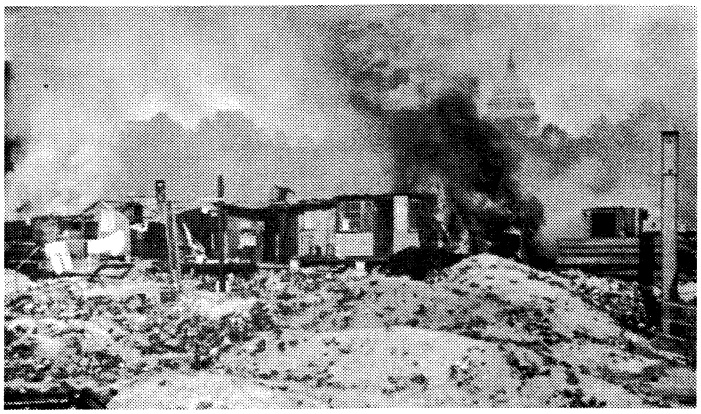

Fig. 1: Bonus Army Camp. Washington. D.C.. 1932.

John Henry Bartlett, a former state governor, witnessed the event and described it as "the most powerful government in the world shooting its starving veterans out of worthless huts." Unarmed, the Bonus Army presented no physical threat, for they merely sat and waited. Their real effect was psychological; they were an embarrassment to the city and to the administration. Bartlett attributed the incident to a conflict of aesthetics. The visible contrast of poverty and wealth which the shelters created in Washington symbolized a distressing national problem, namely the widespread poverty exacerbated by Hoover's policies. The banishment of the veterans was not about public safety but about politics. In the nation's pristine capital, a city on the verge of a massive building campaign, the disorderly camps were a blunt reminder of the administration's failures.

The Bonus Army account raises issues related to American urbanism, specifically the problem of representation. Architecture illustrates values; how cities are shaped and maintained inevitably reflects the beliefs of their makers. Urban form provides a symbolic narrative that serves the governing ideology by promoting a desired image of soceity. Yet, traditionally this image is confined to the showpiece spaces of official America, and it disclaims the actual socioeconomic conditions of the community as a whole in favor of an idealized representation. American cities are segmented demographically as the result of a fundamental class conflict, in which democracy's claims of equal opportunity battle with capitalism's unequal financial distribution. Cities reveal this conflict visually through the split between images of wealth and power in civic space and images of poverty and neglect in ghettos and slums. These images constitute an urban iconography which has been exploited dramatically both by official America and by protest groups, who usurp public space to broadcast a polemical message.

This article examines two projects that used construction as a means of protest. One was in New Haven, Connecticut, and the other in Washington, D.C., Each of these projects brought together images of the extremes of urban conditions in order to dramatize their differences and underscore a problem which contributes to those differences. They were built not by professional architects but by activists who co-opted architecture as a tool for political demonstration. While the constructions were intended to protest specific social issues, they may also be viewed more generally as indictments of conventional urbanism and architectural representation. They challenge the symbolic imagery of official space.

IDEALS

Idealism is a fundamental aspect of American culture. As one historian has put it, "The vision of America as a place of rebirth, a New Eden freed from the historic sins of the Old World, still colors the self-image of the American people." Civic architecture and urbanism reflects America's aspirations as if they were a single set

of universally shared values. One example of this reductivism is the prevalent influence of utopian city plans, which suggest social unity through a simple, often symmetrical shape with a dominant center. The plan of New Haven, Connecticut, illustrates this. In the original plan of 1641, a simple square is subdivided into nine, with the central square reserved as an open green space. [FIGURE 2] Encircling the central green are the built representatives of all the institutions which make up society. Along the southern side of the green are mercantile buildings, and to the east is the city government. The north edge was at first exclusively residential, lined with white clapboard Colonial houses. To the west is Yale University. The churches are on the green, which is the place of congregation, at once the physical and social center of the community. This layout relates less to pragmatic organization than it does to the desire for symbolic order and unity: the individual components of society and the city were balanced around the common space.

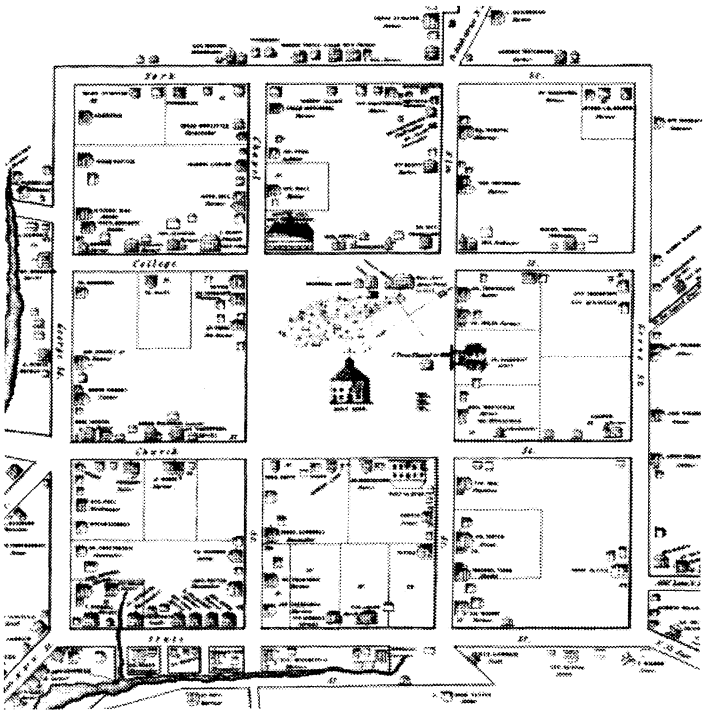

Fig. 2: 1641 Plan of New Haven, CT.

Utopia's image of unity is a fiction, and the word itself reflects this. Thomas More intended the term as a pun, a combination of words meaning "good place" and "no place." Perfection exists nowhere. The pure outline of the New Haven plan eventually clashed with the community's changing demographics. As the community became more ethnically diverse, it was divided into radically different economic spheres, and the city became torn by material and racial differences. Yale's campus plan began to reflect this division. Following riots during the 1850's, the university's open plan began to turn inward. What had been an airy yard with barn-like dormitories became a series of private cloisters behind stone ramparts. Yale began to emulate the monastic organization of Oxford and Cambridge, and despite the original city plan's image of unity, the university presents itself as a refuge, an ostensibly sacred place removed from the common space around it. As the surrounding community became more fractured, the idealism once expressed by the city at large became confined within the university's walls.

PROTEST

In the late 1980's, a series of protests at Yale underscored its distance from the community. During that time, the university, like many other institutions, had extensive financial investments in South Africa, which still practiced apartheid. The divestment campaigns waged on university campuses attracted much attention from the media. A popular form of student protest was the construction of shantytowns as a symbolic reminder of living conditions common to blacks in South Africa. In 1986, a group at Yale built a controversial collection of shanties on Beinecke plaza, in front of the main administration building. [FIGURE 3] Assembled from discarded sheets of plywood and fabric, the sheds were said to be inspired by a South African squatter village called "Crossroads," and they reproduced in miniature the environmental consequences of South Africa's discrimination. The word *apartheid* itself is a spatial reference, a combination of *apart* - ("separate") and *-heid* ("hood," condition or state). Understood in contrast to *neighborhood* (roughly "near dwelling"), apartheid is the condition of dwelling apart.

Fig. 3: Anti-Apartheid Shanties, Yale University, 1988.

The Yale shantytown imitated this space of segregation both politically and aesthetically, through guerrilla construction and through a visual clash with the surrounding campus. The rough hovels fashioned from garbage could not have stood out more clearly against their ornate background. Disapproving alumni called the constructions "an architectural outrage on a beautiful campus" and "an aesthetic disgrace to one of the most fabulous combinations of buildings anywhere in the world." Eventually they were burned down by an angry alumnus. The controversy emphasized the shantytown's meaning. The contrast of iconography symbolized a contrast of ideology. The shanties' aesthetic dissonance with their

site expressed the moral irony which the protestors saw in the university's investments.

Academia portrays its cultural position as the sanctuary of enlightenment. Former Yale president Benno Schmidt has cited "reason and order" as "the essence of a university or any civilized community." Robert Stern, the current dean of the Yale school of architecture, has written of American college campuses as "ideal, independent villages," "among the greatest dream places of our civilization." The university is perceived as an intellectual utopia, a stronghold of progressive ideas and free expression. Beinecke plaza is a typical reflection of the university's virtuous image. It resonates with historical allusions to progressive ideals: the plaza's classical colonnade suggests the place as a latter-day agora or forum, a site for open communal exchange. In actuality, universities are ideological constructs like any other institution and as such are driven by prejudices. Yale is operated by a private corporation which, through such ventures as South African investments, may choose profit over ethics, financial over social consequences. The shanties attacked the suggested hypocrisy of the university, which through its rhetoric celebrates "civilized community" and through its financial investments supported racism. The constructions revealed a side of the university unseen in its architectural representations.

URBAN MYTHS

As the Yale case illustrates, protest challenges the myths of official culture. If the city is a narrative affirmation of values, it is in a sense a type of political myth. Henry Tudor describes the political myth as a story told to promote an ideology. A myth is a view of the world, a way of making sense of the current state of things by interpreting the past. Political myths dramatize historical events for political purposes, namely to strengthen the authority of the status quo. The city as political myth capitalizes on interpretative history as a persuasive tool, and this is exemplified by Washington, D.C. The iconography of Washington conveys an image of stability and order through references both to powerful civilizations of the past and to classic utopian principles.

L'Enfant's baroque plan conjures up imperial associations. [FIGURE 4] The overblown scale of Washington's public places and avenues is spatial fanfare. The dome of the Capitol, the obelisk of the Washington Monument, the Palladian White House, and the temple memorials to Jefferson and Lincoln enshrine the institutions and historical figures of American society. This collection of civic idols presents American values in an epic tableau of political ambition. While the use of historical imagery is meant to suggest authority, it also has an idealized, edenic quality, conjuring up what James Howard Kunstler calls "the dream of Arcadia." The neoclassical style proliferated "as though Americans explicitly believed that the new nation would become this fabled land of peace and plenty."

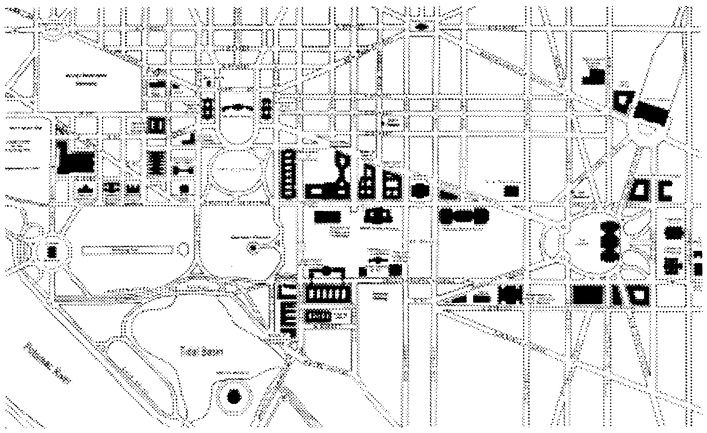

Fig. 4: Plan of Washington, D.C.

The historian Mel Scott describes Washington as the "supreme paradox among cities" because of the conflict between its political system and its aesthetic agenda, which expressed American ideals through the "legacies of autocrats and nobles, from all these seemingly timeless survivals of departed or decayed societies." The apparent irony stems from two simultaneous strains in American architecture and urbanism — idealism and authoritarianism — which represent the ambivalence of a new culture caught between looking ahead and looking backward. The capital of the American democracy simulates the capitals of European absolutism in order to evoke the cultural strength and political power associated with those models.

The historical traditions which inform Washington's overall plan reappear in the design of the National Mall, which in itself is a political allegory. The buildings along the perimeter of the Mall are monuments to government (the Capitol, the White House, etc.), the arts and sciences (the museums and libraries), and great leaders and momentous events (the memorials). In the middle is the long lawn, which suggests both the breadth of America's natural resource and the harmony of nature and culture. The philosopher Charles Griswold writes, "On the Mall...matter is put to rhetorical use....[T]he Mall says a great deal, in what it portrays and in what it omits to portray, about how Americans wish to think of themselves....[T]he Mall is a sort of political mandala expressing our communal aspirations toward wholeness."

In other words, the Mall is political myth, glamorizing past events to strengthen current authority. Place becomes an apology for the order of things. Yet, in reality, the overwhelming scale of the Mall, rather than reinforcing a connection between the individual and society, is simply alienating. Charles Dickens found the capital to be a psychologically empty space, a city of "public buildings that need only a public to be complete." The condition of these civic places suggests that the symbolism outweighs any need for actual inhabitation, as if society's population were irrelevant to society's dreams.

PROTEST

As the nation's capital, its preeminent civic place and the spatial center of the American political myth, Washington has been the site of innumerable protests and demonstrations. One project in particular, built temporarily on the Mall in 1968, was an especially clear challenge to Washington's urban iconography. In the spring of that year, the Poor People's Campaign was organized to denounce the diversion of funding for poverty-relief programs to the Vietnam War. Martin Luther King, who was assassinated that April, had intended to shift the focus of activism from civil rights to economic issues, specifically the distribution of wealth and power in America. At mid-century, the living conditions of minorities in urban areas were bleak. Poverty, racial discrimination, and the policies of the Federal Housing Administration confined the majority of blacks to slum areas.

In 1960, nearly half of all black families lived below the poverty line, and the employment rate for blacks was half that of whites. At that time, however, the national economy was exceptionally good. Cut off from that wealth, the ghettos were marginalized space, referred to as the "Other America." The critic Camilo José Vergara recently wrote, "Ghettos, as intrinsic to the identity of the United States as New England villages, vast national parks, and leafy suburbs, nevertheless remain unique in their social and physical isolations from the nation's mainstream." Though integral to the American urban condition, the image of the ghetto could not be more removed from the idealized symbolic language of civic architecture and urbanism.

As a means of highlighting this disparity, the central initiative of the Poor People's Campaign was the construction of a large shantytown in Washington. The encampment was built directly on the Mall, between the Lincoln Memorial and the Washington Monument. "Resurrection City," as it was called, consisted of many dozens of A-frame and lean-to shacks which for six weeks housed a multi-ethnic population of hundreds. [FIGURE 5] The residents considered this an alternative community, a makeshift city. They bivouacked from mid-May until late June, conducting rallies and demonstrations outside government buildings. President Johnson was appalled. At the end of June, two thousand police officers in riot gear, armed with shotguns and tear gas, surrounded the camp and emptied it out, arresting 100 protestors in the process.

Resurrection City presented a graphic illustration of the squalor that pervaded American cities. It temporarily relocated slum conditions from the wings of urban America to its center stage. It transformed the Mall into a ghetto itself. In *The Death and Life of Great American Cities*, Jane Jacobs discusses the concept of "unslumming," the process of revitalizing deteriorated neighborhoods. Resurrection City reversed that process as a "slumming" of the Mall.

The overty that defined urban space across the country became an exhibition in this space. As Resurrection City attracted curious spectators, it became a tourist destination. Sightseers were said to be "slumming on the Mall." In this second sense of the word, "slumming" means to visit an impoverished area for amusement."

This idea characterizes protest construction as display: viewers become voyeurs. In the context of the Mall, the symbolic center of American idealism, the image of destitution and decay which the shanties present is utterly foreign. What is a common condition elsewhere, even a mile away in Washington itself, becomes a novelty here.

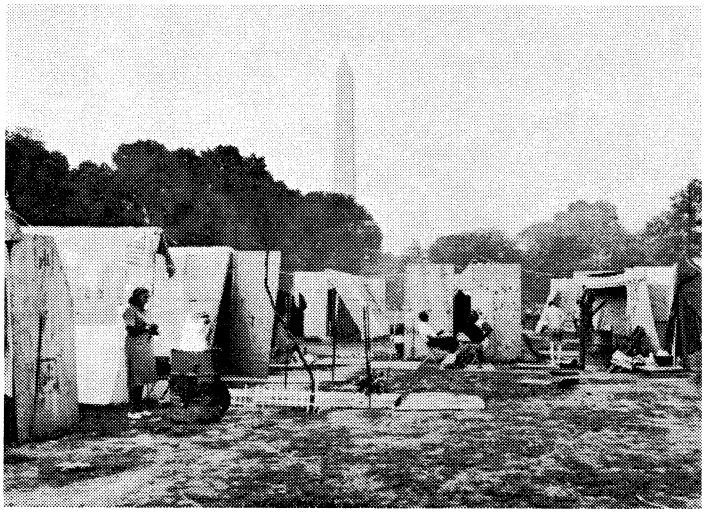

Fig. 5: "Resurrection City," Washington, D.C., 1968.

For most onlookers, tourists, those conditions were in fact unfamiliar. In 1968, the same year Resurrection City was built, a study by the Kerner Commission described a divided nation: "What white Americans have never fully understood...is that white society is deeply implicated in the ghetto. White institutions created it, white institutions, maintain it, and white society condones it." The report's famous summation was, "Our nation is moving toward two societies, one black, one white — separate and unequal." In Resurrection City, the urban manifestations of these two societies came together. Iconographically, Washington continues the legacy of the 1892 Chicago Exposition as a permanent "White City." It is the embodiment of the institutions which the Kerner commission blamed for the ghetto. If Washington is the exemplary City Beautiful, the ghetto is an invisible city, neglected by mainstream society. The shantytown on the Mall made the invisible briefly visible. The failures of urban America momentarily coexisted in one space with the monuments of national pride.

THE STRUCTURE OF PROTEST

The first aim of protest is to draw attention, which it does through provocative action. The shantytowns of Resurrection City, Yale, and the Bonus March are provocative chiefly because of their discordant relation to their context: physical opposition signals political opposition. They command attention through contrast to their surroundings, through disparities of scale, form, function, material, craftsmanship, monetary value, and construction methods. They exploit the iconography of cities by superimposing images of poverty and wealth, highlighting the class-defined divisions of urban space.

This effect is analogous to a series of photographic montages produced by the artist Martha Rosler in the late 1960's, in which *House Beautiful* illustrations of modern domesticity are combined with scenes of the Vietnam War. [FIGURE 6] The coexistence of the two seemingly irreconcilable environments creates an eerie imbalance. Like the photographs, the protest constructions are spatial montage, a combination of two incongruous scenes. Architecturally, what occurs is a kind of typological dislocation, and the physical representative of an otherwise absent social condition appears: the ghetto signifies poverty, the shantytown racism. Transplanted from their normal context, these images become purely symbolic. The city's celebration of material wealth is foiled by unavoidable reminders of society's negligence. This tactic centralizes a marginal place, narrowing the psychological distance by apparently eliminating the physical or visible distance.

In this sense, demonstration sites become what Michel Foucault called "heterotopias." Traditional civic spaces, represented in these cases by the institutions of government and the university, are utopian, as Foucault described: "They present society itself in a perfected form, or else society turned upside down, but in any case these utopias are fundamentally unreal spaces." Protest constructions convert these places into "counter-sites" or "heterotopias," which are "capable of juxtaposing in a single real place several spaces, several sites that are in themselves incompatible." Protest foils society's perfect image of itself by exposing it to its actual, imperfect conditions. With the shanties, Foucault's "counter-site" is not simply a figurative condition but a physical construct. In them, political divisions become tangible, and material opposites vie for a single space.

PARADIGMS

The protest constructions discussed here present a particular challenge to architectural authority in that they turn architectural language against itself. If the urban environment is the materialization of official value, then to *build* protest is to oppose that representation on its own terms, namely through the medium of construction. Yet, while adopting the forms of architecture, the shanties defy its conventional functions. Under the guise of building, protest questions the definitions of architecture by frustrating orthodox standards of critical evaluation. Comparing the protest constructions to certain classic, even canonical, ideas from architectural theory illustrates this resistance. The three paradigms below are attempts to classify or define architecture according to aesthetics, symbolic program and clarity of construction, respectively.

CATHEDRALS AND SHEDS

Architecture is customarily defined by an aesthetic standard. Nicholas Pevsner begins his *Outline of European Architecture* with the statement, "A bicycle shed is a building; Lincoln Cathedral is a piece of architecture. Nearly everything that encloses space on a scale sufficient for a human being to move in is a building; the term architecture applies only to buildings designed with a view to aesthetic appeal." The distinction between buildings and architecture creates a problem of categorization. By Pevsner's definition, the shanties are clearly not architecture. While they incidentally may or may not offer "aesthetic appeal," they are not "designed" with this purpose, but this is part of their effectiveness. The aim of protest constructions is not aesthetics but meaning, and hence they challenge architecture's traditional emphasis on form. Formally, the shanties are no more than Pevsner's bicycle shed, but symbolically they are memorable. They co-opt architectural form in order to achieve something quite non-architectural, namely a sense of political immediacy.

The economic, bureaucratic and sociopolitical practices which allow conventional, permanent buildings to come into being, such as land acquisition, programmatic use, code compliance and communal review, virtually eliminate the likelihood of broadcasting an overt political message which counters official ideology. Temporary and especially unauthorized installations may circumvent these institutional processes as well as the complexity of functions which conventional buildings serve. Further, by reducing architecture to rudimentary construction yet still investing it with social relevance, the shanties effect an unusually concise language. While language in architecture often consists of complex, codified representations, the shacks break down this grammar in order to assert a clear message. In the debate over the Yale shanties, the constructions often were characterized as "free speech" (and thereby legally protected). The idea of construction as "speech" suggests a direct, unmediated communication — building as declaration.

DUCKS AND SHEDS

In their famous study of urban iconography, *Learning from Las Vegas*, Robert Venturi, Denise Scott Brown and Steven Izenour divide buildings into two types of symbolic imagery: the so-called "duck" and the "decorated shed." In a "duck," named for a roadside drive-in shaped like a duck, space, structure and program conform to an overall symbolic shape, a "building-becoming-sculpture." In a "decorated shed," space and structure serve the program, and ornament is applied separately. The distinction between the two is in the relationship between form and symbol. "The duck is the special building that *is* a symbol; the decorated shed is the conventional shelter that *applies* symbols." The protest shanty eludes these classifications, or rather it combines them: it is a conventional shelter that *is* a symbol. It is "decorated shed" without the decoration, a *symbolic* shed, meaningful just by virtue of its being a shed.

The shack as a form is not necessarily symbolic in a political sense; its meaning derives from context rather than form. The Yale shanties may mimic the appearance of "Crossroads," the South African shantytown after which they were patterned, but their intent is very different. The original shanties, while dramatic in their tragic conditions, are used first as shelter, not as a symbolic statement. The significance of the shanty as a building type depends on its circumstance. Inserted in the environment of the university, it con-

jures up its original setting in a unexpected place. Both the protest constructions and their official surroundings manipulate the emotional associations of architecture in order to persuade viewers. Through viewers' past experience with the iconography of buildings, the image of the shanty connotes poverty and deprivation, just as the images of historicized monuments suggest prosperity and power.

PRIMITIVE HUTS

The image of the shanty as an elementary shelter recalls the historical theory of the primitive hut, which speculates on the nature of the first human construction. For Laugier the simple shed built of four posts and a gable represented all that was essential in architecture, everything else having developed from these components. "The little hut...is the type on which all the magnificences of architecture are elaborated." For him the hut represented "true perfection," the standard against which all buildings should be gauged. The primitive hut became a model for formal simplicity, structural logic and economy of means.

The protest shanties, as actual huts, confront the canonical hut with its literal image. The real huts make the metaphoric hut appear an absurd model for monumental buildings, and the paradigm seems an affectation. Hence, the mythic representation of architecture's origins is appropriated in the criticism of architecture's institutional image. The candor of the shanty undercuts the esoteric languages of official architecture.

Although Laugier considered the archaic hut only for its architectural lessons, many theorists examined it for its social implications, as an allegory of cultural progress. The mythic first construction glamorizes mankind's first attempt to shape the environment and assert human will onto the land. The shanties, while echoing the primitive hut as simple shelter, contrast its meaning. They are constituted of sheets of plywood leaned together in a precarious or cursory way. Their makeshift assembly from crude material is the opposite of the philosophical hut's structural clarity. The shanties are more like a house of cards than like Laugier's four-post temple, and this fragile appearance contributes to their association with poverty or neglect. The protest shanties symbolize not determination but deprivation, presenting the hut not as a tribute to primitive ingenuity but as an attack on primitive living conditions in a technologically advanced society.

If the paradigm of the hut represents man's confident occupation of the land, the shanties' tenuous construction suggests an ambivalence toward their space; they have an uncertain, tentative presence which bespeaks a lack of belonging in that setting. While the archetypal primitive hut harmonizes with nature, the shanties are invaders. The source of their materials further implies an antagonistic role. A recurrent practice with protest constructions is the use of second-hand material, scraps from factories, construction sites, and demolished buildings. In both the Bonus Army shacks and the Yale shanties, discarded doors became walls and ceilings. The theoretical hut draws natural material from the land around it, but the protest shanties are assembled parasitically from pieces of the surrounding city. This use is reminiscent of what John Fitchen calls "architectural cannibalism," the ancient habit of removing materials from older buildings for use in new construction. Usually this was perpetrated by one civilization on an extinct one: for instance, the use of ancient Roman bricks in medieval cathedrals, or the Arabs' use of limestone from the pyramids in their citadel in Cairo. In this historical context, the scavenging of material for protest constructions implies cultural obsolescence, as if society's present incarnation were seen to be ineffectual. Demonstration built from debris suggests the reformation of society from its ruins. The city's waste is recycled in its critique.

As a social metaphor, the primitive hut is ambiguous. For the philosopher Rousseau, the hut was the prehistoric shelter of the family, and therefore it housed the origins of society as the first locus of human interaction. In this argument, the primitive hut implies the most fundamental social bond. Seen in this light, the protest shanties return the scale of the individual to monumental civic space in the image of the proto-house, the archetypal communal dwelling. As contemporary primitive huts, they illustrate a most basic human need, shelter, and therefore they remind us of the most basic task of society, to provide for the needs of its constituents. On the other hand, Rousseau also saw the building of huts as the origin of property and entitlement, from which disputes and warfare arise. So, with the primitive hut comes the best and worst of society: fraternity and the struggle for domination. The protest constructions suggest this friction, questioning the inequities of land division and society's inability to reconcile ideological and material differences. As ersatz cities, the shantytowns do not glorify the origins of community, they protest the breakdown of community, the failure to provide a humane environment.

CONCLUSION

The story of the primitive hut is a nostalgic one, a longing for some mythic eden. As a model for building, it represents the desire to imbue the contemporary environment with the character of that lost paradise. In this image, public space is portrayed as idyllic, frozen in time. It memorializes this prehistoric model or any number of historic images through architectural references, always valorizing the past.

While official space is timeless, protest construction is timely. Its ephemerality allows it to address contemporary social and political

problems and present itself with an urgency which most architecture does not. At the same time, by appropriating architectural imagery, the demonstrators give their message a form which rivals the symbolic language of civic institutions. Protest briefly adopts the timeless image of architecture in order to suggest the gravity of its message. Protest constructions are not monuments and cannot compete with the material longevity of the surroundings they challenge. Like all political demonstration, they are simply a critical tool, but one which may instigate social if not physical change. They are meant to temper the unchecked idealism of official space by dramatizing the conflict between ambition and obligation, between society's possibilities and its basic responsibilities.

Exploding the Urban Block:
Residual Urban Space in the Alleys of the Art Deco Historic District, Miami Beach, Florida

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...Such inner peace as men gain must represent a tension among contradictions and uncertainties...A feeling for paradox allows seemingly dissimilar things to exist side by side, their very incongruity suggesting a kind of truth. (1)

A desire to test the elastic limits of preservation as urban strategy lies at the heart of the following essay. The widely publicized image of the City of Miami Beach —as reinforced by its historic preservation guidelines and public review processes— has, over the past 15 years, resulted in a predictable amalgam of nostalgia and gentrification. By testing the development potential of residual, interstitial spaces along the service alleys that define the interior of the urban block in the Deco District, students in a 1999 senior undergraduate design studio at Florida International University questioned both the image of the gentrified historic district and the process that produced it. Guided by a critic who sits on the city's Historic Preservation/ Design Review Board, students suggested myriad ways in which conflicting aspects of the historic and contemporary American city might coexist.

The study developed from an interest in exploring the "tensions, ambiguities and contradictions"(2) inherent in the transformation of protected historic urban fabrics over time, specifically as a result of prevailing development strategies that concurrently press for increased intensity of use and gentrification —while blithely ignoring its social and physical costs. Subtext to such interventions are important but seldom articulated cultural clashes that, in the body of urban built form, pit disparate value systems against one another: On the one hand, an early twentieth century historic district, prized and protected primarily as artifact/ commodity, and is set against the aggressively marketed city of the late twentieth century that simultaneously threatens and depends upon the success of preservation efforts. On the other hand stand the invariably neglected physical facts of a parallel, gritty, urban netherworld of critical need —one inhabited by a disenfranchised indigent population increasingly alienated by the gentrified city and silently occupying the forgotten spaces that straddle history and invention.

The studio adopted a critical stance toward competing issues of development and preservation, proposing not simply to fill empty lots in the historic district with the new, thematically correct construction often favored by the city Design Review Boards, but rather to investigate the shadow networks of the existing city (3) —its mid-block alley infrastructure and residual spaces— as the potential locus of an alternative urbanism (4). Here, the studio posited, in the uncharted territory between the historically protected and the carefully "contextual", a largely independent, darkly private "back door" world (5) might find a legitimate voice, while forging a tenuous coexistence with the highly publicized, much-photographed "front door" worlds of media, fashion and tourism. Specifically, the studio looked to *collage/ montage* as instruments and strategy for the development of viable responses to the complex questions raised by new architectural programs proposed for the re(dis)covered interstitial spaces that were defined by the studio as the "silent alter ego" of Miami Beach. (6) (7)

The student work, contemplating a series of interventions in an early twentieth century historic district (8), served as an ideal vehicle to explore aspects of the American urban condition. The proposals for territory accruing to the service alleys of the Deco District reinterpreted a series of mid-block sites of ambiguous morphology and complex ownership status in the historic center of the barrier island. These rear-of-lot spaces, zoning-mandated setbacks, roof tops and shallow basements, comprised a terrain rendered residual (if not outright invisible), by current planning and zoning practices —as well as by the physical and social changes that have taken place within the city over the past 80 years. The projects, proposing a series of complex initiatives that blurred distinctions between public responsibility and private interests, looked to a broad range of systems of superposition ranging from the casbah to 'complexity theory' (9) while mirroring the intricacies of the contemporary city and proposing an architecture of what Robert Venturi termed not 'either-or', but 'both-and'.(10)

A CHANGING AMERICAN CITY STRUCTURE

Enumerating the distinctive characteristics of a uniquely American urbanism, Alex Kreiger has noted that throughout the nineteenth century, while traditional European cities began to be painstakingly transformed by industrialization, American cities were still largely under construction. As a result, they appeared to offer possibilities for "circumventing the chaos experienced by their

European counterparts in the face of rapid growth and mechanization."(11) In the course of the twentieth century, however, the fabric of the American central city has accumulated sufficient critical mass to begin sharing some of the infrastructure difficulties that have long bedeviled its European predecessor.(12) Among many such, and although much of its population has continued its penchant for suburban flight, the American city is increasingly overwhelmed by growing density and by the automobile.

While contemporary American and European city centers find themselves negotiating some similar technological quandaries in their search for answers to these difficulties, they exhibit vastly different mechanisms for recording the morphological transformations which solutions to these problems demand. The American city, dominated by the Jeffersonian grid, ironically finds both its most public and most private spaces in the unbuilt places within the grid.(13)(14) The lack of constancy in the American urban section has reinforced the street-as-connector as the dominant public experience in the urban landscape, while the corollary concept of building-as-object-within-the-grid has given rise to the inevitability of residual space.(15) Alex Krieger speaks of the American city as a "transient city". What survives best in what Jean Paul Sartre, on a visit to America in 1955, termed the nation's "moving landscape" are not buildings or places, but rather connectors, or venues for movement. In America, streets precede their defining edges. Unlike their European and colonial counterparts, which are defined largely by the fabric that surrounds them, the voids of American streets assume artefactual properties that render them tangible, autonomous, three-dimensional.(16)

In the American city, the relationship of the urban grid to the individual lot has offered possibilities for responding to development pressures by a strategy of demolition and substitution: The past "does not manifest itself in American cities through public monuments (as it often does in European predecessors), but through survivals ... no one has taken the time to tear them down. The presence of historical artifacts is an indication not of reification, but of work to be done." (17) Historically, and, some would argue, as a matter of principle (18), the American city has favored an inclination for building upward from a clean slate. Perhaps, in the tradition of Frederick Jackson Turner, the instinct to begin anew is but one aspect of an American reluctance to surrender the possibility of perennially reinventing itself, to be bound by the weight of its own form, to be too-accurately quantified or too clearly defined.(19) Perhaps because it has placed greater hope on the as-yet-unknown possibilities of its future, the American city has repeatedly devalued itself as artifact and thus, rising legions of historic preservationists might argue, its own past.(20)

By contrast, the European city accommodates the changes wrought by a new technology not by substitution, but by allowing itself to become the foundation for new interventions. Because it does not operate on a grid, but rather on the regularity of building heights and street frontages, it has the ability to create figural spaces. The emphasis there is not on individual buildings, but on their collective aggregation; streets, urban blocks and squares are the predominant public spaces in a continuous fabric built incrementally over long periods of time.(21) Here, residual urban space is virtually non-existent —absorbed, either as solid or collective void, into the very body of the city fabric.

What follows, in the body of work of this senior undergraduate design studio, is an argument for interventions in contemporary American cities that refrain from demanding massive alteration of their context in order to establish urban intentions. A strong local preservation ethos places a clear premium upon the maintenance of the existing fabric in Miami Beach. It unwittingly creates a unique opportunity for a post-structuralist critique of long-standing American planning tactics, traditionally dependent on the Jeffersonian grid and the object building: The studio explores the possibility of reinterpreting aspects of a European urban "fabric" strategy, to fit a contemporary American city that increases in density while eschewing figural space. Leveling a measure of criticism at master narratives of American urban development, the studio proposes that American cities might look to European models for a mechanism that registers evolution without destruction. Student projects suggest that while it searches for means to express its heterotopic condition, the American city might pay particular attention to alternative strategies for inhabiting those residual spaces that mark the course of its making. Specifically, this is an argument for the redefinition of that residual urban space that is the hallmark of a peculiarly American urbanism, comprised of interrelated, but independent, object structures.

Convinced of a need to establish the studio proposals as intrinsic parts of Miami Beach —parts that speak to the collective memories of the city even as they respond to its contemporary needs—the teaching bias of the studio advocated a design strategy based loosely on the nineteenth century concept of "the city as museum."(22)(23) It looked to *collage/ montage* in order to generate "an alternative reality, a critique of reality".(24) In the junctures between its incompatible parts, in the "by-product of the technique" of assembly, lies the identity of *collage/ montage*. Rupturing the Modernist unity between form and content, *collage* makes multiple meanings possible (25) through "the confrontation of autonomous fragments [that] contrast ancient and new structures... finding the ground and the form in which past and present recognize each other".(26) Working in a unique physical context, the studio sought to engage Venturi's "both-and", the "oscillating relationships, complex and contradictory, [which] are the source of the ambiguity and tension characteristic to the medium of architecture."(27)

The Miami Beach projects draw upon the machine aesthetic of the mid-block service alley, upon the forms of rear-of-lot servant quarters, of exterior catwalks, open fire escapes and cyclone fencing, of rooftop terraces and fly-by-night shelters, upon the historic forms, materials and colors of regional artisanship, upon the relationship between city and ocean, city and bay, city and civic space, city and open green space — to discover a new identity for the alleys of Miami Beach that incorporate the ghosts and echoes of its disenfranchised inhabitants even as it lays a groundwork for the future of the city. The projects provide examples of intermediate scale interventions that respect aspects of the historically protected district, contemplate complex composite buildings, recover lost spaces

in the city, and engage existing structures by proposing strong sectional relationships to context.(28) In so doing, they successfully mitigate disparities between the collective fabric and the individual building, between the urban scale and the scale of the single structure, between historic artifact and contemporary development. Moreover, by making proposals that, cutting across boundaries of privilege, hoped to embody the histories and collective experiences of a place, the projects speak to the challenges posed by residual urban spaces to traditional meanings of public,0 community and citizen.

ARCHITECTURAL DESIGN 8

The alleys of the Miami Beach Art Deco District are a shadow network to the avenues and boulevards that traditionally define the city. They are largely undeveloped places of remarkable aesthetics, typically invisible to most passers-by and secondary to the buildings they serve. (29) Characteristically, they are home to power poles, gas meters and trash receptacles, service parking, laundry machines and chain link fences, and the otherwise homeless seeking shelter from an inhospitable –and increasingly unaffordable— 'legitimate' city.(30) In parts of the Beach, these north-south alleys have recently also become home to after-hours nightclubs and eateries, open long after the more conventional city venues have closed, and active well into the wee hours of the morning. Frequented by legions of hardy, in-the-know urban foragers, their survival suggests that the neglected residual spaces that collect along these alleys —unregulated by zoning or planning ordinances, but restricted by the fact that they exist behind protected, historic buildings— might take on a significantly different aspect. The recovery of such spaces, their identification as viable sites for building, and the character of their development, may provide a key to the evolution of a critical —and alternative—urbanism, discovered in conversation with an existing context that is privileged as artifact, by virtue of its historic designation.

The students undertook a series of independently structured design projects sited along and within these alleys, plumbing the range of possible relationships between alley and street. Iconographically specific instances of a broader argument for interventions in the city that work sectionally within the historic urban fabric to enhance it, the projects were completely bound up in exhaustive readings of the site (31), explicitly recognizing the complex intricacies of a unique context. Although tangential problems were addressed throughout the term, the larger portion of the semester was spent in the design and development of solutions to some of the urban and tectonic problems (and possibilities) posed by competing forces simultaneously at work in the Miami Beach Art Deco Historic District. Among them: The pressures of development interests to increase density in an area of high economic value, the restrictions to development imposed by the very same historic district status that makes that area both highly desirable and economically attractive, and the nature of the residual space within which that new development might take place.

Students were challenged to understand the morphology of the *interior* of the urban block —in an historic district largely defined by the picturesque character of its periphery: What tectonic issues should be addressed if the existing built fabric that defines the block is both historically protected *and* of a smaller scale than that which is ordinarily sought by contemporary developers/ investors? What are the socio-economic issues in the proposition that one might build *behind* the buildings that define the streets of the city (said streets understood as the recognizable entities that delineate a protected historic district)? What is the nature of the spaces being proposed for inhabitation? Currently, whose realm are they? What happens to these persons? Activities? Conditions —as a result of development? What defines public and private space in the city? What happens to those definitions in the context of the proposals being considered here? What relationships can be posited/ suggested between contemporary infrastructure and an existing built fabric? Between infrastructure and private space? Infrastructure and public space?

Through individually directed investigations, students tested the viability of a broad assortment of project references, including: the rear-of-lot residential alley structure, the parasite building, the infill structure, the casbah, the additive structure and the hybrid building. They also investigated a range of viable building programs: The (automobile) storage building, the youth hostel, the SRO, the eatery, the nightclub, the tattoo parlor, the 24-hour copy place, the hidden garden, the office structure, the residential high rise. Their work demanded that they understand the parameters that defined the Art Deco Historic District in order to push the envelope of that definition.

Although the studio focused on built and unbuilt space conditions along the alleys of two specific contiguous blocks in the heart of the historic district (13th Street to Espanola Way, Washington Avenue to Collins Avenue). Students were asked to choose their own individual locations for intervention within the two-block area. The work of the semester, which began with a variety of research assignments, led to an array of discoveries that set the parameters for subsequent explorations. These, in turn, drew upon existing zoning regulations, the possible range of property ownership/ development arrangements recognized by the City of Miami Beach, the viability of leasing/ purchasing air rights form public and private entities for construction, and the legal means for re-assembling portions of already platted properties. In addition to exhaustive photographic records of the site, students produced measured drawings of existing conditions and highly detailed, 3/16" models of the two city blocks (including power poles, fences and the occasional tree).

Working in teams, students chronicled the history of planning in the Deco District, noting the fact that its service alleys run from south to north, beginning at the southernmost tip of the barrier island, and bifurcating contiguous city blocks whose longer dimensions are oriented parallel to the Atlantic Ocean and Biscayne Bay coasts. Typically 15 feet in width and (officially) host only to one-way vehicular traffic, they are City- owned easements for public access to a variety of services, ranging from power and telephone

distribution to trash pick-up and fire protection. Properties that abut them are characteristically absolved from maintaining rear setbacks, and height restrictions along the alleys are virtually non-existent. In the most intensely commercial areas of the city, where side setbacks are not required, the alleys are officially accessible only by means of their southern extremities –or through the existing buildings that abut them. In areas of the city where side setbacks require buildings to stand apart from one another, narrow east-west view corridors allow occasional glimpses of the Ocean and Bay from the inner world of the alley.

In much of the Beach, these alleys exist behind historic structures whose architectural integrity the City's Historic Preservation and Design Review Boards are entrusted to protect. Since the street remains the principal definer of the public realm in historic South Beach, historic district regulations seldom reach beyond the perceived impact of proposed structures on the street. Interestingly, students discovered that although City ordinances precluded the demolition (or significant alteration) of protected structures, it was possible to legitimately build behind them –or even above them— so long as the addition was invisible to a six-foot tall observer looking at it perpendicularly from across the street it fronts. As streets on South Beach are relatively narrow, it became apparent to the class that although this type of development had never been proposed in the past, considerable vertical construction was nevertheless legally possible. Inquiries at the City also revealed that building officials, even if not the final arbiters of such questions, would be willing to entertain the possibility that private parties might lease or purchase air rights over the City-owned alleys for development –so long as adequate clearance was allowed for the passage of garbage trucks and (small) fire/ rescue vehicles. Finally, students discovered that the mechanisms for assembling property in unconventional ways appeared to be negotiable at larger scales of development.(32)

In response, the buildings developed in the studio suggested complimentary infill strategies for mid-block conditions: All addressed, in some fashion, a unique condition of growing urban density that forces an ambiguity in the traditional relationship between building front and street. Most, but not all the projects suggested the interior of the lot as the new, (true?) building front and focused attention on the continuous landscape condition of the interior of the urban block as seen from the perspective of the service alley. Each of the projects stretched the boundaries of the urban codes that were simultaneously implicit and explicit in their immediate and larger surrounds. In these conditions, some of the projects found evocative parameters for an exploration of experiential variety within the confines of smallness –while others explored more daring possibilities for generating vertical public space in a manner that reframed the significance of both the street and the protected historic structures that defined it. In each project, the compressed landscape of the mid-density historic district afforded opportunities for a redefinition of urban space.

The studio's fourteen students produced a remarkable range of solutions to the problems of development in the 'fourth wall'. Students were encouraged to work intimately with the unique physical conditions and adjacencies of their chosen sites, using them as both landscape and infrastructure: as points of access, as vertical circulation, as structural support. In all cases, students remarked that their projects were impossible to read as independent objects, and ultimately incomprehensible without the context models to which their proposals accrued.

Among a series of examples, *Eleonora Vasiliadis* proposed a youth hostel for one of the city blocks under study. A long, low, sinuous parasite building that grafted itself onto existing historic and non-contributing structures in the alley, her project suggested the inhabitation of alley air space, allowing clear passage for pedestrian and vehicular traffic below. The structure extended (and borrowed use of) the existing exterior stairs and horizontal catwalks of neighboring structures for access, while allowing for the public inhabitation of neighboring rooftops. Invisible from either primary or secondary street and transforming the alley beneath it, the solution developed from an intensive three-dimensional excavation of the project site that allowed her to interpret the *ad hoc* character of existing construction in the alley. Building in steel and wood where her neighbors built in concrete and masonry, appearing fragile and temporary where existing buildings reveled in solidity and permanence, her project questioned the relationship between old and new structures, between old and new constituencies of inhabitation, and suggested a contrasting tectonic language to respond to the uniqueness of that condition.

Similarly interested in disappearing into the interstices between existing buildings and evoking the precarious impermanence of street existence, *Jorge Bernal* proposed a soup kitchen and a series of homeless shelters for discovered, episodically occurring narrow gaps between existing protected structures. Rejected outright by most of the class as too restrictive to be buildable (the spaces had a minimum width of 5'-0" and a maximum width of 10'-0"), these spaces provided an opportunity to give a tactile dimension to absence. His proposals, twisting and bending vertically for light, occupying spaces high enough above grade to allow existing building services to continue uninterrupted, and supporting themselves by new structural elements grafted upon existing bearing walls, comprised a carefully engineered kit of parts expected to be erected quickly, dismantled at will, and re-configured in spaces similarly discarded as unusable, for a growing population of urban nomads.

In contrast, *Malcom Giblin* and *Daniel Romero* offered solutions that defied height and density zoning restrictions outright. These students stacked sizable residential and commercial program behind existing historic structures, and granted broad public access to the alley. Their proposals introduced the possibility of interior block conditions that harbored far greater density and operated at a far larger scale, than their protected periphery. They demanded a re-evaluation of the definition of a historic district, arguing that contemporary development pressures would render them little more than picturesque facades to the more prominent construction behind them. Significantly, the projects elaborated a language of mid-block development that challenged Kevin Lynch's argument for "lost" city spaces, elevating a new group of alley residents above the urban wall formed by the historic building periphery to

gain visual access to the Ocean and Bay beyond. In contrast to the historic pattern of back-alley residential construction across the United States and in parts of Europe (33), these projects effectively inverted the urban patterns and socio economic hierarchy of front and rear of lot.

Other projects, such as the ones proposed by *Mark Marine* and *Juliana Kirby*, presented new commercial/ residential types for mid-block sites in the historic Deco District. The ground plane in both of these otherwise dissimilar projects was left largely open –even excavated to allow for below-grade parking— and the buildings anchored themselves to the mid-block landscape through sectional intersections with existing structures and underground spaces. Their offerings (an SRO and a youth hostel, respectively) interpreted their mandates as a charge to design bridges that extended across property lines, and touched ground only intermittently while locating points of entry along the alley, the street and the entire depth of the block. Elevating their program elements several stories above existing surrounding rooftops, both projects presented eloquent expressions of the man-made barrier island landscape of Miami Beach, whose seemingly solid ground is only inches above water.

Overall, the student work responded to a unique condition of urban density that rent open the once-private topography of the mid-block. Occupied by buildings no longer anchored to city streets in traditional fashion, that landscape became host to a semi-public world of complex internal connections regulated by their constricted sites and ambitious programs. Signifiers of the multiple identities hidden beyond their front facades, these explorations suggest a new, compelling public realm in what was once a semi -private world defined by city infrastructure (34). The projects challenged the conventional definition of preservation, seeking to replace stewardship-of-the-picturesque/ nostalgic-for-profit with a sense of historical consciousness that nevertheless allowed for (sometimes tremendous) change. They sought to respond to the needs of the diverse urban community whose current presence in these alleys is anathema to the gentrification that invariably follows successful historic preservation efforts. Their investigation of residual, interstitial spaces along the service alleys that define the interior of the block in the Art Deco District found spaces of untapped potential, whose current condition of gritty, critical need, holds one possible key to the development and reinterpretation of the city.

"...The inferno of the living is ...what is already here..., what we form by living together. The are two ways to escape suffering it. The first is easy for many: accept the inferno and become such a part of it that you can no longer see it. The second is risky and demands constant vigilance and apprehension: seek to recognize who and what, in the midst of the inferno, is not inferno, then make them endure, give them space."

Italo Calvino, *Invisible Cities*, "Hidden Cities 5/ The Great Khan" *(35)*

STUDIO CREDITS

Critic:	Marilys R. Nepomechie, AIA, NCARB
Studio:	Architectural Design 8, Florida International University, Spring 1999.
Students:	Otto Barrotto, Jorge Bernal, Valeria Bettoli, Alejandro Cuevas, Walter Faustin, Malcom Giblin, Juliana Kirby, Mark Marine, Rafael Pannizza, Daniel Romero, Brian Saponaro, Angel Suarez, Eleonora Vasiliadis, Johannes Welch

NOTES

[1]August Heckscher, *The Public Happiness*, (New York, Atheneum Publishers, 1962), 102. Quoted in Venturi, Robert, *Complexity and Contradiction in Architecture*, (New York, The Museum of Modern Art Papers on Architecture in Association with the Graham Foundation for Advanced Studies in Fine Arts, Chicago, 1977), 16.

[2]Rigau, Jorge, From the *Call For Papers: Between First and Third Worlds*, 1999 ACSA South East Regional Conference.

[3]Ellen Beaseley, *The Alleys and Back Buildings of Galveston: An architectural and social history*, (Houston, Rice University Press, 1996).

[4]See Michael Sorkin, editor *Variations on a Theme Park: the new American city and the end of public space*, (New York, Hill and Wang, 1992) for a series of discussions by various authors regarding the difficulties of historic preservation and attendant gentrification in an urban context. Especially, see M. Christine Boyer "Cities for Sale: Merchandising History at South Street Seaport".

[5]Allan Shulman, "Lincoln Road Alley Study". Unpublished manuscript submitted to the City of Miami Beach Joint Historic Preservation/ Design Review Board in support of alley construction proposals, 1999.

[6]For an illuminating discussion of alley dwellings and the establishment of urban African American communities in the 19th and 20th centuries, see Borchert, James, *Alley Life in Washington: Family, Community, Religion and Folklife in the City, 1850 – 1970.* (Urbana/ Chicago/ London, University of Illinois Press, 1980). Borchert describes Washington DC alley dwellings, as well as those Boston, Philadelphia, Chicago, and those of various cities throughout England, Germany and Egypt. His general bibliography of alley dwellings is an invaluable resource.

[7]See Ignasi de Sola-Morales Rubio, "From Contrast to Analogy: Developments in the Concept of Architectural Intervention" in *Lotus International No. 46.* (Venice, Milan, Rizzoli International Press,1985) pp 37-45, for an illuminating discussion of the limitations of a collage strategy in developing relationships between new and existing architecture. In so far as the studio focus on collage is what Sola-Morales considers 'optimistic', it is based on an interest in the city as artifact, as what Aldo Rossi terms "the collective memory of man." *The Architecture of the City* (Cambridge, Massachusetts, London, England, Oppositions Books, MIT Press, 1986).

[8]The Miami Beach historic district (and areas presently being submitted for historic district classification) were built in a series of development waves between 1920 and the late 1950's. Its history is well documented in numerous publications, most notably: Britt, L. S., *My Gold Coast:* Dade County Office of Economic Development, *From Wilderness to Metropolis*; Dunlop, Beth, *Miami's Vanishing Architecture.* Gleason, *Miami: The Way We Were* and Hatton, Hap, *Tropical Splendor: An architectural history of Florida.* among others. The Miami Design Preservation League, based in Miami Beach, has extensive archives documenting that development.

[9]See Charles Jenks, *The Architecture of the Jumping Universe* (London, Academy Editions, 1997) "Superposition: Can One Build In Time" for a discussion of the production of the post-Modern landscape.

[10]Robert Venturi's well-known argument in favor of the difficult whole was particularly relevant to our study of the complexity arising from neces-

sary accommodation in an evolving historic context. See *Complexity and Contradiction in Architecture*, (New York, The Museum of Modern Art Papers on Architecture in Association with the Graham Foundation for Advanced Studies in Fine Arts, Chicago, 1977), 16.

[11]Alex Krieger, "The American City: Ideal and Mythic Aspects of a Reinvented Urbanism" in *Assemblage 3*, (Cambridge, Massachusetts, MIT Press, 1987), 41.

[12]See Mario Gandelsonas, "The Identity of the American City" in *X-Urbanism*, (New York, Princeton Architectural Press, 1999) for a discussion of patterns for planning and transformation in the American city.

[13]See also Rem Koolhaas and Bruce Mau. *S.M.L.XL* for a discussion of the (American) Generic City, "held together by the *residual*". (New York, The Monacelli Press, 1998),1248 - 1264.

[14]Alex Kreiger, "The American City", p. 55.

[15]Jean Paul Sartre, "American Cities" in *Literary and Philosophical Essays*. Hutchinson Publishing Company, London, 1955 quoted in Alex Krieger, "The American City" p. 47.

[16]Ibid, p.43

[17]See John W. Reps, *The Making of Urban America: A History of City Planning in the Unites States*, (Princeton, NJ, Princeton University Press, 1965) for a discussion of early planning strategies and urban patterns in the developing United States, tracing their European origins and noting their innovations. See also, A. Krieger, "The American City", p. 51.

[18]See, generally, Frederick Jackson Turner, "The Significance of the Frontier in American History" (1893) in *The Frontier in American History*, (New York, Holt, 1920), 1-38.

[19]See Mike Wallace. *Mickey Mouse History and Other Essays on American Memory*, (Philadelphia, Temple University Press, 1996) for a discussion of America's reluctantly developing acceptance of a preservationist mindset.

[20]Alex Kreiger, "The American City", p.43

[21]See K. Michael Hays in "Introduction" *Reflections on Architectural Practices in the Nineties*, William S. Saunders, editor, (New York, Princeton Architectural Press, 1996), 124-128, for a synopsis of architectural theory in the past half century.

[22]See, generally, Colin Rowe and Fred Koetter, *Collage City*, (Cambridge, Massachusetts and London, England, MIT Press, 1975), 125-149 for a discussion of the uses of collage as an architectural design approach in which "objects are conscripted or seduced from out of their context."

[23]See also Antonio Monestiroli, "A Project By Others," in *Lotus 7: Quarterly Architectural Review*, (New York City, Rizzoli International Publications, Inc., 1992), 108 - 111. Monestiroli makes an argument for collage, differently defined, as the ideal means of understanding and organizing projects with multiple architects in a complex context. He posits collage as a stimulant to interpretation, simultaneously "...guaranteeing the unity of the result and the multiplicity of the choices."

[24]See K. Michael Hayes, *Unprecedented Realism: The Architecture of Machado and Silvetti*, (Princeton, New Jersey, Princeton Architectural Press, 1995), 14.

[25]See Rodolphe el-Khoury, "Paradoxical Seams" in *Ibid*, pp. 92 - 103, for a discussion of montage as a design strategy.

[26]Ignasi de Sola-Morales Rubio, "From Contrast to Analogy: Developments in the Concept of Architectural Intervention" in *Lotus International No. 46*. (Venice, Milan, Rizzoli International Press,1985) pp 37-45. Sola-Morales looks to Giorgio Grassi's critique of Viollet-le-Duc, advocating instead the use of historical architecture as "*analogical* marks of the new construction" (italics in the original).

[27]Robert Venturi, *Complexity and Contradiction in Architecture*, 16, 20.

[28]See Steven Holl, *Hybrid Buildings. Pamphlet Architecture No. 11*. (New York, San Francisco, 1985) for a discussion of the origin and development of hybrid buildings in the American urban landscape as a response to 1- escalating density and land value within a fixed urban grid and 2- the increasingly complex programmatic needs of buildings in the contemporary city.

[29]See Kevin Lynch, *The Image of the City*, (Cambridge, Massachusetts and London, England, The MIT Press, 1960) for an important discussion of "lost" spaces in our cities, rendered invisible to both residents and visitors by a complex array of physical and social causes.

[30]Allan Shulman, "Lincoln Road Alley Study". Unpublished manuscript, submitted to the City of Miami Beach Joint Historic Preservation/ Design Review Board in support of construction within the city's alley structure.

[31]Ignasi de Sola-Morales Rubio, p.38.

[32]The information described in this section was gathered by students from the City of Miami Beach Planning and Zoning Code and Bylaws, and discussed and interpreted in conversations between students and members of the City Planning and Zoning Department and Architectural Design Review staff.

[33]Kevin Lynch, *The Image of the City*, 20.

[34]See Monica Ponce de Leon and Nader Tehrani for an example of a study of infrastructure reinterpreted to enhance urban public space in Miami, Florida. In "The Road 836 Overpass in Miami", Jean-Francois LeJeune, editor, *The New City No. 3: Modern Cities, Journal of the University of Miami School of Architecture*, (New York, Princeton Architectural Press, 1996), 178 -183.

[35]Italo Calvino, *Invisible Cities*, translated by William Weaver, (New York, London, San Diego, Harcourt, Brace Jovanovich, Publishers, 1972), 10 - 11.

I. The County Seat Courthouse Square:
Civil Regionalism

II. Road Trip:
Same as it ever was?

A Paper in Two Parts

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I. THE COUNTY SEAT COURTHOUSE SQUARE: CIVIL REGIONALISM

The county seat courthouse square is a uniquely American urban invention which demarcated the civil aspirations for a vast frontier landscape. Signified today as an open dot in any standard road atlas, the county seat town geographically marks, quite often literally, the center of this nation's more than three thousand counties. The striking frequency of the courthouse square is presently experienced by any rural traveler along converging county roads throughout the South, Midwest and Texas. Rising above its surrounding countryside, dome or cupola seen piercing a canopy of native trees, the courthouse square is a significant historic marker in our nation's political landscape. The romantic associations, particularly in the Deep South, of its role as a region's "social marketplace" forever typified in William Faulkner's account of the fictionalized courthouse square town aptly named Jefferson, remains intact, if slightly tarnished. The elegance of this American arche-type continues to reside in its ability to image for its citizens a polity and genuine place for participation. Its current obsolescence and challenges speak as much to our loss of commitment in a citizenry as it does to a global culture more tentatively tied to a sense of region.

Jefferson's Agrarian Utopia

Thomas Jefferson's distrust of the city and large, centralized government was strongly articulated throughout his lifetime as a legislator and an architect. He believed in the rural, precommercial economic and social order of revolutionary America where landownership alone ensured a citizen's political participation.[1] His conviction that "cities <are> sores on the body politic" confirmed his assertion that: "The Country produces more virtuous citizens."[2] Jefferson's agrarian ideals would lead him to promote dispersed rural townships in the newly opened Territories beyond the Appalachians and encourage small local government as a safeguard against the perceived potential tyranny of a centralized Federal state.

Jefferson's egalitarian vision was to provide each American citizen with land, thus truly freeing them from a dependence on government; establishing the basis for a rural citizenry. Early in his political career Jefferson had advised those drafting the Constitution for the independent Commonwealth of his native Virginia that only "all free males owning more than twenty-five acres of land be allowed to vote."[3] Later, as Governor of Virginia in 1813, Jefferson successfully passed legislation which abolished entail and primogeniture in land tenure, continuing to express his principles of democracy in terms of land ownership. Clearly, as Jefferson located his sacred beliefs in an agrarian culture, the distribution and organization of land itself would be at the heart of any truly democratic body politic.

Jefferson's abiding concern for education, deemed required to effectively produce a responsible citizenry, can be traced in many proposals he made as Governor resulting in the designs for the land grant University of Virginia. Jefferson wrote: "If a nation expects to be ignorant and free, in a state of civilization, it expects what never was and never will be."[4] He envisioned tax-supported, free public education through the university level, with an emphasis on encouraging "youths of genius from among the classes of the poor."[5] School districts would be administered at the most local level, that of the township, and this organization continues largely without exception in the South to this day. Higher education at the university level was reserved and intended to cultivate those individuals with whom would reside the inevitable responsibility of wise gover-

nance. The importance of education in Jefferson's political schema was that it be tied back to the local landowners which supported it at the township level who, would receive in return, virtuous citizens, judges and legislative representatives.

Instrument/Symbol

Jefferson's guiding authorship of the National Survey of 1785 as a member of the Continental Congress would scribe his framework for a rural democracy seemingly across the nation. Vast and monolithic, a grid, without topological incident, would become law as the Northwest Ordinances of 1785 and 1787, reading like a powerful instrument in its attempt to establish an agrarian national land policy. J.B. Jackson summarized its utopian content as a "clear expression of the Jeffersonian dislike of a powerful government, centralized in cities, and the emphasis on the small rural landowner."[6] Yet, amidst the rural economy which dominated Jefferson's vision, he recognized the necessity for population centers to accommodate and serve as seats of local government. Prior to the formal development of the courthouse square, Carroll William Westfall concluded that:

> *The basic political entity within the gridded landscape would be the county: its town would typically be a gridded market town; and the county seat would be the kind ofcity Jefferson hoped would develop. These cities were to be regional centers for the administration of governmental affairs, namely, the just execution of the state'slaws, and the administration of local affairs such as caring for the schools and roads, and keeping the official public record of land ownership and policing landtransactions. As was the case in colonial Virginia, the courthouse was the dominant public building in the county just as the capitol building was the the dominantbuilding in the state. Of course the two resembled one another.* [7]

As the Northwest Ordinances conceptually provided for the political ordering of the landscape in unincorporated western Territories into counties governed locally at the county seat, the grid's instrumental effect on subsequent town planning would proceed virtually unchallenged. The most characteristic form for new American towns after 1785 appear to be little more than a uniform arrangement of blocks, extensions or fragments in some fashion, of the regional grid. John Reps conceeds that the grid-iron street system adopted throughout the South, Midwest and West was convenient to both the surveyor and the ruthless charge of land speculation, perfunctorily conforming to the mandate imposed in 1785.[8] Despite the often dulling attempts at town-making as a result of Jefferson's national grid, it served to encourage political jurisdictions which would become the model for an agrarian citizenship.

The Jeffersonian grid can be viewed as an instrument or, a symbol, of an agrarian utopia composed of a democratic society of small landowners.[9] As such, the county seat becomes the operational locus and clearinghouse of Jefferson's agrarian egalitarian society. Though Jefferson the architect did not envision the actual form of the courthouse square, his philosophical concern for a rural citizen prefigured its requisite political existence and signification. Others would invent and develop the type-form of the courthouse square conforming to his vision of a **civil regionalism**: a community of citizens meaningfully established in a region.

Type/Dispersion

As the trans-Appalachian Territories in the upper Midwest, central river valleys and South opened for land settlement chiefly due to numerous Indian and Colonial state's land cessions just after 1800, a new phase of American urban ingenuity would invent and codify the courthouse square to serve its dispersed populations. Though European town planning theories had been traveling freely to the Americas for well over two centuries, it was the skill and experience gained through actual implementation by New World colonists who developed an acumen for urban invention. In Europe at this time, existing cities constrained by fortifications, dense urban fabric and political division largely limited town planning efforts to Royal court towns or suburban extensions. In the Americas, the colonial experiment demanded the production of entirely new cities, tabula rasa, as evidenced by the influential early developments of New Haven, Philadelphia, Savannah, New Orleans and the prolific legacy of the Spanish Plaza towns. As Leonardo Benevelo observed, in America, the relation between theory and practice was reversed: "instead of the conflict between a wide range of ideal programmes and a scarcity of implementation, there was a lack of proportion between forces, schemes and rate of progress, and the enormity of the operations to be carried out."[10] As settlers began to occupy the new Territories designated in Jefferson's rural republic in the early stages of the nineteenth century, if towns stubbornly refused to spring up as county seats, Americans surely would invent them along with the type-form courthouse square.

The New England Meeting House Green or Common and the colonial Spanish Plaza derived from the 1573 Laws of the Indies suggest earlier forms in America of public space at the center of a new town. Though the Spanish Plaza was configured as an open block and marketplace in the gridded town, the New England Green was rarely symmetrical and most often, not surrounded by businesses. In both cases, founded either by Protestant religious societies or the Catholic Mission, a principal church located at the edge faced onto the open space but, did not occupy it. The courthouse square inverts the diagram of these two European inspired models by focusing from the edges onto an object building in the center.[11] The symbolic significance of this transformation clearly defines the secular goals of the nineteenth century county seat town by replacing the church with the courthouse building. Further, it was widely perceived that the courthouse building not only occupied the center of the county seat town but, was located at the center of the entire county; standing as the Jeffersonian representative of justice and democratic governance equally accessible to all citizens. The type-form situation and symbolic importance of both the square and courthouse building itself was described by William Faulkner in a passage from his 1951 book Requiem for a Nun and the following appears reverently etched in stone on the courthouse building in his hometown courthouse square of Oxford, Mississippi:

A Square, the courthouse in its grove the center: quadrangular around it, the stores, two-storey, the offices of the lawyers and doctors...each in its ordered place: the four broad diverging avenues...becoming the network of county roads and by-roads...But above all the courthouse: the center, the focus, the hub; sitting looming in the center of the county's circumference...protector of the weak, judiciate and curb of the passions and lusts, repository and guardian of the aspirations and hopes.[12]

Faulkner describes one of the two principal type variants which would develop as the courthouse square known as the Philadelphia square or, more accurately, Lancaster square. William Penn's 1682 plan for Philadelphia provided a large central open square, cut out of four adjoining blocks, at the crossroads of its main bisecting avenues, Broad and High (Market) streets. Later sketches reveal that Penn imagined a prominent Assembly or even State House building would occupy the center of this square, to be viewed on axis from any of the four directions entering into the space. Oddly, Penn's square remained open until the present City Hall was begun there in 1872 though, settlers branching out from Philadelphia to establish new counties in southeastern Pennsylvania would build-out Penn's plan with the courthouse building located in a central square. The town of Lancaster was the earliest Pennsylvania county seat to realize the current type-form courthouse square modeled after the Philadelphia plan, as it was laid out in 1729. Following shortly after, the county seat towns of York(1741), Reading(1748) and Carlisle(1766) all placed the courthouse within a central square. Interestingly, Reps conjectures that the Scotch-Irish settlers of Lancaster county may in fact have virtually duplicated the 1622 plan of Londonderry in Northern Ireland which, has at its center an imposing Town Hall that these immigrants would have known.[13] Penn too would have known the Londonderry plan, as he extensively considered numerous sources for the development of Philadelphia. Yet, as the Lancaster example suggests, we must assume that given Philadelphia's economic and political prominence at the close of the Revolutionary War and beginning of the nineteenth century push into the American interior, its plan would exert a strong influence on the minds of those who were to layout new county seat towns.

The second principal type-form variation of the courthouse square has been labeled the Block or Shelbyville square, named after the county seat town in Tennessee where it first appears around 1810. Its invention in southern Middle Tennessee following an 1806 cession of Creek Indian lands might be most easily explained as a geometric inevitability: the Shelbyville square simply uses a block of the town grid, with main streets passing along its four sides. Edward T. Price, in his exhaustive survey of the dispersion of Lancaster and Shelbyville type-form courthouse squares throughout America, concluded that after its invention, the Shelbyville square quickly became the most frequent plan adopted in new counties in most states chiefly because it was easier for surveyors to lay out.[14] As we do not find many significant variations on these two courthouse square type-forms developed in subsequent continental settlement, Price suggests that local officials in these towns were exchanging ideas, and even, surveyors![15] One town copied another as pioneers moved South and West, re-creating what they knew from former eastern locales. These two type-forms quite naturally derive from the formal arrangement of the Jeffersonian coordinates, as they also configure, in built form, a local and consistant image for a dispersed democracy.

II. ROAD TRIP: SAME AS IT EVER WAS?

A renewed interest in issues relating to the "public realm" on the part of architects, urbanists, artists and students has recast an appreciation of older urban models of which, in America, the courthouse square must figure prominently and be re-assessed. Historically, the courthouse square serviced a rural citizenry, as Jefferson had hoped, facilitating the commercial and governmental activities of a county region in one memorably defined location. Its geometry is not merely symbolic, for like any pure typology, it can suit many interests.[16] Edward Price concluded from extensive visits to courthouse squares in the mid-sixties that variety is their genius, "in an interweaving of form, meaning and function."[17] Its attraction as a formal model then, is that it potentially configures diverse activities, the ebb and flow of daily life, in a clear and simple urban arrangement.

My personal interest in courthouse squares developed quite innocently as I first encountered them in Alabama where I was a visiting Professor at Auburn University's School of Architecture. The first courthouse square I experienced was in Marion, Alabama where I felt powerfully that I had happened upon lost treasure. The square at Marion is strikingly consistent, comprised of every element I would learn that tend to make these places picturesque if not memorable; angle parking, generous raised sidewalks, low-slung metal canopies hung off of two story brick buildings, ornate cast iron pipe columned arcades, the Post Office, jail, lawyers offices, bank, beauty shop, barber, greasy spoon cafe, feed and grain store with scales along the adjacent street, hardware store that still operated on hand-written credit ledgers, a pharmacy, signs advertising the Saturday Farmer's market, benches and people lounging in the central square amidst Civil War monuments covered by a shady tree canopy... and the ante-bellum courthouse, standing vigilant for all to see, just as Faulkner had described it. However, conversations I had with many local townspeople that day confirmed what I had hoped and what I immediately feared.

People still recognized each other on the square, or at least knew family names, but most were no longer farmers. Two generations ago they were still trading cotton on the square and farmers sold their produce there daily. Now, Federal services are King and only a few show up to a Saturday market. The courthouse is still busy collecting taxes, recording land transactions, administering justice and servicing voter registration, marriage and drivers licenses; but the poverty in Perry county now supports more important branch offices of our Federal Welfare-state in remote locations. I was told that several clothing shops and a grocery had closed recently, unable to compete with chain stores 45 miles away in Tuscaloosa. And the chidren, still attending the land grant universities envisioned

by Jefferson, are not returning to Marion after graduation to work, much less to govern.

With the optimism of an architect and objectivity of a teacher, I took 16 fourth-year architecture students from Auburn on a road trip through 22 courthouse square towns in Georgia, Alabama and Mississippi in the Spring of 1995 to survey what had become of Jefferson's agrarian utopia in the Deep South. Clearly, the challenges which face this romantic civil arche-type greatly exceeded anything Jefferson could have imagined two centuries ago. Yet, attributing as much to the human spirit to associate, celebrate and create a community of belonging as to the inherent strengths or weaknesses of the courthouse square type-form, we found that these dispersed civil outposts, though humbled, still perform their function to configure a place for regional participation. Many other cultural themes emerged along the way as well...

IRONY

Tuskegee, Alabama remains the home to one of this nation's earliest and most prestigious Black colleges, the Tuskegee Institute. Founded in 1881 by former slave Lewis Adams, Tuskegee Institute was led into national prominence through the forceful leadership of its first President, Booker T. Washington. Macon County, founded in 1831 on Creek Indian lands by White plantation farmers for the purposes of producing cotton, is today 85% Black, as is the town of Tuskegee which serves as the county seat. Entering the courthouse square of Tuskegee, one immediately notices that the courthouse building has been removed to a position on the northwest corner of its Block-plan. Victim of a fire during the Civil War, the courthouse has been replaced in the center of the square by an imposing statue of Jefferson Davis, former President of the Confederacy.

There are no benches in the square at Tuskegee; no idle lounging is encouraged; this square is a shrine to the legacy of the Confederacy. In fact, this is not meant to be a public place; unlike the central squares in most towns, this civic space at Tuskegee is owned and maintained by a private citizens group, the Daughters of the Confederacy. The square and blocks surrounding it have always served to represent the hegemony of a community in the racially divided South. Where one man sees the opportunities of a just and democratic society embodied in the courthouse building accessible at the center of his square, another sees the social and economic power of an oligarchy which has marginalized him toward its edges. This is the feeling at Tuskegee, intense exclusion, thrown into sharp contrast given the celebrated achievement and proximity of the Tuskegee Institute, recently designated a National Monument by the U.S. Department of the Interior. That town and gown relationships at Tuskegee have still been maintained though the courthouse square seemed to be, as it always had been, a place of exclusion for Black Americans, was insightfully described by the writer V.S. Naipaul as a typical Southern "truce with irrationality."[18]

In 1957 the courthouse square at Tuskegee unwittingly served its Black community well as a place for political participation. Gerrymandered out of the Tuskegee City limits to restrict their voting strength, Blacks triggered a shopper's boycott of White-owned businesses on the square that would become a model for Dr. King's nonviolent civil rights activities in Alabama. Within two years, most businesses on the square failed and a Supreme Court decision redrew the town limits to include all citizens. Shortly after, an African-American was elected Mayor and has held office ever since.

Aware of its symbolic importance to his constituency, the honorable Reverend and Mayor Johnny Ford continues to cook-up schemes to purchase the square from the Daughters of the Confederacy for the townspeople of Tuskegee. He has appointed Dr. James Tarver, new owner of the Tuskegee Country Store on the square, as the citizen director of a Task Force to accomplish this. Dr. Tarver is a healer by nature, giving up a six-figure salary as a lead researcher for Roche Pharmaceuticals in New Jersey to furrow the soil of Macon county hoping to continue upon George Washington Carver's prolific work at Tuskegee Institute which developed beneficial by-products from local Alabama plants and vegetables, notably, the peanut and sweet potato. Investigating Carver's notes and example, which led to 432 U.S. Department of Agriculture patents, Dr. Tarver has already found relief for mentrual cramps, impotency, blood deficiency ailments and, he believes, cancer. Operating out of the old Rexall drug store, whose White absentee-landlord moved to Montgomery like so many others after the boycott, Dr. Tarver endeavors to heal his new community through the unique qualities found present in the rich "Black-belt" soil of this region. Mayor Ford hopes to heal his region too, through public ownership of the courthouse square in the center of his county.

EXUBERANCE

Driving into Lexington, Mississippi at dusk on a Saturday evening, our two rental vans were caught up in a swirl of vehicular activity we were not expecting in this small town. Planning to just pass through on our way to visit Nicholas Lemann's storied Clarksdale and having spent the afternoon doggedly measuring the dimension of the quintessential nineteenth-century county seat town of Canton, Mississippi, our tiny armada was presented with a spectacle. Benches full of young Black girls sitting near the edge of the green space in this Lancaster-type square, were excitedly calling and gesturing to certain cars which kept circumnavigating the square: these gals would be able to provide us with some answers. It was Saturday night and the finely dressed Black girls were the objects of attention to prospective male suitors, "looping the square" in their polished cars. Horns honked, girls giggled and waved, eventually they would link up and all drive off for burgers and a dance.

An extensive nineteenth century account of life on the square, reprinted in J.B. Jackson's book *Vernacular Landscape*. and several more recent oral histories collected along our way confirm that "looping", as we experienced in Lexington that evening, has been

as much a part of the social arrangement of the courthouse square as the courthouse itself.[19] In Lexington, an admittedly still segregated town, looping the square is such a finely tuned ritual that the space of the town is alternately reserved for White teens on Friday evenings and Blacks on Saturdays; its been like that as long as anybody could remember. The courthouse square has served as such a precise model for socialization that in several towns visited, different sides of the square become meeting places for different social groups. Remnants of Saturday markets, signs for local Craft and County Fairs and preparations already in place for 4th of July celebrations indicated that the courthouse squares which we surveyed still played a role in the social life their region. And when the model was working well, the sides, the middle and even the roadway provided a meaningful forum for mixing, at times, exuberantly.

WAL-MART

Sam Walton's mission to provide low-cost sundries to folks in the rural South made him the wealthiest citizen in America. His hunch was right, there was a tremendously underserved market throughout the South and, the entire nation for that matter. Initially targeting small towns, not to compete with larger established retailers in built-up urban markets, Wal-Mart could easily replace "Main Street" in a single building. Ruthlessly conscious of Main Street's allegiance to local customers, where shopkeepers knew your name, Walton instituted a policy of placing "greeters" at the entrance to all of his stores to mimic that small town feeling. Given Walton's huge success at saving small-town USA from overpriced vendors, can we conclude that the quality of our civic life equals cheap underwear?

Traditionally, the courthouse acted as a regional magnate thus, businesses benefited from locating around it on the square. Today, without exception, of the 22 courthouse square towns visited, those which had a Wal-Mart within the town limits, and about half did, were quite blighted at the square. Vacancies on the square were roughly double in the Wal-Mart towns as this phenomenon was also reflected in the physical appearance of their blocks. Edward Price correctly identified first the railroad, and then the automobile, as the primary agents for the linear development of Main Street and finally the vast Strip in western town settlement patterns; suggesting that courthouse square towns in the South had been spared this fate by virtue of the provision for a spacial focus at their center.[20] Yet, as the courthouse square was regionally networked to act as the terminus of roads coming in from the country, quite often, new bypass routes better serve access to the regional Wal-Mart. Price, writing in the mid-sixties, could not have forseen the decentralizing effects of Sam's behemoth.

Lancaster County Pennsylvania, previously cited in this survey as its county seat town of Lancaster was the first to fully realize the Philadelphia-plan courthouse square type-form, has been selected to receive three Wal-Mart Superstores over the next seven years. The specifications for the parking lot alone of a Superstore requires 20 acres, the size of 4 football fields. As Wal-Mart executives envision concrete where there once were pastures in Lancaster county, citizen groups have organized to halt them. Apparently, Wal-Mart's reputation for saturating small town markets, economically wiping-out downtowns and then, literally closing their doors and leaving town, has preceeded them in Lancaster County. The question we were unable to answer while visiting those courthouse squares which had been hobbled by their proximity to a Wal-Mart was: once the fragile balance of a small town is disturbed or stolen, can it be returned?

IMAGE OF ONE'S SELF

There is a reassuring sameness to the courthouse squares we visited which yearned to resist change; they fight proudly to preserve and to share their history in the form of monuments and commemorative plaques and unending markers of all description on the square's lawn. War was always a prevalent theme in these squares, especially the big one, the Civil War. Often I was reminded by locals in these towns that they, Southerners, were the only Americans to ever lose a war. I left these squares with the feeling that these people honored above all else perseverance and struggle.

Listening to local folks' accounts of their square's history always seemed to confirm something of their own identity. These squares at the geographic center of a county were also central to the small town Southern culture's way of understanding itself. To me, courthouse squares began to seem like repositories of one's own history, an image of one's self; held solid amidst all of the changes developing around the community. Even though resisting change didn't make sense, it allowed the townspeople's past, imagined as they would like it to be, to live on a little longer: this is the magic trait of the courthouse square.

The county seat courthouse square town of Monroeville, Alabama was home to Harper Lee, author of one of this century's defining Southern fictions, *To Kill a Mockingbird.* In the novel, Atticus Finch, a principled and honest man, was compelled to pursue justice, unpopularly representing an improperly accused Black man on the charge of raping a White woman. The story plays out in the gossip mill of a small Southern town, possibly Monroeville, climaxing in the courthouse on the square where an unjust verdict is delivered. Mindful of this guilt, each Spring the townspeople of Monroeville re-enact the story of Atticus Finch in their own courthouse square,

moving the last act, after an intermission, into the courthouse building where Gregory Peck filmed the dramatic final scene of the movie version. The first act, comprised of several white-columned front porch stage-sets strewn randomly about the lawn of the courthouse square positions the drama to unfold. Sitting in that courthouse square last May, watching this production, it struck me that here, in this space, these people knew who they were.

NOTES

[1]Carroll William Westfall, "The True American City". article published in *The New City* (Miami: University of Miami School of Architecture,1994), p. 10. In this article, Westfall extensively lays out Jefferson's agrarian political agenda.

[2]*Notes on the State of Virginia*. ed. William Peden (Chapel Hill: University of North Carolina Press, 1955), p. 164.

[3]Westfall, p. 10.

[4]Dumas Malone, *Jefferson and His Time. vol. VI: The Sage of Monticello* (Boston: Little, Brown and Co., 1981), p. 248.

[5]*Notes on the State of Virginia*. query XIV: Laws.

[6]J. B. Jackson, "Jefferson, Thoreau & After", in *Landscapes* (Amherst: University of Massachusetts Press, 1970), p. 4. Jackson eloquently argues that Jefferson intended to curb the growth of cities in America through political means and legislation.

[7]Westfall, p. 17.

[8]John Reps, *The Making of Urban America* (Princeton: Princeton University Press, 1965), p. 217.

[9]Jackson, p. 5.

[10]Leonardo Benevolo, *The Architecture of the Renaissance. Vol. II.* (Boulder: Westview Press, 1978), p. 440.

[11]Edward T. Price, "The Central Courthouse Square in the American County Seat", article first published in *Geographical Review* (January 1968). Reprinted in *Common Places: Readings in American Vernacular Architecture*. Ed. Dell Upton and John Michael Vlach (London: University of Georgia Press, 1986), p. 128.

[12]William Faulkner, *Requiem for a Nun* (New York: Random House, 1951), pp. 39-40.

[13]Reps, pp. 12-15.

[14]Price, p. 133.

[15]Price, p. 135.

[16]Price, p. 142.

[17]Ibid.

[18]V. S. Naipaul, *A Turn in the South*. (New York: Vintage International, 1989), pp. 136-154.

[19]J. B. Jackson, "Country Towns for a New Part of the Country", in *Vernacular Landscape* (New Haven: Yale University Press, 1984), pp. 71-76.

[20]Price, p. 140.

COLLABORATIVE PRACTICE

2000-2001 Collaborative Practice Awards

Research/Community/Studio/Laboratory

MARY HARDIN
University of Arizona

Addition to the Timothy Dwight Elementary School, New Haven, CT

MICHAEL HAVERLAND
Yale University

Research/Community/Studio/Laboratory

MARY HARDIN
University of Arizona

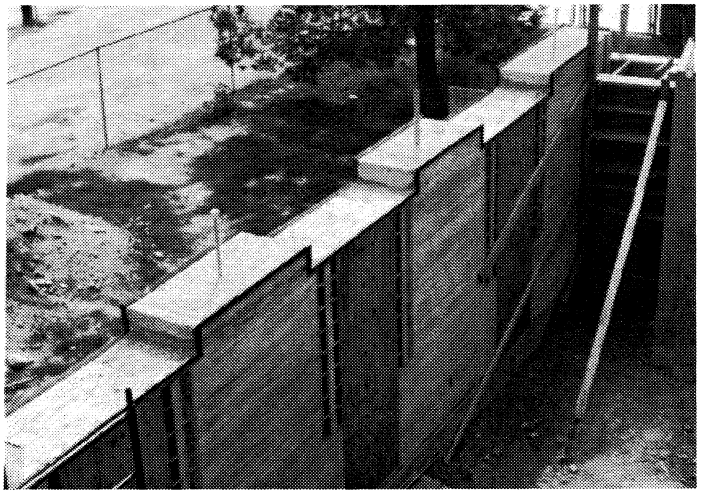
This collaborative practice seeks a relationship between the specific topics of faculty research interests, the more general format of projects given in a design studio, and the needs of the surrounding community. A series of collaborations, described here illustrates the cycle of research, design/build, and subsequent research that fuels the professional practice.

An initial collaboration began when the University's Athletics and Recreation Department contacted the College of Architecture in 1997 with a request for assistance with the design of a new classroom facility. The College of Architecture countered with an offer of a design/build project, and a partnership of two years duration was formed. Students and faculty spent four semesters designing, drawing, and constructing the rammed earth classroom building.

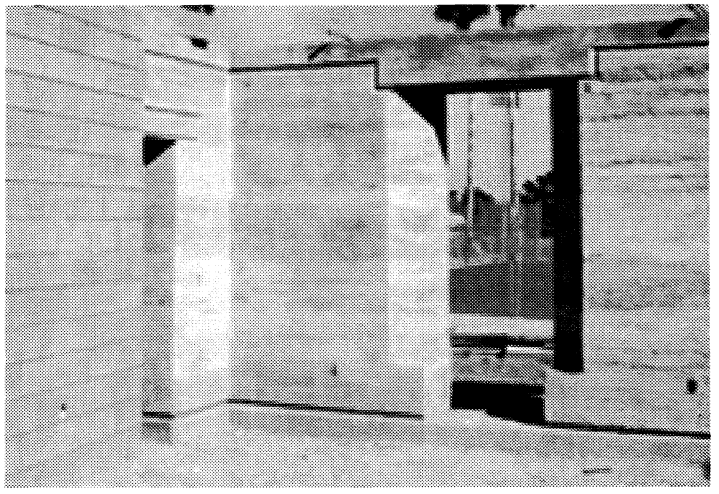
Significantly, the collaboration created the need for research into methods of building with rammed earth. The Design/Build studio was functioning, in essence, as building contractors with very little budget for equipment and overhead. The need to accomplish rammed earth without investing in the expensive commercial formwork used in contemporary projects led to a research goal that would eventually affect the community beyond the campus itself.

As the professors and the shop master in the College of Architecture worked to develop a forming system that would allow their students to accomplish the classroom building, the universality of the need became apparent. The problem of developing a low cost forming system for the Design/Build studio was the same as the challenge of bringing rammed earth into the affordable housing arena. Several rounds of formwork design and test walls prefaced the Design/Build studio.

Even as students shaped the classroom facility, the faculty began to realize the implications of the new forming system in the impoverished communities of the region. One Design/Build professor wrote a grant proposal for an educational partnership between the College of Architecture and a Native American community that was in dire need of additional housing. The Native American community had rejected government built housing that bore no affinity for their traditional building methods, and the tribal Housing Committee was enthused about a partnership that would train members of the community to build rammed earth houses with a low cost

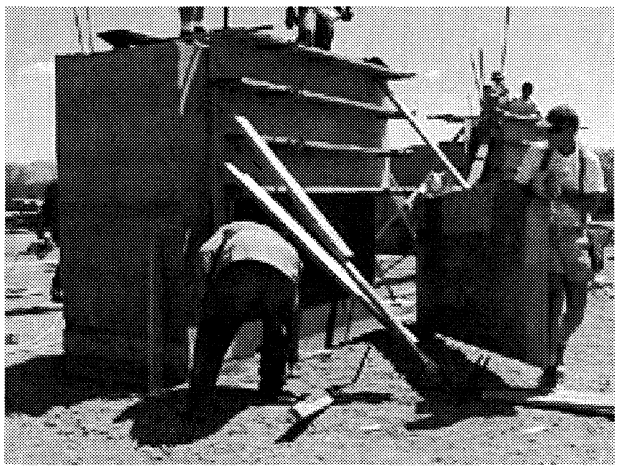


Rammed earth walls under construction for classroom facility.



Completed classroom wall showing chamfers and reveals.

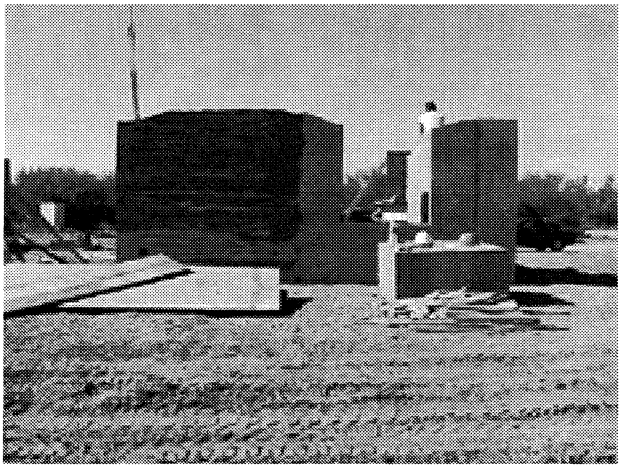
Setting form work for Gila residence.



Stripping forms from Gila house.

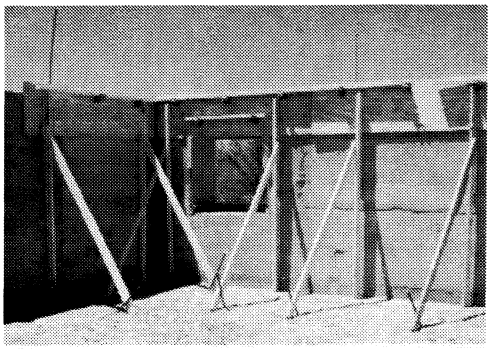
system of formwork and indigenous building materials. When the grant was funded, a new collaboration was formed. One semester later, the Design/Build studio constructed the rammed earth residence in partnership with three to six members of the Native American community each day.

The empirical testing done by the Design/Build studio for each rammed earth project led the professor to seek interdisciplinary assistance, in order to verify in a laboratory hunches that were developed in the field. A new collaboration has formed between the professor of Architecture, a professor of Civil Engineering, and Habitat for Humanity. The two professors are working together (with a third crop of Design/Build students) to engineer a consistent earth and cement mix with consistent water content and compaction. This involves creating tests and testing equipment in the University's Soils Lab to establish the ideal soil conditions, and then experimenting to find ways of controlling field practices of rammed earth construction to achieve the same results. The Design/ Build studio will employ these methods in the construction of a residence for habitat for Humanity during the spring semester of 2001. The house has already moved through the design and drawing stages.

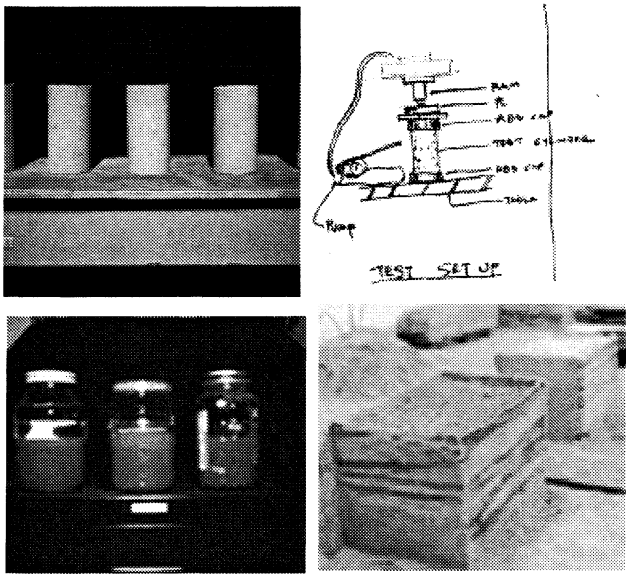


Massive walls of Gila residence take shape.

As series of collaborations, this architectural practice has provided the basis for classroom learning, experiential learning, service learning, and rigorous research for all parties involved.



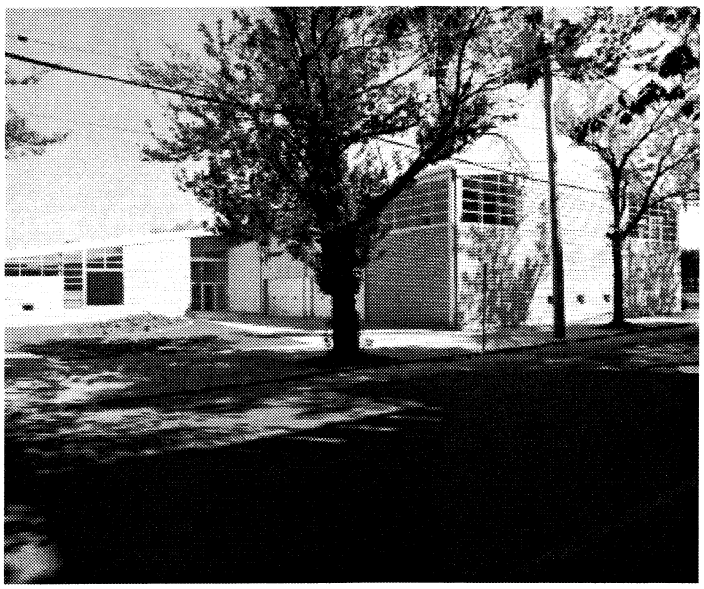
Forming bond beam of Gila house.



Initial tests for Habitat house

Addition to the Timothy Dwight Elementary School, New Haven, CT

MICHAEL HAVERLAND
Yale University



This project is a model for design and community collaboration and illustrates how significant works of architecture can be generated from a bottom-up collaborative planning process. The project originated at a community design charrette organized by the Yale Urban Design Workshop in 1995 and developed as a unique collaboration between the Yale School of Architecture with students from other Schools, GDDC, HUD, and the City of New Haven.

The added value of the involvement of Yale graduate students from various Schools is clearly evident. The wayfinding signs include sketches done by Dwight kids in the Arts classes coordinated by students in the Graphic Design Department. Students from the Law School worked on the funding process and were involved with access and security issues. These informed the building design to make it open as much as possible to the community and to keep the school secure.

The 10,000 square-foot addition will serve the School and the community with a multi-purpose room and meeting rooms for the school and neighborhood-based Dwight Central Management Team. The design of the addition references the existing 1963 Eliot Noyes-designed School but adds windows and a variety of contextual materials assembled with a modern sensibility. An elliptical lobby provides a civic space, like those found in New Haven's great buildings, such as the Free Public Library. The addition has a strong presence with its own identity, but one that still sits quietly next to the School and within the neighborhood context.

INTERIOR

An elliptical lobby provides a civic space, like those found in New Haven's great buildings, such as the Free Public Library and Courthouse.

The design of the addition references the existing 1963 Eliot Noyes-designed School but adds windows and a variety of contextual materials assembled with a modern sensibility.

The lighting of the lobby makes it glow and sparkle at all times of the day was designed by students at the Yale Drama School.

EXTERIOR

Large letters on the front and back of the building spell "DWIGHT" and say boldly, we are proud of our school, of this neighborhood and this community.

Economical brick is used in a way that is lively, fresh and modern. The green references the serenity of natural landscape, and the white the precast concrete of the existing school.

The addition has a strong presence with its own identity, but one that still sits quietly next to the School and within the neighborhood context.

DESIGN TEAM

Owner:

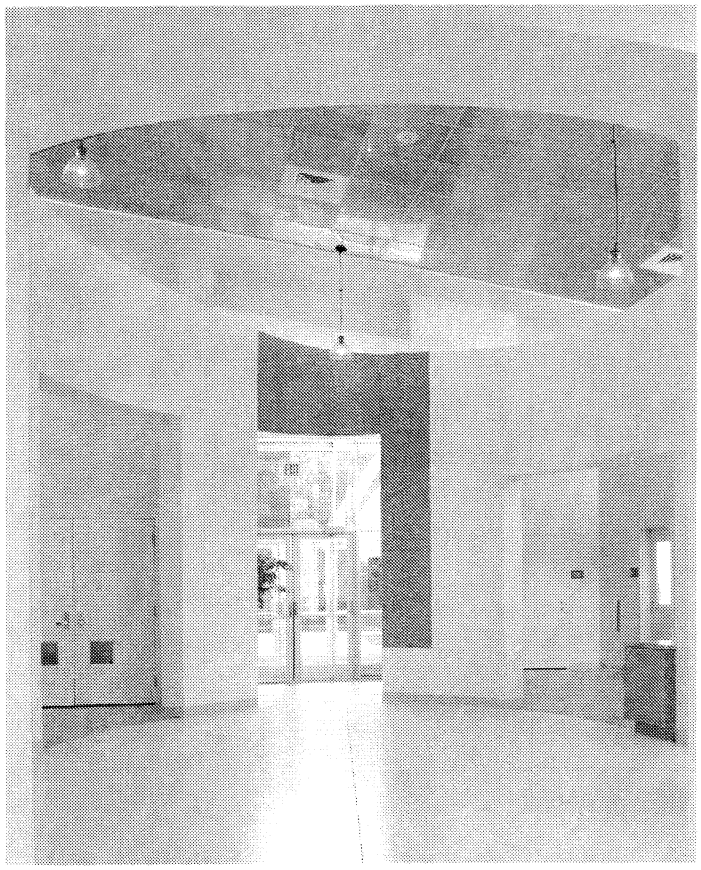
City of New Haven, Board of Education

Project Designer:

Michael Haverland, Yale Urban Design Workshop

With students from the Yale Schools of Architecture, Art (Signage), Drama (Lighting), Environmental Studies (Landscape), and Law (Access/security):

Paul Arougheti, Ben deRubertis, Al Dasher, Dominique Davison, Marcos Diaz-Gonzalez, Thomas Dunn, Joe Fong,



Billy Forrest, Mark Gage, Kristina Lamour, Jen Lau, Michael Lee Poy, Tom Morbitzer, Joe Pikiewicz, David Reinfurt, PaulWhittaker, Jim Woodworth, Belinda Young

Architects of Record:

TAMS Consultants, Inc.

Landscape Design:

Balmori Associates

Owner's Representative:

Daniel S. Haim

Construction Managers:

A. Prete Construction

Design Committee of the Greater Dwight Development Corporation:

Paul Ruchinskas, Executive Director, GDDC

Curlena McDonald, Co-Chair

Ruby White, Co-Chair

Bernadette Strode, Principal

Lillian Aguilar, Cynthia Farrar, Jim Govang, Willie Freeman, Winston Ireland, Peggy Moore, Marion Murray, Sheila Shanklin, Bob Solomon, Bea Dozier-Taylor

Exhibition Designer:

Jen Lau

All building photographs by Andrew Bordwin Studio

DESIGN CULTURE

NON-WESTERN DESIGN CULTURE

DIGITAL DESIGN CULTURE

INTERDISCIPLINARY DESIGN CULTURE

DESIGN EDUCATION CULTURE

URBAN DESIGN CULTURE

Non-Western Design Culture

Moderator: Barbara Laurie, Howard University

Towards a New Tribal Architecture:
Designing Little Big Horn College Campus

DANIEL GLENN
Montana State University

Architecture as "Wild Being"

RACHEL MCCANN
Mississippi State University
Reader: Ethel S. Goodstein, University of Arkansas

Towards a New Tribal Architecture:
Designing the Little Big Horn College Campus Plan

DANIEL J. GLENN
Montana State University

INTRODUCTION

The design of the Little Big Horn College is an extraordinary opportunity to explore the formation of a "new tribal architecture", specifically because the primary focus of the College is the preservation and continuation of Crow Tribal culture. The President of the College, Dr. Janine Pease Pretty On Top, states that "the Crow Indian community has taken up the challenge to envision and dream of a learning community in a respectfully designed and uniquely Crow campus plan." In the collaborative design process for the Little Big Horn College entitled, Community Envisioning Process for the New Campus, the intent was to facilitate direct involvement of tribal members in the creation of the design. The ongoing process - led by an architect of Crow Tribal heritage - has included research of Crow culture and design, consultations with tribal elders, participatory workshops with Little Big Horn College staff, faculty and students, design charrettes and in-studio design explorations.

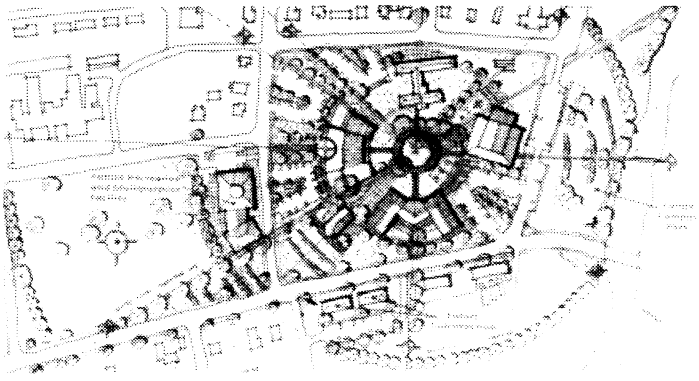


Fig. 1. Conceptual Master Plan for the Little Big Horn College Campus in Crow Agency, Montana. (Drawing by Daniel Glenn.)

This process has led to a completed master plan for the new college and is aiding in the effort to secure six million dollars to build the first phase of the plan. The next step is the development of the architecture itself. The specific nature of the architecture is yet to be determined and the approach to that determination is the subject of this paper. The process thus far has led to several conclusions: First, a participatory process directly involving tribal members is vital in determining the nature of a culturally specific design. Second, critical determinants of form can be drawn from traditional tribal architecture and artifacts without necessarily being derivative of the form of those artifacts. Because the essence of meaning in Plains Indian architecture is highly abstract and understood principally through oral tradition, any attempt to successfully develop new forms outside of that oral tradition is very difficult if not impossible. The structures embody meaning yet can only be "read" through interpretation, traditionally by elders of the tribe. And finally, while "form follows function" is a modernist tenet, it is also descriptive of nearly all traditional Native American structures, but only if the term "function" is understood in all its complexity.

CONTEMPORARY NATIVE AMERICAN ARCHITECTURE

The traditional culture of many Native American tribes is still very much alive and vibrant and yet the built environment of the reservations, with a few notable exceptions, does not reflect the tribal culture. In her book, *Contemporary Native American Architecture*, Carol Herselle Krinsky documents projects in Native American communities all over the United States which have been designed with the intention of being culturally responsive. The projects are often excellent examples of the potential of the development of a culturally responsive architecture, but they represent only a handful of exceptions to the majority of built structures in reservation communities. Reservations in the United States are dominated by Bureau of Indian Affairs standardized housing, which are typically stripped down versions of the American ideal suburban bungalow: a rectangular box on a concrete slab with a minimally-pitched gable roof. House plans, originally designed as World War II veteran's housing, originate in Washington, D.C.. These homes are repli-

cated by the tens of thousands on reservations across the country, without regard to climate or other regional considerations, much less tribal culture. Institutional and commercial structures are typically equally removed from the culture. This is in marked contrast to the built structures of tribes historically—amply documented in Nabokov and Easton's text *Native American Architecture*—in which each tribe had distinctive dwellings particular in every detail to the tribe's culture, regional climate and local resources.

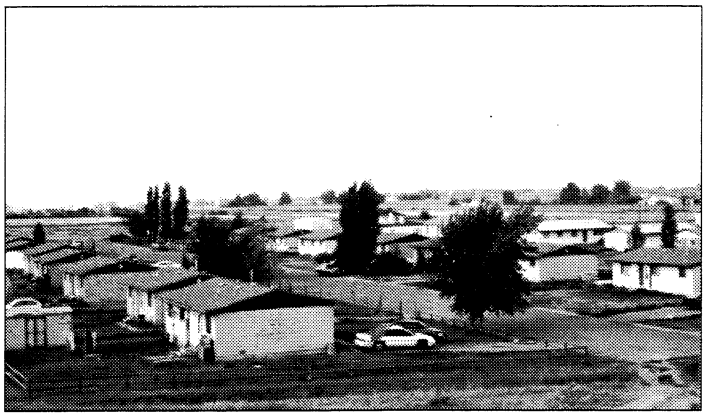


Fig. 2. View of HUD homes in Crow Agency, Mt. (photo by D. Glenn)

Instead of being expressed in the built environment, the tribes' cultures today are expressed through language, story telling, ceremonies, pow wow gatherings, dress (both ceremonial and modified daily wear), drumming, singing, food, family structure, community structure, decoration and art work. Cultures are expressed wherever the people have control over the medium of expression. The built environment is typically controlled by outside entities, such as the Bureau of Indian Affairs, various other branches of the Federal Government, the construction industry, and commercial interests. Recent changes such as the "Indianization" of the Bureau of Indian Affairs, Indian preference in Federal contracting, and greater control by tribal governments has had an incremental impact on the nature of the built environment on reservations, but the overall effect does not yet appear to be transformative.

If the built realm of today's indigenous communities is to be reflective of the unique cultures of each region and each tribe, processes must be developed which give a voice to the people of the tribe. New structures and communities need to be designed which are culturally relevant and yet not historically derivative, in danger of becoming caricatures of historic models. The evolutionary process that created the extraordinarily responsive structures of the past, such as the plains teepee, the desert hogan, and the coastal long house, cannot be replicated today. Yet new forms can be developed which reflect the interweaving of new technologies, materials, and lifestyles with ancient knowledge and traditions inherent in today's tribal communities. The difficult part of the equation is exactly how to go about developing new forms that are in fact relevant and meaningful to today's Native Americans.

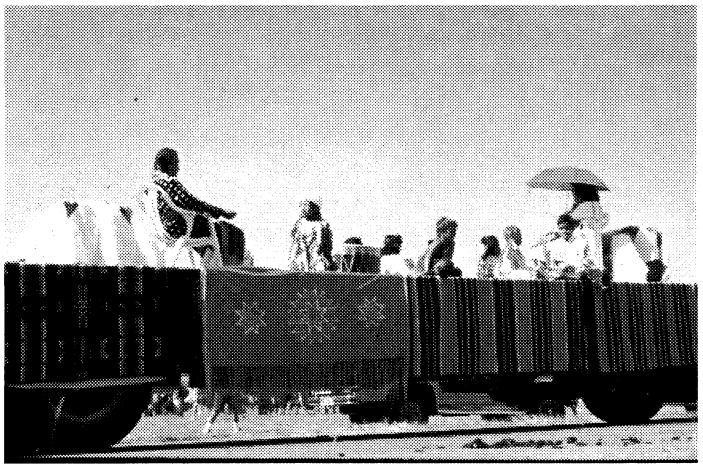


Fig 3. Crow women in the Grand Entry at the annual Crow Fair. (photo by D. Glenn)

In the her book, Carol Herselle Krinsky documents many of the efforts of the past three decades to develop culturally relevant works of architecture. While the book is a catalog of excellent efforts towards developing contemporary Native American architecture, it also documents the great difficulty architects face when confronted with this particular design challenge. How, for example, does one create formal expressions with brick and mortar or steel and glass which successfully reflects a nomadic plains culture? The temptation to resort to the "concrete teepee" is difficult to resist. If the Greek temple we revere in Western architectural history evolved from a reed hut to a marble masterpiece, and later to be reinterpreted in concrete, steel and dryvit, perhaps there is nothing inherently wrong with the concrete teepee. The teepee is a powerfully iconographic form. If I.M. Pei can successfully utilize the ancient and powerful symbol of the pyramid in Paris, reinterpreted in steel and glass, then perhaps a similar use of the teepee's conical form can be more than emblematic of a stereotype or caricature in the American West. Its form has of course been utilized repeatedly in this vein in the West, from the literally concrete teepee gas stations of the mid-twentieth century to museums and grandiose, Las Vegas-style casinos of the latter twentieth century. The most extraordinary of these is Antoine Predock's American Heritage Center in Laramie, Wyoming. The core of the building is a massive, six story conical form that closely reflects the teepee form both in its plan and its shape.

Yet such simplistic formal constructs do not represent a "new tribal architecture". Derivative forms are in fact highly contradictory with the nature of historic tribal architecture. As Nabokov and Easton thoroughly document in *Native American Architecture*, traditional structures evolved from a complex blending of technology, climate and culture.

Perhaps the most important lesson from such structures is that while they are imbued with layers of meaning, they are at the very same time simple, elegant responses to climate and social need. For

example, in the Crow teepee, each one of its twenty-one poles are symbolic of elements integral to Crow culture, including animals such as the bear, the mountain lion, the owl and the coyote. And yet there is no attempt to literally represent the meaning of these poles.

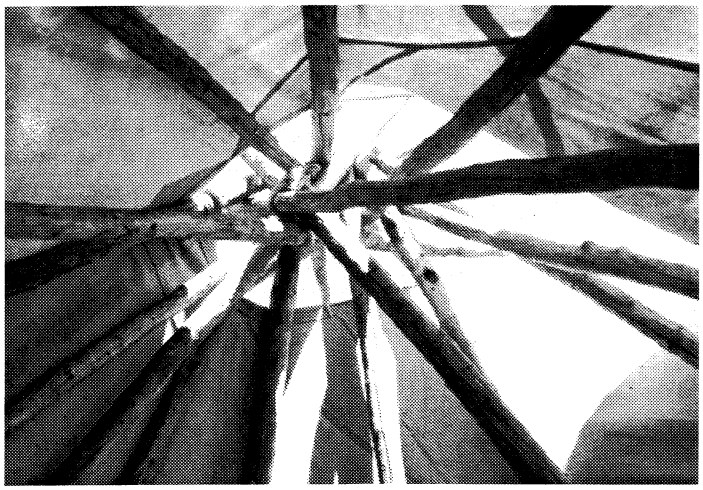


Fig. 4. View of the structure of the Crow teepee lodge. (photo by D. Glenn)

Power and meaning is embedded in the teepee structure through the oral tradition. Therefore, if a new structure is designed which is not somehow integrated into the tribes evolving oral tradition, it cannot possibly become meaningful to the tribe, regardless of what it might look like. As the renowned Australian architect Glen Murcutt has stated, regarding his work with the Aborigines, the critical issue is not what a thing *is*, but what it *does*, both culturally and physically.

ICONOGRAPHIC/NATURALISTIC/COSMOLOGICAL

In the many attempts to develop a contemporary Native American architecture, three basic approaches have emerged: iconographic, naturalistic, and cosmological. The iconographic approach is clearly the most common, and it appears in many forms. These buildings attempt to express the culture through the built expression of emblematic icons: traditional structures, traditional artwork, or animal forms. The Arapaho architect, Dennis Sun Rhodes, has designed many buildings with this approach, including the Native American Center for the Living Arts in Niagara Falls, New York, which is designed in form of a giant turtle, an animal sacred to many tribes. This approach certainly has merit. The advantages include the lack of ambiguity in the form, in the same way a cruciform church is unambiguous in its meaning to the Christian religion. The ability of the architecture to be read and understood by the community is critical to it being relevant to that particular culture. Yet in some ways the parallel to the cruciform church is inaccurate. The plan of the cathedral was derived from the form of the cross but the expression of the building was not a giant cross. In some ways the cross in the cathedral is more akin to the role of the circle in the design of a teepee lodge.

The circle, to Native Americans, is an almost universally sacred symbol in much the same was as the cross is to Christians. In the high plains, the form of the sweat lodge, the teepee lodge, and the encampment is circular in plan, not in geometric perfection, but in the idea of the circle. The perfect circle is implied without having to be built. The remainder of the structure of the lodge is not, as far as we know, iconographic. There is no attempt to form a symbolic expression in the teepee form itself. In the Crow teepee, there is extraordinary imbedded meaning in the teepee structure, but this meaning is conveyed through numerology and oral tradition, not form. Additional meaning is often overlaid on the Plains teepee through iconographic painting, but this is decoration more akin to the stain glass windows of a cathedral than a building shaped to represent a particular form. On the other hand, the sweat lodge is described by the Crows as "the body of the buffalo." The willow frame is the ribcage and the fire is placed off center to symbolize the heart. Yet, even in this case, the meaning is highly abstract. There is no attempt to literally represent the buffalo's body in the structure's form or detail.

The only literal expression of animal imagery in the form of the architecture might arguably be the Northwest coastal long houses, in which the entry ways were developed as elaborately carved totems expressive of animals. Yet even here the buildings themselves were not formed in such a way as to represent an animal. Their forms are quite utilitarian, though also like the teepee, abstractly embedded with meaning. The whole idea of creating a highly complex form that attempts to directly emulate an animal or any other object seems contradictory to the bulk of Native American architectural tradition. When such examples were presented to the Little Big Horn College, the overwhelming response was highly pragmatic concerns that such complex forms, no matter how beautiful, would be problematic: difficult to construct, expensive, and difficult to maintain. The Native American Center for the Living Art has in fact been in-operational for several years partially due, apparently, to roof problems and maintenance difficulties with the building. This is not to say that iconography should not play an important role in the design of contemporary Native American architecture. Its role, however, should perhaps be relegated to its role in the traditional architecture: as decoration, not form.

The second most common approach to the creation of a contemporary Native American architecture is what I've termed "naturalistic." In these buildings, the architects design in a manner which attempts to make the buildings reflective of nature. The foremost proponent of this approach is the Canadian metis architect, Douglas Cardinal. His most famous work, the Canadian Museum of Civilization in Ottawa, is designed to emulate the complexity and power of natural earth forms. This work is not iconographic as it does not directly symbolize nature, but instead attempts to express the spirit of nature. In other architects' projects, this might be less in the form of the building but more in the use of materials expressive of the region. Its interesting that the work of Antoine Predock might typically be termed "naturalistic", yet when he was commis-

sioned to design the American Heritage Center, he chose to be iconographic in his overt use of the teepee form. The naturalistic approach has a lot of promise, and as Cardinal has demonstrated, it can result in powerfully expressive works of architecture. Yet like the iconographic approach, the forms are derivative, not inherent to their function or their purpose. In addition, a "naturalistic" architecture is almost inherently highly complex formally, as nature is highly complex, yet traditional Native American structures are universally simple in their form and structure. There is an economy to the architecture that is reflective more of the actual practice of living lightly on the earth than the imagery of building like the earth.

The third approach, a "cosmological" design, seeks to utilize the spiritual, universal world view of a tribe to inform the tectonics and siting of structures. In this approach, the cosmology of the tribe is a primary tool in generating the form of the building or collection of buildings. In the best sense, this might lead to a sort of Feng Shui of Native American architecture. The cardinal directions, the sacred circle, numerology, star mapping, and geography, which play a vital role in the world view of Native American tribes, are utilized to develop the form and arrangement of the architecture. The most vocal proponent of this methodology is the firm of RoTo Architects. In their design of Sinte Gleska University near Rosebud on the Pine Ridge Reservation in South Dakota, the firm utilized Lakota cosmology as a primary generator of form. Unfortunately, this approach was not combined with the clarity and simplicity of traditional Native American architectural forms. Instead, it was merged with the highly complex splintered geometries of contemporary Western high art architecture, quite indistinguishable from the architects' earlier work in the firm of Morphosis. Instead of Lakota tribal cosmology generating a uniquely Lakota architecture, it became a rationalization for the firms delight in wildly complex form making. The extraordinarily high cost of actually building such forms resulted in the project's collapse, unfortunately after the foundations had been poured. Another firm was brought in with the thankless task of trying to utilize these foundations to develop some sort of viable building for the university while cutting construction costs by two-thirds. Perhaps one of the most vital lessons of traditional Native American architecture was lost on the architects, that of economy. Like their forefathers, the majority of tribes today have extremely limited resources - with the notable exception of a handful of casino billionaires. This situation, in combination with a philosophy which reveres the earth as a living being, implies that a truly Native American architecture in contemporary America will be restrained - in both materials and form.

LEARNING FROM THE TEEPEE

While "form follows function" is a modernist tenet, it is also descriptive of nearly all traditional Native American structures, but only if the term "function" is understood in all its complexity. The teepee is the embodiment of this tenet and provides a powerful lesson in form making for any modern attempt to develop a Plains Indian architecture.

The structural form does not seek to be anything other than what it is. It is not iconographic.

Fig. 5. View of a Crow encampment at the annual Crow Fair. (Photo by D. Glenn)

The teepee appears to be quite simple, but that perception is deceiving. In fact, it is a sophisticated structure that varies substantially in detail and structure from tribe to tribe across the Great Plains. The structure has evolved over millennia, with the earliest forms dating back at least 5,000 years. Perhaps if we give the tract home another thousand years or so to evolve, it will become something equally admirable.

Unfortunately, given our rapid destruction of the natural environment, we may not have a thousand years to find out. Our own culture too often mistakes simplicity for a lack of sophistication, yet this simple structure utilizes renewable resources - buffalo hide and lodge pole pine - to provide year around shelter in a fully portable dwelling that requires no more than an hour to erect. It is adaptable to the coldest winter nights or the hottest summer days; and it is beautiful both in exterior form and interior space. In the summer heat, the sides are rolled up to catch the breezes. In the winter, an inner liner known as a "dew cloth" is tied to about five feet up the poles and provides both an improved upward draft for smoke ventilation and an insulated layer for warmth. The structural form was derived both from utility and from spirituality: the circular form is sacred to the Plains Indian, representing the circle of life. The dwelling in nearly all tribal cultures is much more than shelter; it is a sacred space. The doorway among the Crows, for example, faces the rising sun to the east, and the interior space layout is highly regimented and ritualized.

Almost as intriguing as the teepee is the encampment, formed by multiple lodges. The beauty of a large gathering of lodges is something to behold, as visitors to the Crow Fair can attest. There thousands of teepees are erected for one week in August each year along the Little Big Horn River, forming the largest gathering of Native Americans in the country. For that one week, Crow Agency becomes the "teepee capitol of the world." The traditional encampment on the Great Plains was often circular like the lodge itself, with an opening to the east. The encampment circle, like nearly

everything in Native culture, was multifaceted - being spiritual, social and practical. It protected a large open social space in the center from the high winds that continue to hold reign over our region. The beauty of the encampment is also in the multiplicity of the elegantly simple forms on the land, creating a powerful single whole. While individual expression was often quite pronounced, it was limited to the paintings on the lodge exterior.

A NEW TRIBAL ARCHITECTURE IN THE MAKING

The design of the Little Big Horn Campus Plan has sought to develop a "new tribal architecture" with direct relevance and meaning to the Crow people. Its success or failure will not be known until it is built and occupied, but the reactions thus far have been very promising. This has been largely attributable to the extensive process to develop the design work. The teepee lodge and the encampment have become the primary conceptual basis for the design of the Little Big Horn College campus. This approach evolved out of the participatory process, in which tribal members directly developed design concepts in a workshop setting facilitated by graduate students of architecture from Montana State University.

Fig. 6. Cultural Advisors for the charrette process included Art Fitzpatrick, Sr. and Scott Russell, staff members of the Little Big Horn College.

The Design Workshops and cultural research were conducted with 15 graduate students in the MSU School of Architecture led by the author, a professor of architecture and a descendant of the Crow Tribe. The students met with tribal elders, toured the reservation, researched the history and cultural practices of the tribe, and facilitated several Design Workshops with the community. The process included an intensive Design Charrette involving a total of 50 graduate students in architecture and a dozen guest faculty and design practitioners, and cultural advisors from the tribe.

Utilizing "kit-of-parts" models to aid in quickly generating design schemes, teams developed approaches to the layout of the site plan for the college. The schemes which emerged were not as proposed as formal derivatives of the teepee itself, but instead the organizational structure of the lodge and the encampment became the basis for the new campus layout. The circle becomes the dominant ordering device, as in the teepee. The cardinal directions and the social and hierarchical ordering of the encampment and the lodge were translated by the Crow participants into ordering principles for the layout of the various programmatic functions of the campus.

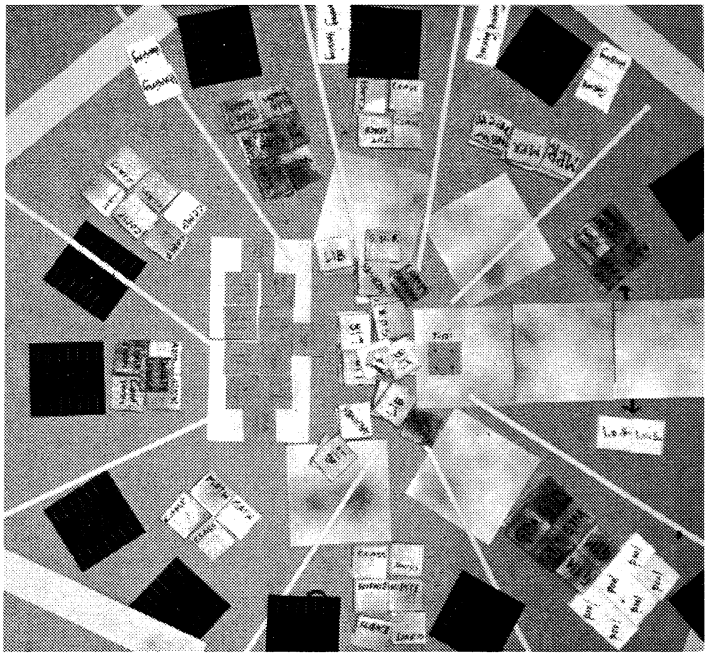


Fig. 7. Tribal members lay out a proposal for the campus plan using a "kit-of-parts" model.

For example, the primary symbolic entry for the campus comes from the east. The administration would be located at the west end of the site, or the rear of the "learning lodge", in a similar manner as the chief sits in the rear of the teepee. The buildings are then arranged in a circular pattern, which form a central social space as in the traditional encampment. The circle is also preferred, as it is largely non-hierarchical, with the various departments of the campus sharing an equal relationship to the center and to on another. Ten radial paths were proposed, emanating from the center of the campus, which would symbolize the "ten lunar months of gestation" and the sacred number ten, which is central to the Tobacco Society, a Crow social and religious organization dating back several centuries.

The work of the design workshops was translated into designs by design teams of Crow cultural advisors, graduate students, faculty, and guest professionals in a five day charrette. Four schemes were presented back to the college for feedback. Preferred alternatives were developed in a design studio. The final scheme was developed by a professional team of architects, all of whom had participated in the process, and it substantially follows the scheme that was developed in the design workshops.

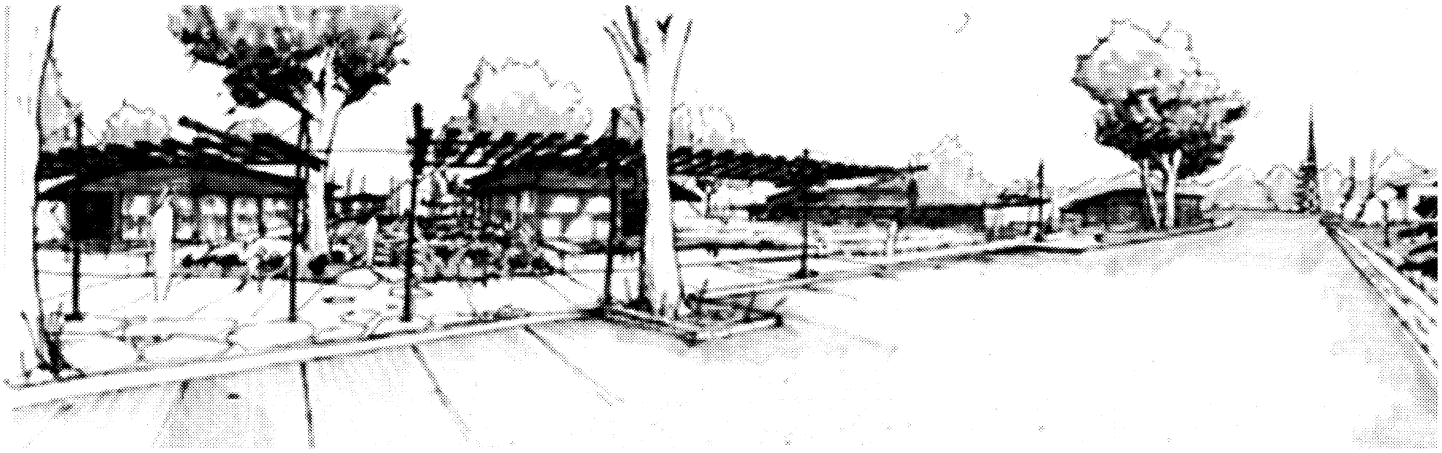


Fig. 8. Charrette sketch of the proposed campus as viewed from the main street of Crow Agency. (Drawing by Jess Graden, a MSU School of Architecture graduate student.)

The master plan that emerged out of this process has been lauded by the community for its direct cultural relevance. In the design studio and in the charrette, efforts were made to give formal expression to the architecture, but the final design work is still in process. The participatory design process will continue in the development of the building designs.

The following are design parameters derived from process thus far and the study of the traditional architecture:

- An effective, direct participatory process is vital to the cultural relevance of the design work.
- The designs will seek to achieve a simplicity of form derived from utility in harmony with the natural environment. As such, they will be "green buildings" with the forms designed to maximize daylight, natural heating, cooling and ventilation.
- Economy of means will be a primary component of all design decisions, both as a function of a limited budget and as a philosophical principle.
- As in the teepee, the structure will be expressed and legible to the occupants.
- The forms will not seek to be iconographic in any direct way, though the circle will be incorporated as a primary organizational element.
- The meaning of the architecture, while abstract, must be incorporated into the structure in a manner that allows it to be "read" by future generations.
- Iconography will be incorporated into the building through decoration of the built elements. Crow artists will invited to develop the designs for the various elements.
- Local, natural materials, will be incorporated into the building, though following the adaptive nature of the tribe to new technologies over the centuries - the horse, the rifle, the car, the computer - the latest materials will be utilized throughout.
- Following the sustainable intent of the building, locally available, low embodied energy materials will be favored.
- Native plants will be predominant in the landscaping.
- In the Crow tradition, pragmatism will be favored over dogmatism in decision-making.

BIBLIOGRAPHY

Albright, Peggy. *Crow Indian Photographer: The Work of Richard Throssel*, University of New Mexico Press, 1997.

Bryan, William L. Jr. *Montana's Indians*. American & World Geographic Publishing, 1996.

Glenn, Daniel J. *Little Big Horn College Community Envisioning Process*. MSU School of Architecture publication, 1999.

Hoxie, Frederick E. *Indians of North America - The Crow*. Chelsea House Publishers, 1989.

Krinsky, Carol Herselle. *Contemporary Native American Architecture: Cultural Regeneration and Creativity*. Oxford University Press, 1996.

Linderman, Frank B. *Plenty-coups: Chief of the Crows*. University of Nebraska Press, 1930.

Linderman, Frank B. *Pretty-shield: Medicine Woman of the Crows*. University of Nebraska Press, 1932.

Lowie, Robert H. *The Crow Indians*. University of Nebraska Press, 1935.

McCleary, Timothy P. *The Stars We Know: Crow Indian Astronomy and Lifeways*. Waveland Press, Inc., 1997.

Nabakov, Peter and Easton, Robert. *Native American Architecture*. Oxford University Press, 1989.

Nabakov, Peter. *Two Leggings: The Making of a Crow*. University of Nebraska Press, 1967.

Voget, Fred W. *The Shoeshine-Crow Sun Dance*. University of Oklahoma Press, 1984.

Architecture as "Wild Being"

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The rise of western culture has been marked by an ever-growing urge and ability to turn our backs on the world's material presence while we seek to understand things through language and intellection. Thus the means of understanding wherein body and mind act in concert has given way to a disembodied rationality in which the body has no legitimate place. Architecture has not been immune to this phenomenon, and we have long been producing buildings to be read and interpreted rather than experienced. Rationality has at its core a desire to control and predict, and consequently to suppress things that escape or exceed our conceptual confines. The world's materiality is one of the things that constantly escapes and exceeds these confines; with the body denied as a means for understanding, material presence is nonsensical excess. French phenomenologist Maurice Merleau-Ponty, who died prematurely in 1961, developed a philosophy that subverts rational attempts to conceptually circumscribe the material world. This paper examines architecture's materiality through Merleau-Ponty's idea of "wild being" and argues that ex-urban settings—where the cultural landscape is overwhelmed by the natural one—may be the most appropriate venues to explore and experience the wild being of architecture.

Merleau-Ponty does not construe the world as objects defined in relationship to a human subject. He posits instead that the human subject is one subject among a host of other, equal subjects. We exist within a continually fluxing web of interrelationships called the Flesh, and our own subjectivity is defined by relating ourselves to, not by distinguishing ourselves from, the other parts of the world. We are open circuits, completed in sensory contact with the world, and this relationship is not one we can fully control.

According to Merleau-Ponty, to experience an object[1] is to partake of its interrelationships within the complex and dynamic web of phenomena that make up the world. Merleau-Ponty contends that a visible entity points constantly to a host of other things, visible and invisible, that support and are related to it: "every point is a pivot, every line a vector" into the larger world.[2] Yet objects are also recalcitrant. They reveal only a certain amount about themselves and about the invisible structure that supports them, and at any moment they conceal more than they reveal. Objects have fathomless depths; they point and reveal while simultaneously remaining autonomous and uncommunicative. David Abram, in *Spell of the Sensuous*, speaks about the "enigmatic, hidden dimension at the very heart of the sensible present, into which phenomena may withdraw and out of which they continually emerge."[3] Merleau-Ponty refers to this uncontrollable dimensionality, this revealing-while-holding-back, as "wild being."[4]

Abram illustrates the wild being of an object with a simple description of a clay bowl. In his description, as he views the bowl from one side, the other is withheld from him. While examining the outer surface, the inner is withheld. From any vantage point, it is impossible to see the body of the bowl contained between the inner and outer surfaces without breaking the bowl, destroying its integrity. Abram writes:

> *There can be no question of ever totally exhausting the presence of the bowl with my perception; its very existence as a bowl ensures that there are dimensions wholly inaccessible to me.... Even a single facet of this bowl resists being plumbed by my gaze once and for all. For, like myself, the bowl is a temporal being, an entity shifting and changing in time.*[5]

Yet, while withholding aspects of itself, the bowl is constantly pointing to its interrelationships within the larger world. We can see the marks of the potter's hands, scratches and stains accumulated from daily use. We can feel its weight and solidity and its low center of gravity as it balances in the hand and distributes itself stably on a flat table top. The density and color of the clay call forth the density and color of the earth. Textured areas in the bowl interact with moving sunlight to delineate changing patterns of light and dark. Our fingertips can feel them, tracing along their bumps and hollows. The sensuousness of the bowl is the medium for communicating these relationships.

To experience architecture is to partake of its interrelationships within the same complex and dynamic web. Architecture is a vector that points outward in all directions—to the movement of the sun, to the effects of moisture and atmosphere, to the bounty of the earth's resources, to the hands and the processes that prepared and assembled it, to the mobile, sensate human participant. Its medium for pointing outward is its own materiality and the capacity for that materiality to affect our senses, that is, its sensuousness. We understand what is being revealed through receptive sensory

experience that connects us not only to a piece of architecture, but also to the larger world.

Architecture is also recalcitrant. It is precisely its materiality and spatiality that make it "wild," indecipherable, and ultimately unmanageable. When conceived in terms of human projections, such as geometry or composition, architecture becomes domesticated and intellectually consumable, as an understandable whole comes forward to unite its disparate parts. But when experienced corporeally, architecture unfolds little by little, each moment presenting a new and different experience, while it stubbornly resists intellectual consumption.

Ancient, oral cultures founded their activities in a sense of relationship between themselves and a living, natural-transcendent world. An awareness of their shared subjectivity with the world deepened this relationship. Martin Heidegger, in "The Age of the World Picture," contrasts the ancient and modern modes of relationship between human beings and the world in terms of subjectivity. In the ancient mode, the subject of experience is a world actively revealing itself to receptive human beings. In the modern mode, the lone subject is the human being, at the center and in control, and the world is relegated to peripheral and subservient status. Abram characterizes oral cultures as "enveloped, immersed, caught up *within* the sensuous world." In contrast to the world of rational cultures, the "breathing landscape" they inhabit is not "just a passive backdrop against which human history unfolds, but a potentized field of intelligence in which our actions participate."[6]

Heidegger contrasts the participatory ancient relationship to the modern one, with its lone human subject. In the modern relationship, truth or significance no longer resides within unfolding phenomena, but depends on human valuation. We assume a projective stance and an attitude of domination in which conceptualization is more valuable than experience. Heidegger characterizes the modern era as "the age of the world picture," referring to the way we have conceived of the world as a tableau composed from the perspective of our central vantage point. From this vantage point, "what is, in its entirety, [exists only] to the extent that it is set up by man, who represents and sets forth.[7] The vista from here forms a marked contrast to oral cultures' experience of a breathing, intelligent landscape.

The immediacy of the world for us, according to Merleau-Ponty, is predicated in the imperceptible lag between our corporeal response to a situation and our conceptualization of it. Architects can draw out this interval by focusing on the immanent and deemphasizing those elements that are most readily subsumed into mental constructs. An emphasis on the material and temporal qualities in a space—surface, light, variations in color, and repetition, rather than on form and figure, delays conceptualization and allows us to recognize that the architecture is communicating with us synaesthetically. In this relationship, architecture is an unfolding phenomenon, continually emerging, communicating its significance to receptive participants. It responds to the intelligence of the landscape, adapting to its rhythms and existing in active relationship to it.

The walkway in Macon, Mississippi connecting the Corpus Christi Catholic Church and its parish hall, designed by David Lewis (Fig. 1), unfolds through corporeal experience and responds to the material presence of its site. We approach the walkway straight on, from the west, while the south wall of the church and a row of mature cedar trees abut the path and occupy the periphery of our experience. Seen from the street, the walkway both withdraws and emerges. The white uprights of the balustrade catch the sun at intervals, and present a luminous, intermittent surface. The narrow intervals between the wooden uprights set up a rhythm of light and dark that is overlaid by wide intervals of light and shadow cast by the robust cedar trunks. Dappled light filtering through clusters of cedar needles adds to the complexity of the pattern. The white church wall, the ground, and the cedar trunks catch their own patterns of light and shadow. All these elements contribute to the experience of a bounded exterior space that interacts with sun and wind to be created anew in each changing moment. The variability and flux of an emerging world is played out on the surfaces of the entire space. At the back edge of the space, the geometry of the walkway is regular and strong, yet a geometric understanding of the walkway is overwhelmed by corporeal experience of the place it inhabits.

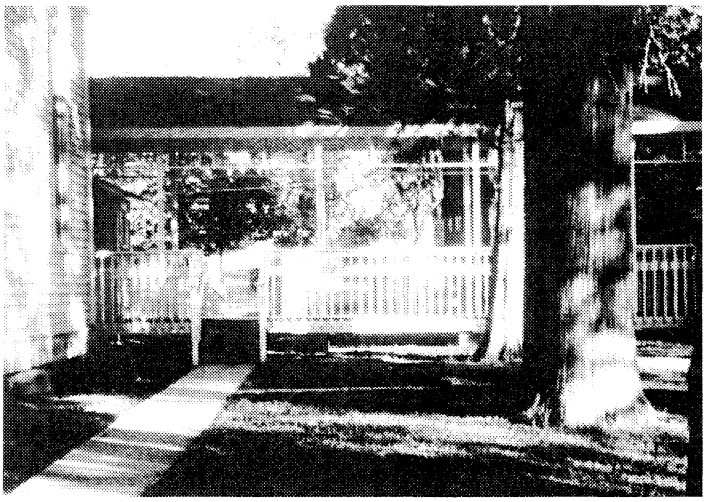


Fig. 1. Corpus Christi Catholic Church. Macon, Mississippi. Lewis/McCann Design Group. 1992. Front view (west façade) of walkway (author).

The goal of the path is the walkway, yet the figural character of the walkway is diminished by its relationships. The trees veil it partially, and its openness allows the space behind it to rival it as a figure. In the mornings it is backlit, existing as a dim shape against the bright area behind it; after noon its front surfaces receive patches of light. The walkway hovers above the ground, an area of profound shadow giving presence to the interstitial zone of the crawl space.

As we approach the walkway, it unfolds to reveal new experiences. From the street, the overall organization is apparent; the quick rhythm of the balustrade plays against widely spaced posts that support a solid roof. Close up, the trees, church wall, and walkway roof vanish into the half-perceived realm of peripheral vision, and our gaze goes through the entrance bay to focus on the open space beyond. Only when we are a step or two away does the interior

space of the walkway begin to open up, as the floor surface, the interior of the back balustrade, and the undersurfaces of the ceiling zone become visible, enclosing elements. Reluctantly, at the last moment, the walkway becomes more present than the space around it. The walkway's own materiality is revealed on the balustrade and posts, where the wood's directional grain rises through the reflective surface of white paint.

Fig. 2. Corpus Christi Catholic Church. walkway interior. looking south (author).

Once inside the walkway (Fig. 2), the experience recalls the rhythmic intervals of the line of cedar trees it intersects. It uses repetitive architectonic elements, none a figure in its own right, to measure out its distance. The ceiling plane is expanded into a perceivable zone by hanging lamps, intersecting metal tie rods, and open fascia panels. The sides of the walkway are open in the middle, allowing the walkway to bleed out into the space around it. Sunlight spills across the walkway from one side or the other, depending on the time of day, and is filtered by the balustrade and the cedar trees into discrete pockets, increasing the presence of the floor. Sunlight defines the posts, carving them into sharp, dark edges against brightly lit faces. Depending on our focus, we can be either enclosed within the walkway or part of the space outside.

The pragmatics that contributed to the walkway design are an integral part of its "wild being." The openness of the walkway is responsive to the heat and humidity of Mississippi. The dark crawl space stems from three concerns: to allow cooling and drying breezes under the walkway floor, to keep the length of the wooden beams away from the damp ground and avoid rot, and to pierce the ground plane as little as possible to avoid disturbing the roots of the trees. Like a clay bowl, the walkway reveals the materials and processes of its making. The wooden construction reiterates the materials of the church, which itself attests to the abundantly forested region in which it stands. The process of construction is discernible, but speaks of relationships rather than forming a narrative in its own right. Every construction element in the walkway can be carried by one person and assembled by one or two. The size of the elements calls forth a bodily response—we can easily imagine lifting the wooden members of the balustrade and setting them into place. The walkway also reveals the ecology of its region and the effects of its climate: the strong Mississippi sun has caused paint in the sun to crack, and the wet heat has caused paint in the shade to mildew.

Every piece of architecture interacts with natural elements and with the mobile human perceiver to reveal interrelationships such as the ones presented in the example above. But in most architecture today these relationships are overshadowed by figural maneuvers in form and image that call attention directly to the architecture as something we understand primarily through vision and language. Symbolism is present in the Macon walkway in crosses formed by the tie rods and in the three-to-one relationship of each bay and its constitutive members. But the deemphasis of outline and figure in favor of surface and repetition allows a corporeal relationship to flourish without being consumed by symbolism. This subversion of conceptualization strengthens our corporeal connection with the walkway by dragging out the interval between experience and conceptualization of which Merleau-Ponty speaks, and allows us to appreciate its wild being.

Since the preclassical Greeks, architecture's slow and steady development into the modern era has been one of increasing conceptualization. As we have increasingly laid bare the world as conceptual object, we have concomitantly made architecture into an object to be read and decoded rather than experienced. Current buildings all too often consist of an efficient structure covered with a thin, communicative veneer of symbolic images. Once these images are recognized and consumed intellectually, there is nothing to encourage awareness of our relationship with the larger world.

Openness to architecture's wild being can change our experience of any building, urban or ex-urban. Every building, no matter how theoretically derived, is, in the end, unavoidably material. It reflects sunlight and hides parts of itself in deep shadow. Its surfaces grow cold and hot, crack and become host to moss and insects. But the natural wildness of ex-urban settings is perhaps the most effective setting for communication by the wild, material aspects of architecture. In these settings, human invention does not dominate and enframe the field. The vast emptiness of Texas scrubland is

echoed in the sparse layout of its small towns, where buildings punctuate the landscape rather than define it. The wild and out-of-control, the patently undesigned, are constant reminders of an order and spatiality that exceed and envelop the human realm.

Abram writes about the inclination for Native Americans to know their landscape intimately by name. The names are densely distributed and reflect the sensuous properties of each place. He cites examples of Native American place names such as "big cottonwood trees stand spreading here and there," "coarse textured rocks lie above in a compact cluster," and "water flows down on top of a regular succession of flat rocks."[8] Architecture can be responsive to site in this same way, its forms and surfaces designed in celebration of the sensuous, natural properties of site. And in celebrating its own materiality, architecture retains a wild presence that beckons us toward a reciprocal relationship with it. The Macon walkway, dynamically and relationally defined, exists in a reciprocal, give-and-take relationship with its surroundings and with the moving inhabitant. Its ambiguous spatial qualities and discrete, tectonic parts resist labeling; instead, they engender qualitative descriptions that recall the complexity and sensuousness of Native American place names.

The world, in its complex beauty and wildness, lives, breathes, and communicates its intelligence through its sensuous aspects. By resisting conceptual control through its own material presence, architecture gives voice to a suggestion that we can find our way back into a relationship with this wild world by asserting kinship with nature rather than dominion over it—by letting it surprise us, delight us, confound us. The first step toward recovering a reciprocal relationship with the world is to acknowledge it as a dynamic subject equal to ourselves. The wild being of architecture resists consumption and points outward to the dynamic processes of a world that is continually emerging. In doing so, it illuminates the connected physicality of our existence and positions us in dynamic relationship with a host of other, equal subjects. Oral cultures, all primarily ex-urban, understood the dynamic and participatory nature of this relationship. Openness to architecture's wild being can allow us to rediscover it for ourselves.

NOTES

I would like to thank David Lewis for discussing his intentions for the Corpus Christi parish hall and walkway.

[1]I use the word "object" to denote a material entity, but the term needs some clarification. Although the relationship between self and other, subject and object, forms a continuum, the modern era has articulated a sharp distinction between them, classifying the sentient human being as subject and the surrounding world as a separate object, itself made of discrete objects. The word "object," therefore, can connote the separateness inherent in the modern position, which I do not intend. I use "object" because it stresses the materiality of a thing, as opposed to the word "entity," which stresses a thing's existence and is silent about its materiality.

[2]Maurice Merleau-Ponty, *The Visible and the Invisible*, ed. Claude Lefort, trans. Alphonso Lingis, Evanston, Ill., 1968, 218.

[3]David Abram, *The Spell of the Sensuous: Perception and Language in a More-than-Human World*, New York, 1996, 222.

[4]Merleau-Ponty, *Visible and Invisible*, 218.

[5]Abram, 50-52. The direct quotation is from page 51.

[6]Abram, 260.

[7]Heidegger, "World Picture," 128-30.

[8]Abram, 155.

Digital Design Culture

Moderator: Phoebe Crisman, University of Virginia

Emerging Design Cultures in the "Cyber-Real" Age:

The Tales of "Extreme" Architectural Practices

ALFREDO ANDIA
Florida International University

The Evolution of Form:

Exploring Algorithms as Form Determinants in Design

ABIMBOLA O. ASOJO
University of Oklahoma

Emerging Design Cultures in the "Cyber-Real" Age:
The Tales of "Extreme" Architectural Practices

ALFREDO ANDIA
Florida International University

REVOLUTIONARY NINETIES?

In this paper, we will argue that even though computers transformed many aspects of architecture, in the nineties, the use of technology in our profession has not been revolutionary. In fact, we will argue that computers were not used, in the nineties, to transform anything fundamentally in the profession. Instead computers were used to support and reinforce the image of what architecture has been throughout the twentieth century.

Professional offices used computers, in the nineties, to make their design, construction, and communication processes more efficient and productive. And a decade later, computers are no longer foreign; in fact many professionals can no longer think or work without staring at them. However, despite this remarkable change, most offices today operate as they did in the previous decades. The majority of architects still deal with drawings, deadlines, consultants, and clients. And most importantly their economic survival is exclusively dependent on the construction of brick and mortar infrastructures.

A similar fate has occurred to a number of young avant-garde firms such as UN Studio, NOX, Oosterhuis, Reiser + Umemoto, O.C.E.A.N., and Greg Lynn's Form. Early in the nineties, these firms became digital pioneers, eliminating first the traditional methods of paper and pencil design, then eliminating the traditional processes of architectural imagination, materiality, and mobility. These offices have built considerable reputations and fame almost entirely by publishing their hallucinogenic designs as quickly as they could invent them. Today, they are obsessed with proving their designs are constructible. However, in spite of the heroic and revolutionary atmosphere that surrounds these efforts, the objectives of this generation are very traditional. These practices have been focused almost exclusively in an area that has fixated the entire avant-garde movement of the past century: the new aesthetic form.

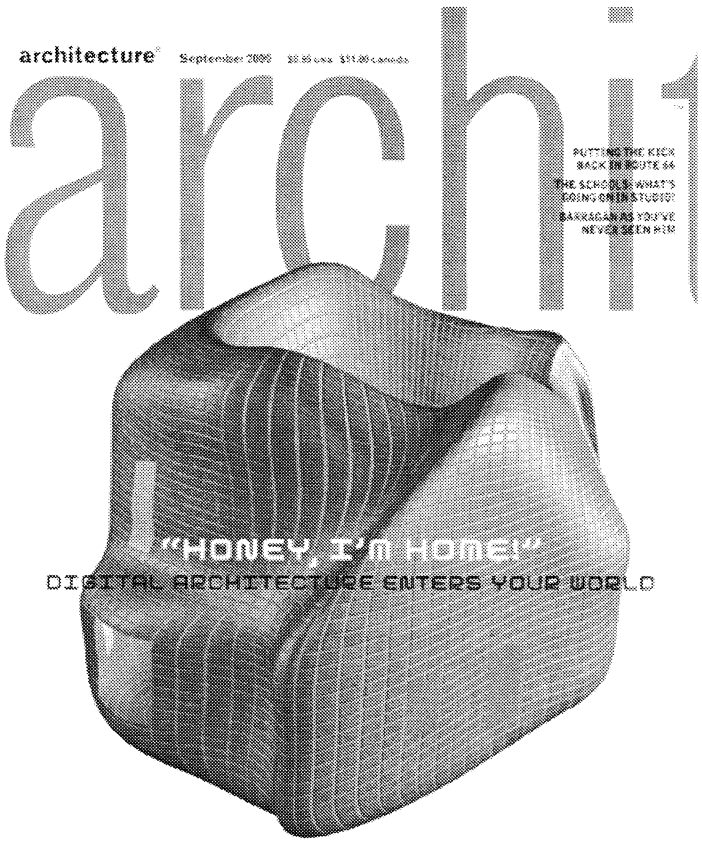


Figure 1. Cover article of Architecture magazine. September 2000. The nineties success of blob design is already an architectural myth. The cover article says: "rarely in any generation does a single academic institution have a sweeping effect on the profession at large. the way Harvard did in the '50s under Walter Gropius – and the way Columbia has over the past six years." Source: Cover Page. Timothy Greenfield-Sanders. "The Computer School." Architecture Magazine. *(September 2000): 93 –108.*

BEYOND THE BLOB: AT THE THRESHOLD OF A CYBER-REAL DECADE

In this paper, we will explore how a new generation of architects is attempting to move beyond the productivity or aesthetic gains from digital technologies. These architects can be characterized by being less interested in becoming big stars of built architecture, but more enthusiastic about understanding the new condition of urbanity in the digital era. Their observation is that geographical space is no longer the final frontier of humanity. What is emerging is a mixed reality; a reality which is both cyber and real, synchronous and asynchronous. These designers believe that these new spaces are not created to replace reality but instead to support more effectively contemporary capitalistic behaviors.

The four design firms, which we will explore in the following pages, believe that there is a parallel type of practice: one which can break away from architecture's traditional commitments to the professional world (built square feet) and/ or to the avant-garde circles ("cool" new forms). They believe that a new branch of architecture can help transform space not only physically or aesthetically but communicational and psychologically. They believe that the powers of architectural design can be incremented by several orders of magnitude if one understands how human activities can migrate from pure functional physical infrastructures into the more distributed digital spaces.

ASYMPTOTE: DESIGNING A CYBER-REAL STOCK EXCHANGE

Five years ago, the New York Stock Exchange (NYSE) began to integrate its myriad of computer data into one easy to use system. In the process of developing the "design" of the new virtual stock exchange system the NYSE contracted the New York based architectural firm, Asymptote.

Asymptote was founded in 1989, and is well recognized in architectural circles for their competition and installation projects that explore the relationship between the digital and physical worlds. This commission was for Asymptote a unique opportunity to build what they had been experimenting with for almost a decade.

The project turned out to be more than just an interface exercise. "We approached it as if it was a traditional architectural project," said Hani Rashid and Lise Anne Couture, founders of Asymptote. The NYSE is full of intensity, jargons, and actions, which must be represented in the virtual exchange in order to be easily understood by the users. The design of the virtual space "had to be a reflection of the intensity and the architectural language of today's NYSE", said Rashid. The fully interactive 3-D Trading Floor (3DTF) consolidates several data streams. On the walls, of the virtual world, there are stock prices, news, indexes, and live video from major television networks, which are constantly flowing in real time. On the floor, of the 3DTF, the trade booths are arranged as they are in the real layout so it is easy for users to understand. A fully interactive 3D graph is situated on the virtual floor; the graph allows for instant replay of graph-events that occur in the stock market. The 3DTF is depicted on nine 25-inch PixelVision flat-panels, which allows users to access many types of information instantly, something impossible to do in real space or with current databases.

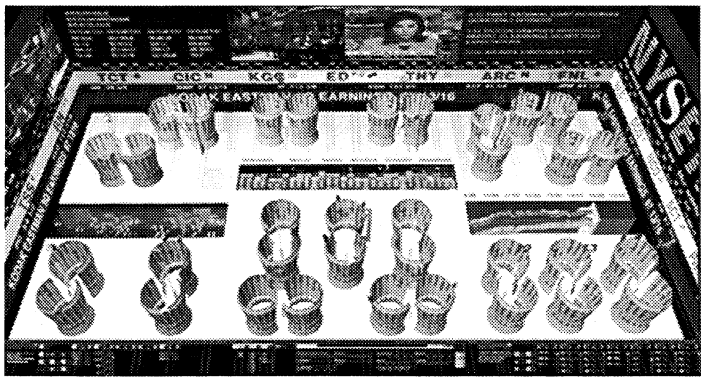


Figure 2. The new NYSE virtual stock exchange. designed by Asymptote. displays a virtual environment in which traders can interact with 3D graphs. real time ticker bands. and video feeds. Source: www.asymptote.net.

"The idea was to create a visual environment through which traders can navigate, analyze, and act upon at-a-glance. Trade actions are very dynamic," said Rashid and Couture. "What happens on the trade floor gets immediately broadcast through the media, information on which the market reacts, and then quickly translated into orders on the floor." On the real trade floor, it is impossible to see and analyze the complex dynamics of these interrelated events. However, in the 3D virtual representation, it is possible to manipulate, even to do instant replays, for quick analysis of the activities that occur on the exchange. "It is incredible to see how engaged operators get in the 3DTF when the market has drastic changes during they day," expressed the architects.

The NYSE initially had contracted a group of engineers, from Silicon Valley, to design the entire project. But they had difficulties designing the data navigation. This led the client to Asymptote. Rashid said, "When the clients saw that all their data could be assembled in a navigable world, they said: Why didn't we hire an architect before?"

The 3DTF project led to a second commission, for Asymptote. The NYSE needed a physical location for this virtual environment. They named the space "Advanced Trading Floor Operation Center." It is a high-tech workplace, or a "theater of operations," for virtual trading. Today the "theater of operations," that houses 3DTF, has become so popular that it is also used to broadcast live updates from the NYSE by several major TV channels, in the US. The Operations Center is powered by 6 Silicon Graphics Onyx2 graphics visualization supercomputers, 43 PixelVision high-resolution, a number of flat-panel monitors, and highly innovative applications.

Currently, the Asymptote principals have high hopes for the future role of architecture in cyberspace. They think that current trends, in Internet commerce, are dull, and current technology does not interact as humans interact with real buildings. "For example the

website of Barnes & Noble is just a glorified magazine page," Rashid said. But that site could be re-designed to contain many of the features and richness of the real bookstore: the lounging, the browsing, and the opportunities to socialize. "This can only be achieved with architecture," points out Rashid.

ASYMPTOTE: DESIGNING A CYBER-REAL MUSEUM

In the middle of 1999, Asymptote was working on a commission for another large cyber-real project: The Guggenheim Virtual Museum (GVM), for the famous Salomon Guggenheim in New York. The GVM is the most ambitious digital project a museum has attempted in the United States. The Guggenheim is investing one million dollars in the first version of this project. The virtual museum, like the virtual exchange, is expected to have both a real and a digital presence. The GVM is expected to have a physical presence on the video wall (43' by 24') in the Guggenheim Museum location in Soho (New York City). It is expected that the project will be part of the transcontinental expansion of the museum, including sites in Venice and Berlin. With different mediums and via different digital technologies the Guggenheim events could be experienced with the other cities. The GVM is expected to open its virtual doors in 2000-2001.

The first impression of the virtual museum is that it is in constant change. The elements are recognized at first sight: "The Plaza," in which are located the public functions of the museums, "The Ramp" which guides to other Guggenheim museums in the world, and the "Galleries" which introduce the user to the different collections of art. The visitors navigate through the museum with a bar that cuts sections of the 3 main elements of the GVM: "Plaza, Ramp, and Galleries." In the design of the GVM, Asymptote, plays with elements which are very close to the experiences a visitor discovers in the real world: the user develops a sensation of spatial movement, develops a sense of destination, and, above all, is capable to allow users to learn and fixate memory experiences of the information in the virtual environment. This is something very difficult to achieve in today's 2D Internet World. Users tend to surf in a random way, they easily lose their sense of destination and time; it is very difficult to track down or remember location of visited sites. The 3D space of the GVM, developed by Asymptote, is one of the most mature attempts, to date, to develop informatics architecture in which the traditional aspects of architecture: destination and space memory are explored. The virtual environment, according to Asymptote, offers a second level of reality, one in which space can be manipulates by the user. Once the visitor becomes acquainted with the environment one can develop short cuts, which will allow quick access to the information and events desired.

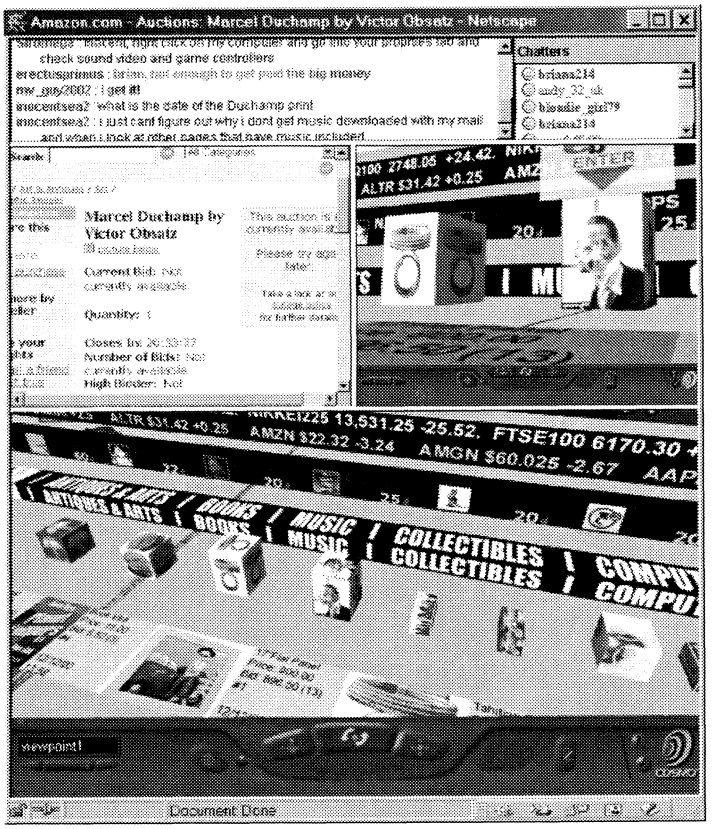


Figure 3. 2069, Inc. prototype of a virtual world that supports Internet navigation in highly interactive web sites such as auction sites. B2B bidding, and stock trading. The architecture of the world is designed to bring together, in one virtual space, the information of several web sites. The user can navigate through the VRML world via two different windows, which allow for different scales of interaction with the information. One frame with the traditional web page and another with chat support the interaction occurring in the VRML world. Actions in any of the frames trigger actions in the other frames.

M.C. INTERNATIONAL & 2069, INC.: DESIGNING THE SUPERMARKET OF THE FUTURE

The third case that we will present here refers to a series of research and consulting proposals, by the firm M.C. International and 2069, Inc., in the area of grocery shopping in the digital era. M.C. Intl. and 2069, Inc. are a network of architects, designers, industrial designers, software designers, and business consultants in the USA, Latin America, and Europe. The office network was founded to collaborate in the development of designs, technologies, and systems that can anticipate the needs of urban culture in a digital era.

In 1996, M.C. Intl. developed a series of prototype projects reflecting the impact of the Internet on supermarket shopping. The average American spends approximately 25 minutes each time they enter into a grocery business, and an estimated 70% of those who shop do not enjoy the experience. Moreover, the action of shopping in most metropolitan areas, in the United States, involves the action of driving, making the entire experience more than an hour long chore which includes undesirable activities such as finding parking, getting lost in infinite aisles, reading about extraterrestrial abductions in magazines along checkout lines, selecting paper or plastic, carrying heavy bags, and arranging the products on the proper shelf at home. The weekly grocery shopping duty appears to be a mundane burden in every day life considering that at least 50% of the groceries, every American family buys each week, are staple goods that solely replace previous purchases. Computers have improved many of the operations that help run the grocery businesses, but have had little impact in re-engineering the experience, activity, or space in which grocery shopping takes place. For most Americans the once a week shopping ritual has not changed much.

Commerce on the Internet is attempting to transform grocery shopping. For example, Wal-Mart's Web site already sells 800,000 different items: from a Maine Lobster sold for approximately $48 and delivered live in 24 hours, to a pecan pie sold for $17, and a pack of chewing gum sold for less than $1 dollar. Although, it appears that Wal-Mart has exerted effort in designing their web site, it seems that little thought has been placed on understanding how we are to receive the goods. Wal-Mart delivers the products with an overnight carrier, which proves to be inconvenient, and expensive therefore making this experience unattractive. Other companies have attempted to solve the problem at the receiving end. Relatively old companies such as "PeaPod" and new ".com" companies, such as "Web Van," currently receive grocery orders via Internet and telephone, and will deliver for a small fee. They are attempting to change grocery shopping, similar to how Domino's Pizza changed the pizza business.

In the beginning, M.C. Intl. and 2069 Inc. researched the possibilities for combining shopping for groceries on the Internet and receiving those goods in a timely fashion. Their studies suggested that the delivery of groceries to home in less than 24 hours was uneconomical. However, they found that assembling individual orders that could be picked up at a central location was possible in less than 2 hours without major additional costs to the operation. In fact these studies suggested that the savings in supermarket facilities and stocking activities were significant. They reflected on the reality that in many suburban metropolitan areas the action of shopping is very much related to the action of driving. The proposal attempted to integrate both activities by creating metropolitan infrastructures that would allow people to order groceries on the web, or by phone, and receive them as people perform their every day driving.

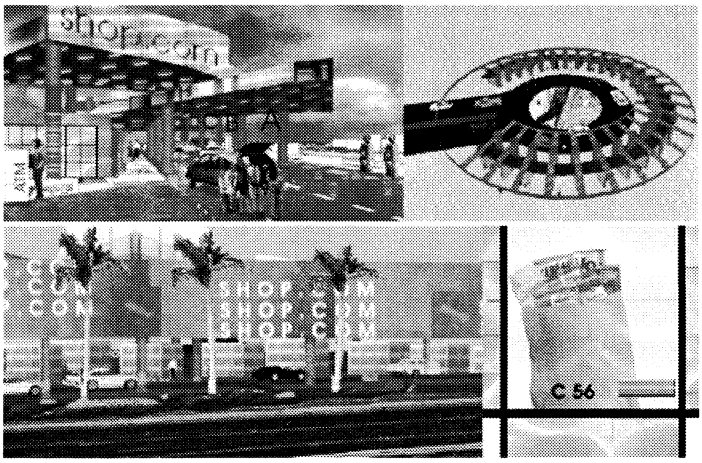


Figure 4. Several prototypes of cyber-real supermarkets, created by M.C. International and 2069, Inc., included the designs of drive-thru infrastructures and software alpha versions. The users shop and buy groceries on the Internet, and then receive the groceries in specially refrigerated mailboxes, in drive-thru infrastructures, near streets or highways with traffic of more than 25,000 cars per day.

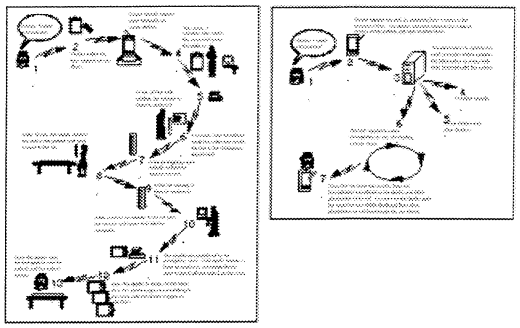
The proposals created drive-thru shopping strips located on the side of highways and freeways, with more than 25,000 cars per day, in which people could receive their grocery orders in specially designed mailboxes. Payments could be collected at the time of ordering or at pick-up. These strips would also attract other kinds of business/activities such as ATM's, gas stations, coffee & donut shops, newspaper stands, fresh produce & bread markets, drycleaners, fast food, and post office centers; this could also be a place for other online retailers to deliver their products. These infrastructures, when compared with traditional supermarkets, not only offer more sales per square foot, and an efficient way of shopping in areas with high vehicular mobility, but also present an extraordinary challenge for designers.

"These drive-thru infrastructures do not have a definite form, they are constantly changing", say the principals at 2069, Inc. They add,

> *"These infrastructures are always contemporary. They are like biological organisms that grow and evolve over time. They will follow a similar process of development as ATMs have pursued in the last 10 years in the U.S. ATM's initially appeared inside traditional banks, they later moved to the exterior of banks, then finally expanded to supermarkets, malls, airports, and other locations. Similarly, drive-thru grocery strips may initially emerge adjacent to existing supermarkets, and then slowly migrate to heavy automobile traffic zones."*

LENON & ASSOCIATES: DESIGNING EMERGENCY ROOMS IN THE DIGITAL ERA.

Jim Lennon and Associates, a small architectural firm in California, has been developing and using information technology tools to analyze and solve complex design problems in emergency departments. These computer programs analyze and simulate the "activity workflow" inside those departments. These simulations demonstrate that emergency rooms are over-designed and what occurs in them is extremely predictable. Lennon's studies show that the size and shape of emergency rooms are not only dependent on physical requirements but also on how people communicate, act, and converse, in the space. The simulations demonstrate that a typically patient spends approximately 2.5 to 5 hours in the emergency department while the estimated time spent with the doctor is only 5 minutes. The communication among the staff is precarious, and the time lost is enormous.



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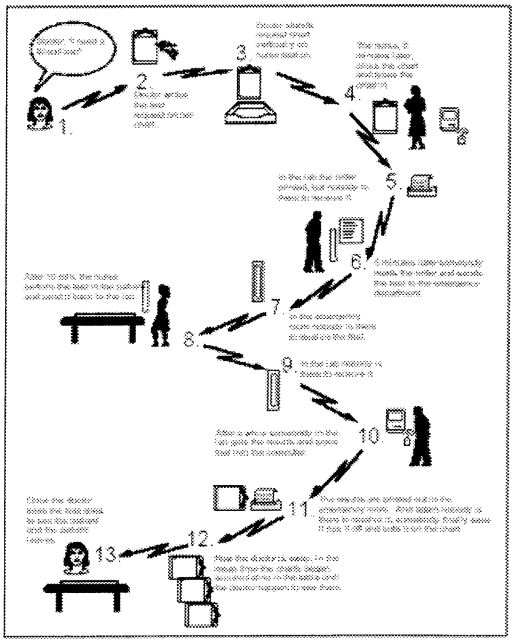

Figure 5. On the left is example of a conversation workflow that occurs when a doctor requests a lab test to be performed. for a patient. in a traditional emergency department. On the right is a diagram showing the redesigned activity workflow by using hand-held computers and audio communication devices in the same emergency department.

The image to the left of figure 5 shows a typical example of the activity workflow that occurs when a patient enters an emergency department in many hospitals today. As part of the design solution, the architects specified a computer system that will act as an information system for doctors and nurses, which will improve the activity workflow. The new information system includes several technologies such as hand-held computers connected to the hospital computer network by wireless modems and earphones. The diagram to the right is the redesigned process. The new process considerably improved the time a patient spent in the emergency departments. This had tremendous implications on improving the efficiency of the physical design of the building.

KOOLHAAS: THE CYBER-REAL PARADOXES OF DESIGNING A LIBRARY

Rem Koolhaas with his new office AMO (the mirror name of his former office OMA) is attempting to provide design solutions that are not only translated into creating buildings but in some cases destroying them. Koolhaas began to re-invent his traditional office during the design of the 90 million dollar Seattle Public Library. Koolhaas says that the major question confronting an architect, when designing a library today, is not how the library should be, but if we really need a central public library at the beginning of this digital century. He said, "there is certainty that there will be books, but uncertainty about the varieties of other media" (Wolf 2000). The problem with this uncertainty is that one can make major mistakes in the program of a building which could be replaced for example by a large data-base and a delivery system of books with 100 vans. The solution of the OMA/AMO office for the Seattle Library project was to maintain the building infrastructure. The reason was political and psychological for retaining the North American understanding of what a public library is. However, according to Koolhaas, the design solution for the building is a large database, not digital, but analog. The physical distribution of the library follows the ordering of information in the library computer system. The objective is to create a predictable space so that the user can search for a book or any other type of information in the computer.

Koolhaas's initial intuition in Seattle was quickly formalized in other new projects in development today. "The relationship between the virtual and real space, in commerce, is deeper," says Koolhaas. The more that is spent on electronic commerce, the more need there is to capture potential customers in anyplace and at anytime. There is more need to develop real spaces that have political and psychological impact. OMA is designing stores for Prada in three cities in the US: San Francisco, Los Angeles, and New York. The stores not only sell clothes, but they are the psychological support of the brand. The proposal of Koolhaas' office is to incorporate cultural and hip programs to the traditional clothing store. The idea is to transform these three stores into a pilgrimage destination inside those three world cities. The new combination, OMA/AMO, began to develop another dimension to this project. They began to collaborate with one of the most renowned firms in product and brand design: IDEO. Koolhaas is working with IDEO in order to create a means to dis-

tribute the events and architecture of the three Prada stores in cyberspace. So, while OMA designs the physical space of shopping, AMO is trying to reformulate how you shop by embedding technology in the stores with maximum invisibility.

Rem Koolhaas, in a recent interview, said that the objective of his new organization AMO is "to test the basic proposition of the new economy: the fewer atoms you move, the more money you make...is to invent speculative strategies that don't take geographical space" (Wolf 2000). For Koolhaas and OMA, the "virtual architecture kills three birds with one stone: it offers payment for concepts instead of concrete. It delivers something to clients that match the velocity of their demands. And most important, it supplies an ingenious antidote to claustrophobic global development" (Wolf 2000).

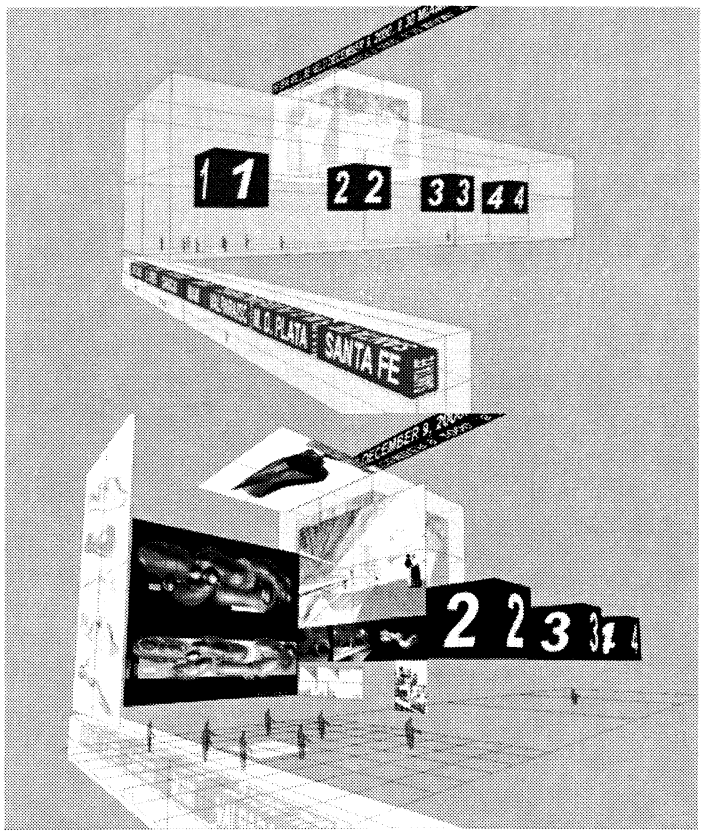

Figure 6. The "Virtual Design Studio Space" prototype named "iStudio." at Florida International University, investigates the software design and human behavior of architectural studio life with digital conditions. One of the most important aspects in a virtual world is the need to rebuild the human body. Avatars and audio chat are introduced to develop a sense of scale and community.

CONCLUSION

The four cases, presented above, are more than a temporary design formula. They reveal a flamboyant new state of freedom in architecture that is not compromised with the formal and aesthetic preoccupation of physical space. It is an architecture that produces and imagines at the threshold of the built and the un-built worlds. Human activities are no longer "functions" in space, but "actions" that can occur anytime and anywhere in real or virtual places. The emergence of an urbanity based on "action," rather than on "function," can have important implications to the cultural framework of "design" that has dominated architecture for near 130 years - since the writings of architects such as Viollet-Le-Duc (Viollet-Le-Duc, 1875) and Louis Sullivan (Sullivan, 1956).

Design - either of infrastructures, computers, or human systems - in the digital era, can not only improve the physical conditions of humans but can also drastically advance our capacity to interact - the ultimate potential of urbanity. The most important theoretical claim presented in this paper is that architecture, in a cyber-real era, can no longer be based exclusively on traditional notions of function, form, and aesthetics, but on the study of "action" that grows from the writings of philosophers like Austin (1962), Searle (1969, 1979), Dreyfuss (1972), and computer theorists such as Flores and Winograd (1996). Summarizing, these authors say that human interaction occurs only ultimately at the level of human conversation. Language creates worlds. They say if designers can understand how we converse then we can improve the method in which we shape computer systems, organizations, and human spaces.

Each one of the cases presented in this paper demonstrates a new capacity for architects to observe human conversations in space. By following that principle each solution is modified not only by the visual and corporal experience of the user, but is improved by the design of the actions and communication processes of the activity itself.

REFERENCES

Austin, J. L., *How to do Things with Words.* Cambridge: Harvard University Press, 1962.

Benedikt, Michael / editor. *Cyberspace: First Steps.* Cambridge: MIT Press, 1991.

Boyer, M. Christine. *CyberCities: Visual Perceptions in the Age of Electronic Communication.* New York: Princeton Architectural Press, 1996.

Castells, Manuel. *The Informational City: Information Technology, Economic Restructuring, and the Urban-Regional Process.* New York: B. Blackwell, 1989.

Dreyfus, Hubert L. *What Computers Can't Do: a Critique of Artificial Reason.* New York: Harper & Row, 1972.

Greenfield-Sanders, Timothy "The Computer School," *Architecture Magazine*, (September 2000): 93 –108.

Lynn, Greg. *Animate Form.* Princeton, N.J.: Princeton Architectural Press 1998.

Mitchell, William J. *City of Bits: Space. Place. and the Infobahn.* Cambridge: MIT Press, 1995.

Negroponte, Nicholas. *Being digital.* New York: Knopf, 1995.

Searle, John R. *Speech Acts.* Cambridge: Cambridge University Press, 1969.

Searle, John R. *Expression and Meaning: Studies in the Theory of Speech Acts.* Cambridge University, 1979.

Sullivan, Louis H. *The Autobiography of an Idea.* New York: Dover Publications, 1956.

Van Berkel, Ben and Bos, Caroline. *Move.* Amsterdam: UN Studio & Goose Press, 1999.

Viollet-Le-Duc, Eugène Emmanuel. *Discourses on Architecture.* Boston: J.R. Osgood, 1875.

Winograd, T. and Flores, F.. *Understanding Computers and Cognition : A New Foundation for Design.* Norwood, N.J.: Ablex Pub. Corp., 1986.

Wolf, Gary. "Exploring the Unmaterial World," *Wired Magazine* (June 2000): 309 - 319.

The Evolution of Form:
Exploring Algorithms as Form Determinants in Design

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INTRODUCTION

> *"A person doesn't really understand something until he teaches it to someone else. Actually a person doesn't really understand something until he can teach it to a computer, i.e. express it as an algorithm. The attempt to express it as an algorithm leads to a much deeper understanding than if we try to understand things in the traditional way" (Knuth, 1976, p. 709).*

This paper explores algorithms as form determinants design using the built in programming languages of Computer-aided design systems (CAD). The process involves defining design rules that are programmed into the computer. Several concepts like recursion, random generation and shape grammars are explored in order to produce a wide variety of possibilities. Two models utilizing the AutoCAD's Autolisp are presented in this paper. The first examines a parametric Autolisp routine developed for Le Corbusier, and the second explores genetic programming using elements from Corbusier's design style. The examples involve sets of instructions, which are the rules input into the computer. The user is then prompted for some parameters, and the computer executes the solution. The programs contain variables that incorporate the rules so that the results are not repetitive. The objective is to utilize the inherent properties of computers to generate a wide range of unexpected design alternatives. As a solid modeler, AutoCAD uses closed volumes as its primitives and a series of operations for inserting, deleting, reshaping, and positioning that allow for manipulating form. The programs involve manipulation in the three-dimensional world utilizing the X, Y, and Z coordinates. Such explorations permit the development of certain routines and transformations that are in line with design principles.

GENERATIVE THEORIES IN DESIGN

Since the Roman times, designers have been using generative theories to develop plans and work out the most appropriate plan from several alternatives. In the 19th century "Ecole Polytecnique" and "Ecole des Beaux Art" designed by exploring several ways in which elements of a fixed vocabulary could be assembled in different combinations to generate architectural form. Durand's Precis des Lecon's d Architecture (1803) also suggested ways in which sets of potential plans and elevations combinations can be generated.

Twentieth century architects used three-dimensional volumes in composing design. For example, Le Corbusier used a vocabulary of basic volumetric elements and assembled them into complex architectural composition. Likewise, Frank Lloyd Wright gained inspiration from his early childhood froebel blocks. Many of his designs emerge from a process of taking simple volumes and intersecting them in space to create form. More recently, Coates, Healy, Lamb, and Voon (1997) have employed generative modeling to generate limitless instances of forms by random growth, addition, and decomposition. The process involves computation of algorithms, algebra, and variable combined with design knowledge. The concept involves finite sets of relatively simple rules which result in complex outcomes (i.e. complexity from simplicity). The rules are explicit; their values are assigned, manipulated, and selectively applied. Generally, design has a number of components in relationship to one another and therefore has two aspects: the number of components and the relationship between components (i.e. objects and rules). The rules distinguish a random pattern of objects from a significant design. The rules can be employed in composing and decomposing architectural objects as generating or analytical tools.

The design process disseminated in this paper relies on identifying design rules and their relationships and utilizing concepts such as bottom-up/top down approach, shape grammars, and algorithms. The author also explores the development of design grammars in order to utilize the inherent potential of computer-aided design systems as design tools through programming and not just as drafting tools in design.

BOTTOM UP/TOP DOWN APPROACH TO DESIGN

Mitchell (1990) notes "if we approach architectural composition in bottom-up fashion, we rely on our knowledge of the formal and functional characteristics of given architectural vocabulary elements to suggest feasible and useful ways of putting them together in composition. Conversely, if we approach design in top-down fashion, we rely on our knowledge of formal and functional characteristics to suggest appropriate choices and adaptations of elements to pro-

vide given functions in given contexts. In either case, our knowledge of how to select, shape, and put things together to serve architectural purposes can be expressed in the form of shape rules "(p. 234).

Fawcett and Woljtowicz (1986) note "a complete design is the end product of a process that begins with a vocabulary of well-defined components"(p.26). In the bottom up approach, the process of design involves a selection of components from the vocabulary, placing the first one and adding others successively assembles the design. In contrast, the top down compositional technique starts with an abstract form, which is elaborated until it is transformed into form. Here we have a comparative research methodology of the black box versus glass box respectively, demonstrated in the creative process that generates form. Both approaches rely on knowledge of a given vocabulary and sets of relatively simple rules which result in complex assemblies (i.e. complexity from simplicity).

SHAPE GRAMMARS

Frank Lloyd Wright (1954) stated in the Natural house that "every house worth considering as a work of art must have its own grammar" (p. 296-297). He also stressed the importance of consistency in grammar and the importance of a design having a language of its own. Stiny (1980) defines "shape grammars as a set of initial conditions, a lexicon of primitive objects, and syntax of transformations on those objects".

Fawcett and Wojtowicz (1986) define "shape grammar as a principle by which vocabulary elements can be put together, and inherent in a grammar is the set of mappings between vocabulary elements such that certain grouping of elements can be transformed to another group"(p.43-67).

The process has been demonstrated in producing line drawings that resemble those of Palladio by Stiny and Mitchell (1980) and Frank Lloyd Wright's villas by Koning and Eizenberg (1981). Shape grammars have been employed by Richard Coyne (1988) to describe algorithms for performing arithmetic operations on geometric entities called shapes.

More recently, Coates and Makris (1999) have incorporated shape grammars and genetic programming in spatial composition by starting with sets of geometrical structures and their relationships. Their approach uses genetic programming with a library of objects in a genetically bred computer program. The concept of design vocabulary is used to enable a simplistic definition of the rules which can be input as points, lines, volumes, shapes, and primitives in a computer algorithm for the exploration of alternative solutions.

RESEARCH MODELS

The following two research models illustrate experiments in form generation in Autolisp, AutoCAD programming language. The first is a parametric Autolisp routine for Le Corbusier and the second explores genetic programming using elements from Le Corbusier's design style.

MODEL I: PARAMETRIC AUTOLISP ROUTINE FOR LE CORBUSIER

In Le Corbusier's own summary of his main architectural elements, he identified in his buildings the following five points of Architecture: Pilotis, Roof Garden, Free plan, Ribbon Windows, and Free Facade. The Pilotis raised the building off the ground into the air and allowed for the space underneath to be used for parking cars, road, or gardens. Space lost was replaced on the top by a roof garden which was a space open to the sky, containing greenery with a view all round. Free planning was possible since the frame carried the weight and partitions were organized independently (e.g. some were curved to express their freedom and function). Ribbon Windows were located from side to side of the facade horizontally lighting the whole interior evenly and giving maximum view. The Free Facade portrayed the exterior walls as non-load bearing, thus reemphasizing the inherent potentials of a frame.

Le Corbusier employed this five points in three main combinations: firstly, as a membrane stretched over reinforced concrete frame where walls enclosed the columns; secondly, setting the walls back from the main structural frame; and third, as mass penetrated.

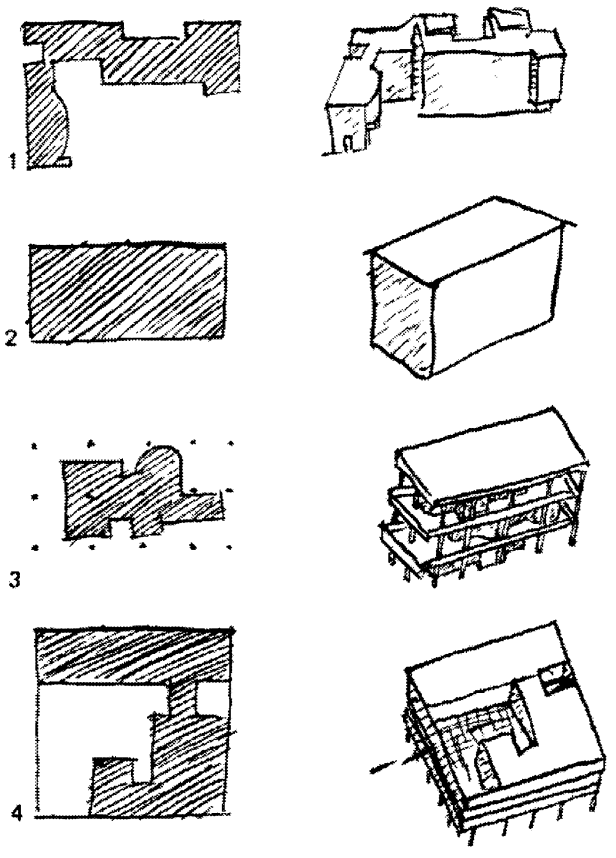


Figure 1 illustrates three main combinations of Le Corbusier's Five points of Architecture.

Table 1 - summarizes major elements from Six of Corbusier's buildings The following buildings were chosen because of their similarities, size, simplicity of language of design and relationship to the five points of architecture, which is the starting point of the design algorithm.

Project	Building Form	Major Elements	Spaces
Citrohan House project 1920	Rectilinear and cubical in configuration. The building is subdivided into two cubical forms.	Double height space in living room External staircase Interior spiral stairs Zoning-Living, cooking, dining and sleeping.	Living, gallery, roof terrace, bedroom and kitchen.
Villa at Vaucresson 1922	Double cubic form, building form based on relationship between two masses. Contrast between smaller vertical and larger horizontal elements	Sloped site Entry is placed between two masses Clearly defining major and minor elements. Detached staircase Main axis parallel with road.	Living, dining and bedrooms.
Houses for Workers, 1924	Cube with triangular Upper floor slab	Double height living room Three activity zones Diagonal reinforced with straight flight of stairs. Minimum accommodation requirements	Living, dining, Bedroom and kitchen.
Weissenhof house 1924	Rectilinear configuration. Building raised on pilotis	Main staircase is enclosed Roof terrace Curved elements control movement Pilotis imply garage is underneath building and living room on the 1st floor. 3 columns in transverse direction 5 columns in longitudinal direction. Double height living spaces	Roof terrace, living, bedroom, dining and kitchen.
Villa at Garches for Michael Stein, 1927	Large scale domino structure. Mass around the reinforced concrete frame.	5 columns in longitudinal and transverse direction. 5,2.5,5,2.5,5 an ABABA relationship longitudinally. 1.25,4,3,4,1.25 an ABCAB relationship transversely. Two apsidal staircase Convex and concave walls define spaces. Free forms. Apsed hammerhead forms.	Living, dining, Bedrooms, gallery and roof Terraces.
Villa Savoye, 1929-31	Contrast between enclosed and open spaces. Building raised on pilotis.	Central Ramp Pilotis. Roof Garden 5 bays in longitudinal and transverse direction. Curved elements encloses and defines circulation and major axis. Entrance on the curved wall	Living, dining, Bedrooms, gallery and roof Terraces.

Table 1 summarizes major elements from six of Corbusier's buildings.

The buildings were chosen because of their similarities, size, simplicity of language of design and relationship to the five points of architecture, which is the starting point of the design algorithm.

Another design configurations used by Corbusier such as the Interlock system had elements locked around the service stack (Baker, 1986). Since the frame of the building carried the load, part of the floor slab was taken out to create double height rooms or semi-open spaces. The facade was also opened at any level or removed entirely or became sunshades with the walls set back from the facade. The reinforced concrete frame and slab formed the basis of Le Corbusier's main design approach, and within this cage various activities of the building were accommodated. The structural elements were organized to easily accommodate circulation elements.

Program Rules

The program rules were based on the main elements of Le Corbusier's architectural style and classified under the following main categories:

1. Orthogonal Cage determination
2. Circulation
3. External walls
4. Main curved elements of interior

These categories were further elaborated into rules specifying points, vectors, polygons, and other graphic tokens that could be interpreted in Autolisp.

Orthogonal Cage Determination

The orthogonal cage represents the structural frame and the rules were based on the following:

Rule 1. The structural grid system was based on the number of columns in the transverse and longitudinal direction of the building. The relationship between the longitudinal and transverse axis are based on proportions identified in Le Corbusier's design and interpreted in this project as an ABC relationship. This is interpreted in the program in an X and Y-axis. A represents the distance between the columns in the X axis; B varies between being equal to A, 0.5A to 0.75A; and C exists when there are multiple column grid spacing in the X axis.

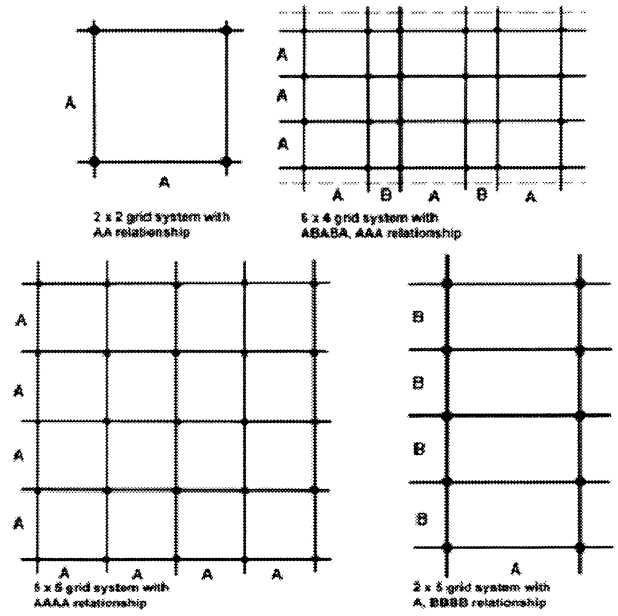


Figure 2 illustrates some grid rules.

Rule 2. Like Le Corbusier after the determination of the column grid, a major axis is defined in the X or Y-axis. The rule is to place the major axis in the Y direction if the number of columns in X was greater than in Y and vice versa.

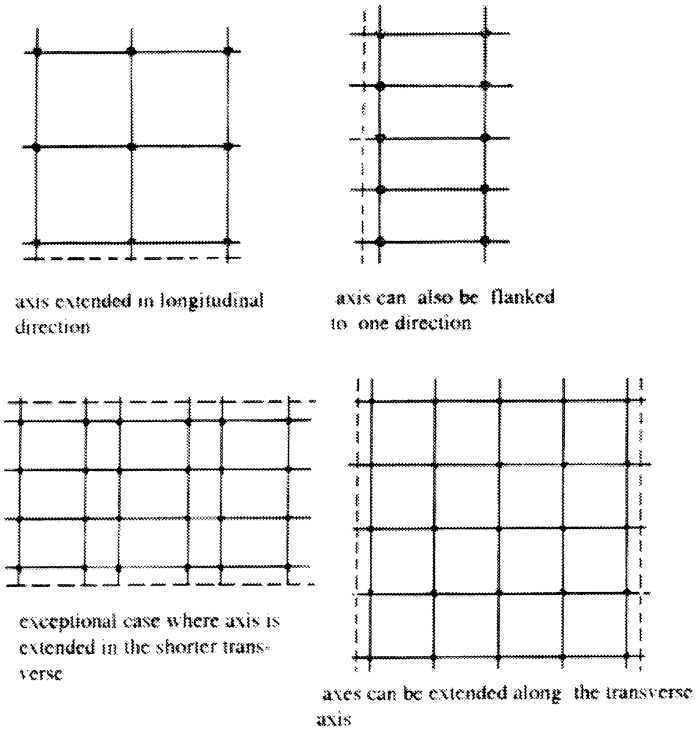


Figure 3 illustrates rules for axis determination.

Rule 3. Randomly determine the number of floors between two, three and four.

Rule 4. Place the living room position either on the first or second floor.

Circulation

The vocabulary of circulation elements were dogleg, spiral, straight flight apsidal staircases, and ramps as identified in Le Corbusier's buildings.

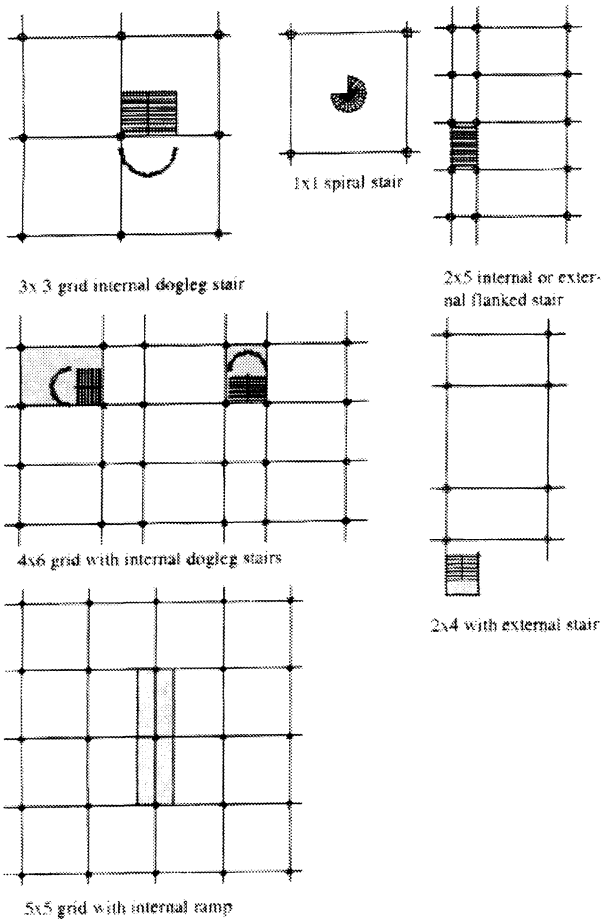


Figure 4 illustrates vocabulary of circulation elements.

Rule 1. Spiral staircases are placed in buildings with two columns in the X and Y-axis.

Rule 2. A straight flight of stairs is flanked to the side when placed in a three by five grid.

Rule 3. A ramp is placed in a five by five grid.

Rule 4. Two apsidal stairs are located in a five by three column grid.

Rule 5. External dogleg stairs are in a three by five column grid.

External Wall Placement

The placement of the structure's external walls were based on three main criteria: firstly, a membrane around the structural frame; secondly, set back from the structural frame; and thirdly, around the structural frame and raised on pilotis.

The following rules were applied:

Rule 1. If the number of floors equals two, then the external wall is a membrane around the structural frame.

Rule 2. If the number of floors equals three or four, then the buildings could be raised on pilotis or set back from the reinforced concrete frame or a membrane around structural frame.

Main Curved Elements of Interior

Corbusier utilized a variety of curved elements in his building interior since partitions were non-load-bearing. Their independence was usually reflected in their free organization, and curved elements were concave and convex in form.

Rule 1. Curved elements defined building entrances.

Rule 2. Curved screens defined terrace floors.

Rule 3. Curved elements defined circulation elements.

Rule 4. Ramps were enclosed by curved elements.

Programming

AutoCAD's built in programming language Autolisp was chosen based on AutoCAD's adaptability and popularity. Autolisp is derived from common lisp and can be customized to specific needs. Lisp presents information in form of lists. Lisp is known to be the most extensive of computer languages; it has about 200 to 300 built-in functions, and programmers can also create their own functions. In lisp, functions are used to express data and programs.

In the program, separate functions were written for main elements like the column grid, circulation elements, terraces, curved screens, external wall placement, etc. The functions were given separate arguments based on the rules, and a main function evaluates all these separate functions. The use of randomness was incorporated so that the program determines the evolution of the design and thus explores architecture as self-generated.

The Autolisp routine is loaded from the command prompt in an AutoCAD drawing file, which then prompts the user for a random number function. The user can input a random number between 0 and 32567, then the program by itself selects a column grid system based on the program rules. Upon determining the column grid system, it determines the number of slabs, types of external faces, elements of interior, and then the curved screen. Figure 5 to Figure 7 illustrates some of the "Corbu" like prototypes generated

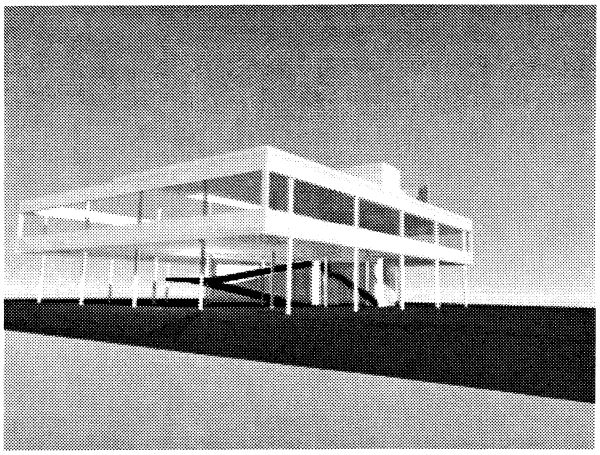


Figure 5 illustrates generation from random no. 13.

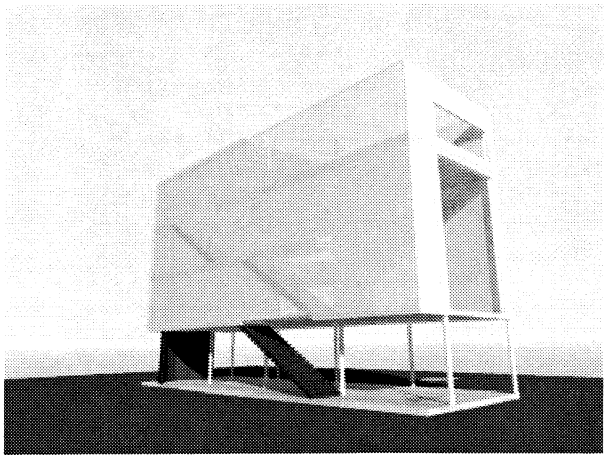


Figure 6 illustrates generation from random no. 35.

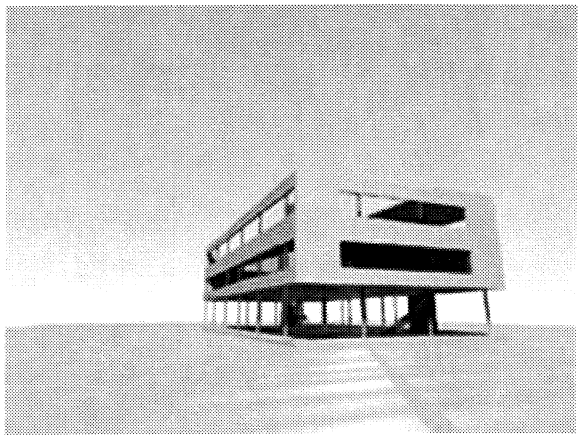


Figure 7 illustrates generation from random no. 119.

Main part of 16 page Autolisp Routine

```
(defun c:bay ( / )
    (setvar "cmdecho" 0)
    (solservmsg 0)
    (command "ucs" "w")
(command "layer" "make" "0" "")
    (command "erase" "all" "")
(setq p1 (list 0 0 0)
        rad  0.1 (getreal "enter radius of column")
h  3.0
seed(getint "seed value for random number function"))
(setq a(getreal "max dist between cols"))
(setq choice (fix (rand 1 4)))
(cond ((= 1 choice)(setq b (/ a 2)))
((= 2 choice)(setq b (* a 0.75)))
        ((= 3 choice)(setq b a)))
    (setq colx (fix (rand 2 6)))
    (setq coly (fix(rand 2 6)))
    (setq ch(fix (rand 1 4))
        makeit T copyouter T)
(cond  ((and (= colx 2)(= ch 1))(setq coly 2 makeit nil))
        ((and (= colx 2)(= ch 2))(setq coly 6))
        ((and (= colx 2)(= ch 3))(setq coly 5))
        ((and (= colx 3)(= ch 1))(setq coly 3))
        ((and (= colx 3)(= ch 2))(setq coly 6))
        ((and (= colx 4)(= ch 1))(setq coly 2))
    ((and (= colx 4)(= ch 2))(setq coly 6))
    ((= colx 5)(setq coly 5 copyouter nil))
    ((and (= colx 6)(= ch 1))(setq coly 2))
    ((and (= colx 6)(= ch 2))(setq coly 4 copyouter nil)))
(command "layer" "make"  "cols" "")
(setq tp(colgrid p1 (list a b) b coly colx makeit copyouter))
```

```
(command "layer" "make"  "slabs" "")
(setq h1  0.2)
(setq slabnum (slab p1 h1 tp ))
(command "layer" "make"  "external" "")
    (setq face (external))
    (terrace)
    (command "layer" "make"  "steps" "")
    (stairsNstuff)
    (openings)
    (command "layer" "make"  "duct" "")
    (stack)
    (curvescreens)
    (command "zoom" "e"))
```

MODEL II: GENETIC PROGRAMMING

This model explores genetic programming using elements from Le Corbusier's vocabulary. Genetic programming allows the parallel exploration of design worlds defined by initial axioms and production. The aesthetics of the end product depend entirely on the initial grammar. A good set of axioms and production may lead to success, while badly chosen axioms may lead to small design worlds. Coates P. and Makris D. 1999 note "a well chosen grammar leading to a large number of non-trivial design worlds increases the likelihood of finding a suitable candidate as the solution to a properly posed problem"(p. 4).

In genetic programming the basic idea is that architecture results from the multiplication of simple relationships. The range of moves available when exploring by hand are limited. Coates and Makris, 1999 note "the use of a recursively defined generative grammar using genetic programming allows for recombination and embedding of morphological moves to any level of complexity required"(p. 2).

Program Rules

This model starts with some basic configurations from Le Corbusier's vocabulary; the columns, slabs, and column grid relationships already identified in the previous algorithm represent the initial conditions. In the Autolisp program, the geometry of the initial conditions are defined and a set of transformation defined in the x, y, and z axis. These transformations like the previous model are based on an ABC relationship, where A represents the distance between the columns in the X axis and B represents the Y axis and varies between being equal to A, 0.5A to 0.75A and C exists where there are multiple spacing in the x axis. In the Autolisp routine the first generation of eight objects are generated from this initial conditions, and the user has control over future generations by selecting two parents from this generation to be mutated

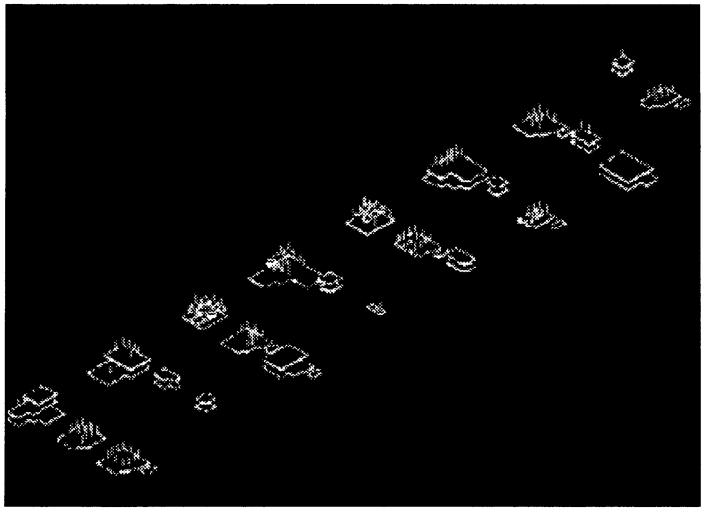


Figure 8 illustrates generation from GP for Le Corbusier – Random seed 1. Probability of mutating 2. No of Generations 2. Parent of Row 2 = 1&2. Parent of Row 3&4.

The Autolisp routine presents configurations that are similar to Le Corbusier's and the mutations are driven by visual judgement, which encourages cooperation between the computational power and human creativity. The resulting forms at this stage illustrate that an evolutionary approach is related to the process of generating composition. Coates 1999 suggests "that a complete examination of the implication of genetic programming in architectural design would necessarily reflect the inevitably complex and dynamic character of architecture, and draw some lines towards methodologies to model brief and space"(p.3).

CONCLUSION

Coates and Makris (1999) note "the basic design problem consist of the prediction composition of the solution from primary determinants. Different design strategies contain different theories to approach the compositional problem. The problem is that though it is relatively easy to determine the putative structure of the problem, the determination of its possible formal structure is extremely difficult. Furthermore, the problem definition (brief, program, criteria matrix, bubble-diagramming etc.) does not imply a solution, but rather should form a basis for testing possible configurations"(p. 3).

Exploring design algorithms present an opportunity to examine a wide variety of possibilities and unexpected alternatives. Exploring algorithms in form generation highlight the importance of rule based systems as an integral part of the design process and rules can be modified to systematically define a new language of design

that reflect changing circumstances and incorporates new ideas. The process offers an opportunity to develop a deeper understanding of the design process through defining simple rules in form of grammatical relationships between design. The process contributes to the human technology interface debate and serves as a starting point for utilizing CAD systems in generating design rather than utilizing them merely as rendering and drafting tools. Perhaps, as expertise in visualization skill increases within the profession, the development of design algorithms through automated systems becomes an area that needs to be explored by designers, to utilize computers to their fullest capabilities in creative thinking and problem solving.

Since the range of solutions available when exploring by hand are limited by the increasing complexity of the design, the next step of this research is to introduce this methodology in studio and digital media classes. The author does not propose to diminish the designer's capability in anyway; it should be noted that the end product strictly relies on the chosen axioms defined by the designer. A well-chosen grammar results in the likelihood of finding more possible design solutions. The methodology proposes alternative creative techniques and offers the designer an opportunity for exploring a wide range of design possibilities.

REFERENCES

Asojo, Abimbola O. "A Design Algorithm After Le Corbusier," *Proceedings of the Association of Collegiate Schools of Architecture Technology Conference.* Montreal, Canada,(June 25-27, 1999): 110-115.

Baker Geoffrey H. *Le Corbusier: an Analysis of Form.* New York: Van Nostrand Reinhold Co. Ltd, 1996.

Boesiger Willy. *Le Corbusier.* Barcelona: Ingoprint, 1992.

Coates, Paul; Healy, Neal; Lamb, Chris; and Voon, Wi. "The use of Cellular Automata to explore bottom up architectonic rules", Proceedings of the Eurographics UK Chapter 14 Annual Conference, Imperial College, London, UK, (1997): http://www.ic.ac.uk/rer01/cfp.html

Coates Paul. and Makris Dimitris. *Genetic Programming and Spatial Morphogenesis.* London: CECA, 1999.

Coates Paul, Thum Robert and Walker Miles. *Generative Modeling Workbook.* London: CECA, 1998.

Corbusier Le. *Towards a New Architecture.* New York: Dover Publication, 1986.

Coyne, Richard. *Logic Models of Design.* London: Pitman Publishing, 1988.

Hillier, Bill and Hanson, Julienne. *The Social Logic of Space.* Cambridge: University Press, Cambridge, 1988.

Jean-Nicholas-Louis Durand, *Partie graphique des cours d'architecture faits a l'Ecole Royale Polytechnique* . Paris, 1821.

Knuth, Donald E. "Computer Science and Mathematics", *American Scientist* 61(1975):709

Koning H. and Eizenberg J. "The Language of the Prairie: Frank Lloyd Wright's Prairie Houses" *The Environment and Planning B8* (1981): 295-323.

Mitchell, William. *The Logic of Architecture.* Massachusetts: The MIT Press, 1990.

Stiny George "Introduction to Shape and Shape Grammars" *The Environment and Planning B7* (1980): 343-51.

Stiny George and William J. Mitchell "Counting Palladian Plans" *The Environment and Planning B5* (1978b): 189-198

Wojtowicz Jerzy and Fawcett William, *Architecture: Formal Approach.* London: Academy Editions/St. Martin's Press, 1986.

Wright Frank Lloyd. *The Natural House.* Ohio: Meridian Books, 1960.

Interdisciplinary Design Culture

Moderator: David Brown, Rice University

Bounding Space:

A Cross Disciplinary Foundation Design Unit

JEFF DAY
BRIAN REX
University of Nebraska—Lincoln

Late Modernity and the Dilemma of *Intra*disciplinary Discourse

PATRICIA MEEHAN
University of Arkansas

Bounding Space:
A Cross-Disciplinary Foundation Design Unit

JEFF DAY
BRIAN REX
University of Nebraska—Lincoln

Streamlining becomes here an organic force as it relates to the dynamic equilibrium of the motion of the body within encompassed space. —*Frederick Kiesler, "Pseudo-Functionalism in Modern Architecture*

Whatever occupies space always forms the border between an outside and an inside. But the interior is really only an exterior lying farther back. But where in the world would there be an outside and an inside, if not in space?
—*Martin Heidegger, "The Thing"*

INTRODUCTION

The cognition and description of spatial conditions are essential components of any foundation for the design and visual arts. However, the ability to discern subtle spatial distinctions and the limits of spatial boundaries is often clouded by habit and apparent familiarity with the conditions in question. For example, one thinks one "knows" the spatial make-up of one's bedroom, but can one really see the space of the room from a position outside of this perceived familiarity? Or, to invert the question, how can one know a space that one sees with new eyes? Perhaps we need to take Paul Valery to heart when he suggests that; "to see is to forget the name of the thing one sees."

The process of seeing a thing is a process of defamiliarization. This process involves an abstraction of the familiar object (or space) which allows one to step outside of the familiar and habitual understanding of the thing. Orthographic Architectural drawings can be part of this process, but as Frederick Kiesler wrote, "The floor plan is no more than the footprint of the house. From a flat impression of this sort it is difficult to conceive the actual form and content of the building. If God had begun the creation of man with a footprint, a monster all heels and toes would probably have grown up from it, not man." The process must be spatial.

This inter-disciplinary design unit provides first year Visual Literacy students with both foundation skills and a glimpse into the mysteries of the familiar by focusing on a particular aspect of the formal: Boundaries. As the second semester Form Unit, the three-week unit expands the first semester's emphasis on the superficial qualities of surface to a fully three-dimensional and robust understanding of Form. In the work presented here we illustrate the developing categorizations of Boundaries that range from actual, precise, and material (Bona Fide) limits to spatial, legal, immaterial, and ephemeral (Fiat) boundaries. These terms are introduced in the studio as part of an effort to help the students develop not only a complex understanding of form and space, but also a view of design as the resultant vector of an analytical approach to a place. For the purposes of the Form Unit, all projects share a common ground as analyses of the student's most familiar place, her bedroom.

THE COURSE WITHIN THE UNIVERSITY

Visual Literacy is a three-year-old cross-disciplinary instruction unit that encompasses a learning community of Textile and Clothing Design, Architecture, Interior Design, and Fine Art students in their first year of foundation design education. The pedagogy we present here is a four week long unit (with 9 hours of contact time per week) in a two semester long program. Each faculty member teaches one of four thematically charged instructional units through which groups of students (20 students per studio) rotate over the course of a semester. The thematic foci of the four units are Drawing, Color, Frame (composition), and Form (the subject of this discussion.) Though taught by architecture faculty, every effort is made to keep the Form rotation focused on an interdisciplinary, foundation design sensibility rather than allowing the study of Form become "the architecture unit."

PATHS OF STUDY THAT RUN THROUGH THE COURSE

Of the roster of students who enter the "Vis Lit" program it can be expected that less than two-thirds will matriculate through professional design programs of study in which they will learn to actively alter the environment around us through Art, Architecture, Interior Design, or Textile and Clothing Design (TCD). Statistically, the number of students who do not pursue one of the design arts through to graduation may be approximately one-third. Stat source?? Therefore, in its position as an introduction to the world of the arts it

seems Visual Literacy exists for two fundamental reasons: 1. to begin design foundation curriculum instruction for a set of students who will go on to traditional roles in the design fields, and 2. to offer an opportunity to those students who, if given the tools, appreciation, and understanding, can impact the visual arts as intellectual patrons or simply through the application of design principles in everyday life.

An analogous pedagogical model could be drawn from Italy where one of the most common "first degrees" (bachelor's level) in college education is an architectural one. The goal of such programs is not to mould each student into a practitioner or to flood the professional market with architects, but to use architectural training as a strong and broad "liberal arts" foundation for further study in a variety of fields. In Italy, architecture is understood as a valuable and canonical appreciation to have in any segment of society. To put the position of the Visual Literacy Program within the university more succinctly, we are teaching both the fundamentals of design and basic design culture with the same pedagogy. Design culture includes worlds of patronage, fetish, appreciation, connoisseurship, criticism, and fellowship through the creative arts. To ignore or downplay the opportunity for the immersion of a broad collegiate community in design culture through the Visual Literacy program is to miss (at least) half the opportunity at hand. What is needed is a pedagogy in Visual Literacy that teaches the superficial qualities of Form and Form-Making to all student Visual Literacy tracks in an engaging way that neither becomes "design for non-majors" nor a "Pieta Making 101" course.

THE INTELLECTUAL FOCUS OF THE UNIT

In the same way that direction and speed are the component conditions of Velocity, surface and volume are the elementary conditions almost universally found in three-dimensional Form. Whereas the first semester Form unit focussed on the definition of surfaces as visual and tactile manifestations of material Form (what we call a Bona Fide Boundary,) the second semester adds another degree of complexity with the notion of the surface of an immaterial spatial boundary (a Fiat Boundary). These terms share a topological origin and are best described by the following passage from Barry Smith and Achile C. Vazi:

> *Consider John, the moon, a lump of cheese. These are objects possessed of divisible bulk. They can be divided, in reality or in thought, into spatially extended parts. They have interiors. They also have boundaries, which we can think of (roughly) as infinitely thin slices. The boundary of the moon is the lunar surface. The boundary of John is the surface of his skin.*
>
> *But what of inner boundaries, the boundaries of the interior parts of things? There are many genuine two- dimensional (sphere- and torus-like) boundaries within the interior of John's body in virtue of the differentiation of his body into organs, cells, and so on. Imagine, however, a spherical ball made of some perfectly homogenous prime matter. If the possession by an object of genuine inner boundaries presupposes either some interior spatial discontinuity or qualitative homogeneity, then there is a sense in which there are no boundaries to be acknowledged within the interior of an object at all.*
>
> *Yet we do sometimes speak of inner boundaries even in the absence of any corresponding physical discontinuity or qualitative differentiation. Even in relation to a homogenous sphere we can still talk sensibly of its upper and lower hemispheres, its center of mass, and so on. We shall call the inner boundaries involved in such cases fiat boundaries. Inner boundaries involving spatial discontinuity (holes, fissures, slits) or qualitative heterogeneity (of material constitution, texture, electric charge) we shall call bona fide boundaries.*

In Vis Lit we propose that Bona Fide Boundaries are all physical edges, surfaces, and discontinuities while Fiat Boundaries are immaterial surfaces defined by the movement of a body in space (the student moving in the room.) Thus, the Bona Fide Boundary is defined by walls, windows, mouldings, furniture, and objects within the room. As the Fiat Boundary of a particular event or aggregate of several events is secondary in that it is defined not only by the actor but also by the Bona Fide Boundary itself. We describe the space between the Bona Fide Boundary of the room and the Fiat Boundary as an Interstitial Space. The unit is consequently split into three segments: The first focuses on analyzing and representing the Bona Fide Boundary of the room, the second on the Fiat Boundary as defined by a selection of typical events, and the third on synthesizing this information and discovering the shared Interstitial Space.

Questions that are addressed in this unit are:

What is Space?

What defines and delimits Spaces?

What are the differences between Fiat and Bona Fide Boundaries of space?

How can one graphically record a space?

How can one construct a spatial model from two-dimensional information?

How does motion impact the perception of space?

Are objects prior to the space around them?

The ultimate goal of the unit is to help students look at spaces in a more complex way and to realize that spaces are defined by boundaries. The students explore a range of surface boundary categories (between Fiat and Bona Fide) as they are perceived in the space of a room (their abode) and the non-material spatial boundaries defined by the everyday trajectories of events that occur in their abode. Skills of description, representation, and reconstruction are explored not through design so much as analysis. While this unit plays in the consequences of bodily movement on Form (and vice versa),

other units in the course explore the body in different ways, providing a cohesiveness to the course as a whole.

THE UNIT METHODOLOGY

The unit is made up of a series of highly focused and discrete but additive and incremental exercises where the thoughts and products of one day becomes the basic material for the next. This pedagogic structure, including the discussion about the product that emerges from it, effectively helps to build an understanding that is not based in architecture or any other discipline. A major component of the daily instruction is a time in which the students talk about each other's work in a critical way. In the execution of this critique it is strongly stressed that the conversation about the contents of the work focus on adjectives and verbs on the subject of the analysis rather than the metaphors of external reference. So, statements of fact such as "It is..." rather than "It looks like..." are encouraged. The value of this self-referential nature for the Visual Literacy student is enhanced when it is tailored to be non-representational, and it is open to a diversity of external references in criticism (drapery, landscape, flesh, etc.) The removal of the idea-generating phase of design allows the student to approach making directly and with a modicum of objectivity so the discourse of the studio does not founder on issues of taste. Ultimately, these exercises based in "A-disciplinary" tactics result in solutions for cross-disciplinary strategies demanded by the demographics of Visual Literacy.

THE ROLE OF DRAWING AND OTHER TECHNIQUES:

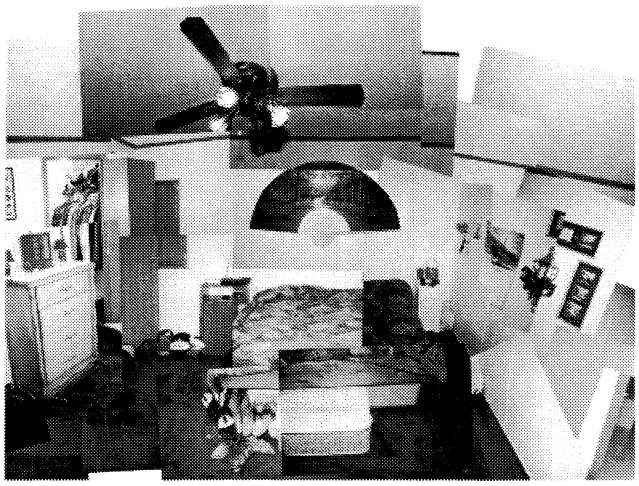
In this unit graphic techniques common to any one disciplinary field are eschewed for methods that are either hybrid, primitive, or obscure within our design disciplines yet invoke a strong lesson in form making. In this rotation drawing has as much in common with a pattern in dress-making, Duchamp's "Standard Stoppages", and templates in graphic design as it does with a tectonic designer's building section. Drawing becomes not only a tool for analysis and description but of abstraction. Traditional orthographic projections (sections in elevational and planimetric orientation) are employed as a means to defamiliarize the visual apprehension of surfaces and boundaries in a room (see the Cardinal and Cat-Scan exercises.) Other techniques are similarly used in sequence to further distance the student's understanding of space from the familiar scenographic representations of space's physical boundaries. Most of these techniques, while utilizing different tools such as the computer and digital media, are understood as various methods of drawing. Techniques such as chrono-photography and digital modeling are used to "draw" time (record time-based activities with lines in space.) The computer is used to draw in three-dimensions by translating two-dimensional information. Chrono-photography collapses the trajectories of a three dimensional event onto a still surface. By moving back and forth between techniques from one exercise to the next the student gains an ability to blend media and methodologies in what Rosalind Krauss has termed a "post-medium condition."

A VISUAL & DESCRIPTIVE UNIT CHRONOLOGY FROM START TO FINISH

The instructors assign each of the following exercises with a lecture on theory and precedents and typically give the students one class interval (two days) to complete the work for an in class pin-up for the next class meeting time.

- Photo-collage of the room

  In the first exercise students are asked to make a photo-mosaic or constructed-frame photograph of the type made popular by the artist David Hockney. With prints from a full role of film, students construct a collage-image depicting the entirety of their room. Unlike a normal photograph, the photo-collage challenges the student to take a more active role in the image making process in such a way that depicting becomes both objective and creative at the same time. These images serve as a reference point for student, the instructors, and the rest of the class of the "familiar" state of the room.



- Catalogs of objects and events which "take-place" within the room

  To better understand the role of possessions in the act of inhabitation and personalizing a room, the students next make a graphic catalog of the contents of the room organized with a clear typological structure. As part of the same exercise, the students make a list of 20 activities that they performed on a typical day in the room. For example:

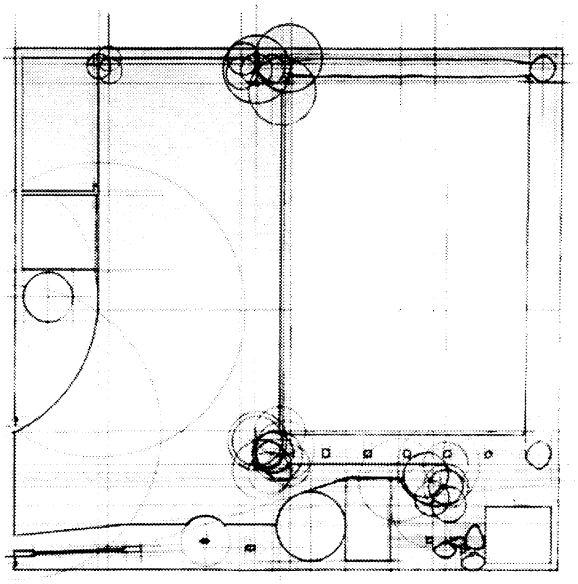
ACTION LIST

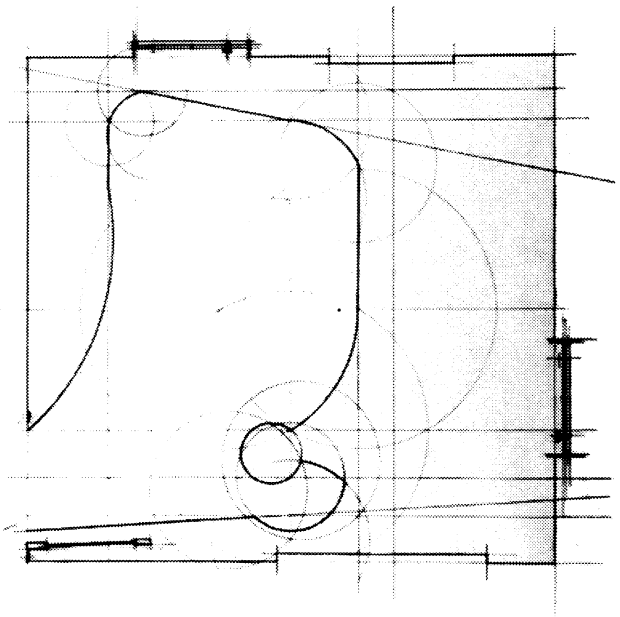
1. sleep
2. get out of bed
3. get clothes out of dresser/closet
4. get dressed
5. put socks and shoes on feet
6. "style" hair
7. apply antiperspirant/deodorant
8. leave room
9. enter room
10. sit in chair thinking of ways to pass time
11. read
12. sip r.c. soda
13. mess with stereo
14. put kraftwerk record on
15. watch pokemon
16. make shoddy attempt at rocking out on base
17. turn kraftwerk record over
18. get snack
19. eat snack
20. watch alf
21. pog
22. use wiffle golf ball as a projectile
23. drink restaurant quality lemonade
24. watch craig kilborn
25. homework
26. remove shoes and socks from feet
27. take off clothes
28. get into bed
29. sleep

The students title and describe each event on a separate 3 x 5 index card so the chronological categorization of the list can be supplemented with other taxonomies. These groupings could be based on duration, intensity, volume of space occupied, superimposition, and so on.

- Cardinal sections of the room

  In the most conventionally architectural exercise, students measure the momentary section through the middle of the room "in situ" through each of the cardinal directions (horizontal at the mid-point between floor and ceiling, vertical side to side, and vertical front to back). These sections



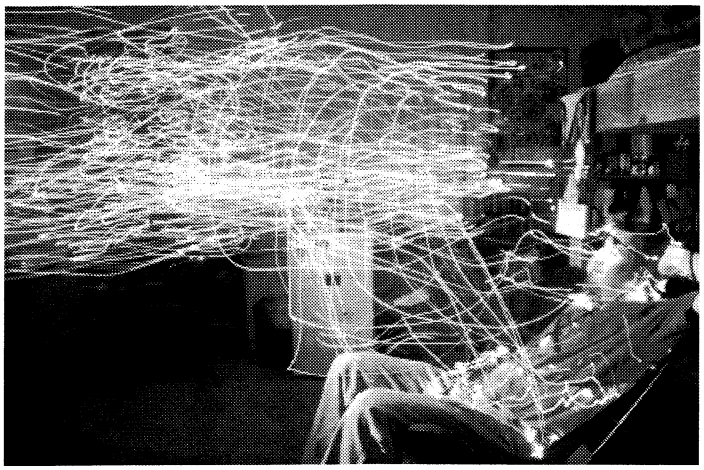


follow the profiles of wall or furniture as the student cuts through a specific part of the room, but they do not show the interiors or construction layers of the objects. Thus, the surface of a piece of furniture becomes continuous with the wall or floor depending on the placement of the object. All construction and "regulating" lines are to be preserved. The line on these drawings represents a Bona Fide Boundary of the room.

- Cat-Scan sections of the Room

  After selecting one of the cardinal section drawings, the student draws a series of sections at one-foot intervals across the entire room in the same orientation with respect to the room as the original. Like the original section, these sections show the profile of any object that they happen to intersect. Drawn on translucent media, these sections overlay to produce an abstraction of the bona-fide bounds of the room in the manner of a series of sections used to create a 3-D image in a digital environment.

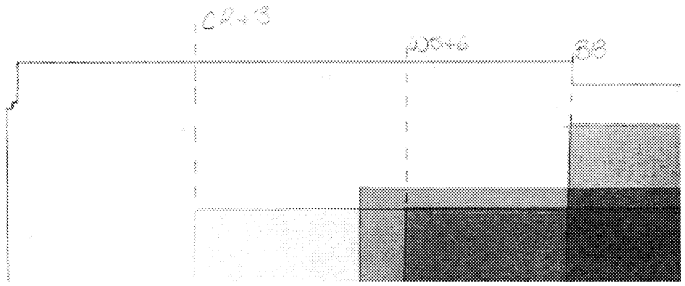
- Chrono-photographic study of activities



But we must not confound the data of the senses, which perceive the movement, with the artifice of the mind, which recomposes it. The senses, left to themselves, present to us the real movement, between two real halts, as a solid and undivided whole. The division is the work of our imagination...like the instantaneous flash which illuminates a stormy landscape by night.

—Henri Bergson

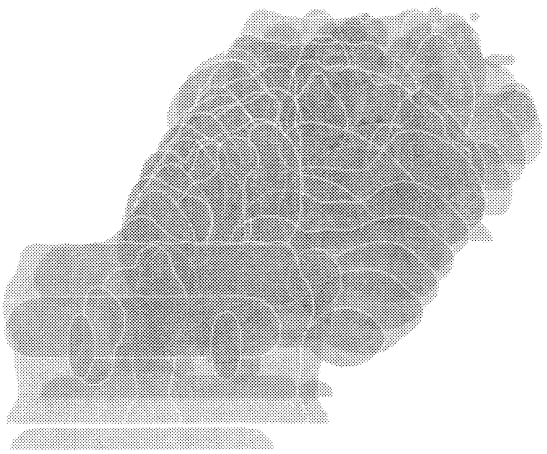
In Matter and Memory, Bergson developed a very clear presentation of what movement is and what relationships can be drawn between movement and matter. Bergson, like many others of his time, was very much affected by photographic studies that collapsed movement (the time-motion studies of Marey or Muybridge for instance). Specifically, he and others were intrigued by how such records of movement should effect the arts. This kind of thinking had profound influence on Futurism, dada, and Cubism. One of the distinctions that can be inferred from Bergson about movement is that there are two ways to measure or quantify movement: 1. in the relative terms of a geometer where things are measured according to something (a coordinated reference) beyond the action in question or, 2. in the real terms of a physicist where things are measured according to conditions internal to the event or action in question. As students begin to find the various bounding spaces of their rooms they will begin with the real and the specific, quantifying individual events or actions by evaluating their own internal structures.

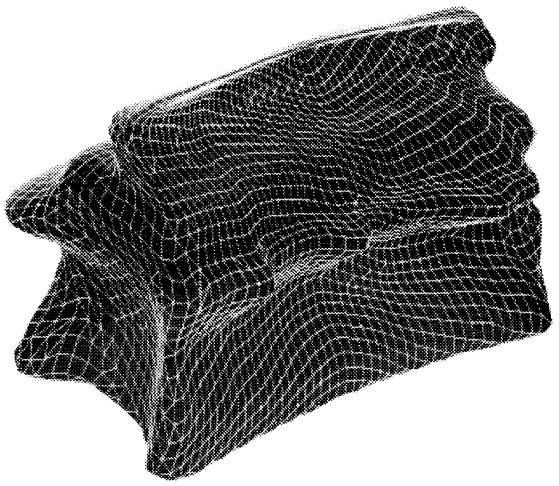


The chrono-photographic exercise adds an element of time to the documentation process and is associated with Bergson's second class of measurement. In collaborative groups of three or four, students make a roll of time-exposed slides documenting several actions as they take place in their rooms over the course of a few seconds or minutes each. Actions and events are represented spatially by the trails of lights worn by the students as they perform the activity before the open shutter. Students select all of the actions introduced into this experiment from the original list made in the second exercise, and when viewed in sequence, the images produce a record of the space occupied by selected groupings from the the event catalog.

- Computer modeling

  With a photographic record of events in space (represented from perpendicular points of view) the students construct three-dimensional computer models in Form-Z of the "solid" space "consumed" by the movement depicted. The





new solid model created represents the surface of a Fiat Boundary that in this case, is a non-material boundary in space. When cut into sections, these solid models can then be translated back into drawing form and combined with the Cat-Scan sections.

- Fiat Boundary

  To each completed Cat-Scan vellum, students add the Fiat Boundary, as it would appear at each particular plane cut through the room. While this boundary is an abstraction, students must give it a level of detail that corresponds to the previous drawing assignments. This exercise introduces the notion of interstitial space as students can begin to discern a relationship between the Fiat and Bona-Fide boundaries of the room.

- The Radical Reconstruction Exercise

  A thing is a hole in a thing it is not.

  —Carl Andre

The final week of the rotation is spent constructing two solid models of the space in the room: one representing the space within the Fiat Boundary as a solid, and the other representing the Interstitial Space between the Fiat Boundary and the Bona Fide Bounds (walls, furniture, and objects.) The students construct the models by cutting sheets of extruded polystyrene to correspond to each of the Cat-Scan Sections. Once laminated, sanded, and painted, the models provide a return to the room as a whole, however this time understanding of the room has been filtered through a series of defamiliarizing exercises.

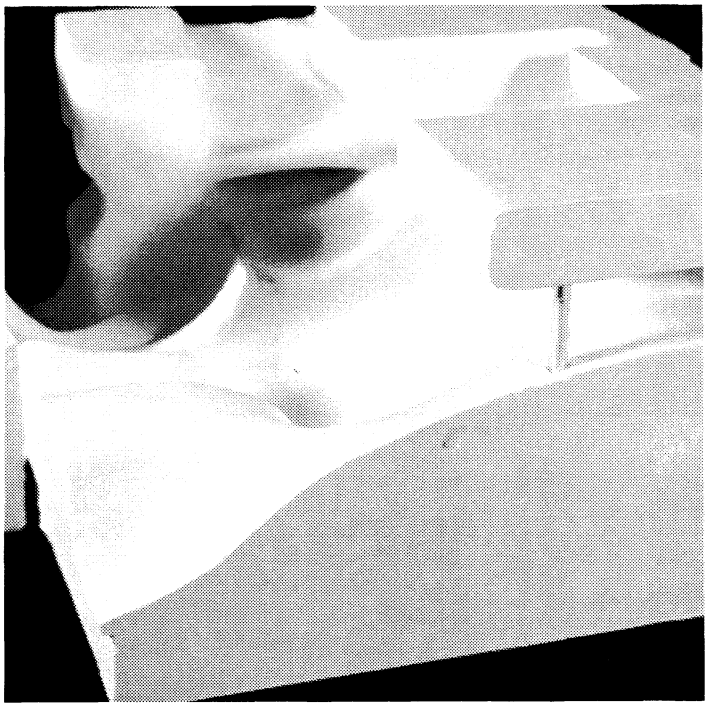
CONCLUSION

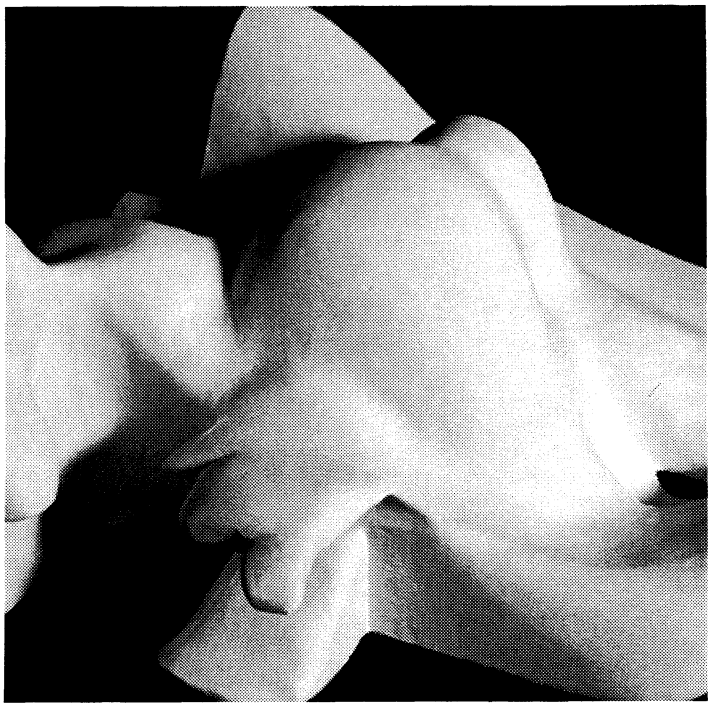
The Form Rotation Unit has three distinct periods of making and reflection:

a) Simple Surface Identification & Manipulation

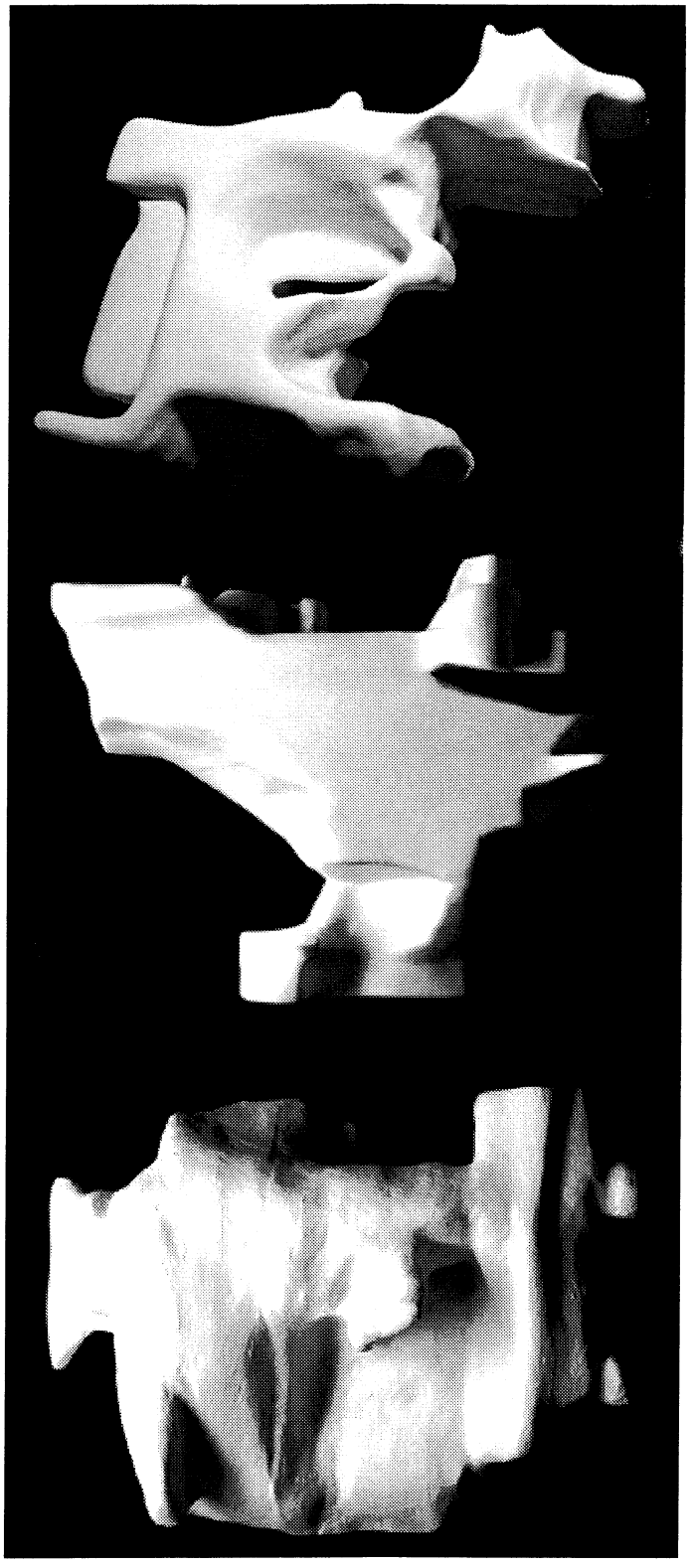
b) Element and Surface Identification and Manipulation

c) Identified Surface and Element Generation





It would seem that this kind of education should be beneficial for both kinds of students outlined early on in this paper. For the traditional "professional-track" (matriculating) design student it draws out and limits the construction of form to a few highly articulated and "in-between" techniques. For the citizens of "visual culture" in our student population (all of our students, but specifically those who don't matriculate into a professional design discipline) the Form Rotation Unit attempts to speak to the student in terms that are palpable and familiar by working in familiar but more supple conditions of Form. The outcome of this effort results, we believe, in a student population with a better ability to better read, understand, and manipulate their environment (be it a table setting, a room, a yard, etc.) willfully, critically, and with thought.



Architectural studio education rendered to a broader, university-wide, community is an opportunity seldom considered in current curricular discussions. With this Visual Literacy program set up as a freshman learning community in which a third to a half of the annual participants don't matriculate into the design professions let alone into architecture, the studio experience becomes a de facto liberal arts course for a portion of the students. Considering this opportunity to teach a broad cross-disciplinary student body and faced with the task of condensing an introduction to architectonic and artistic space making into an intensive pedagogical unit, we introduce Bounding Space.

Late Modernity and the Dilemma of *Intra*disciplinary Discourse

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0. PRE(R)AMBLE

I read this conference's call for papers only days after attending a focus group discussion regarding the University of Arkansas's 2010 Commission vision statement and development plan. More specifically, the call for papers on *Design Culture* brought home a discussion I had with a colleague in Chemical Engineering. This conversation dealt with the rate at which knowledge increases in the world today, and the difficulties this poses for developing adequate curriculum and content.

Roughly, the rate at which general knowledge doubles accelerated from every 100 to every 50 years during the period extending from 1700 to the beginning of the 1900's. Knowledge rates then increased to doubling every 30 years through the early part of this century. By the 1990's it had accelerated to doubling every 20 months. Knowledge in chemical engineering is currently doubling every nine months.

The big question was, how does one best prepare graduates, in such a context, for their professional lives? 'Information delivery' will make them more immediately useful to employers, but will carry them only so far and so long. More theoretical or research skills will not necessarily help them to be immediately productive, but will serve better to support their long term success, should they survive their early years.

It was in this context that I read this session's topic statement, whose oft repeated caricatures, limits, and assumptions I will push against here. It is an initial exploration into disciplinary matters in the late modern context, and is admittedly provisional. This passage from Sanford Kwinter frames this beginning:

> *What is at stake in the question of modernity is, of course, an ontological problem regarding the nature of Being, but equally important and equally at stake is an epistemological one dealing with the nature of knowing. Today's crisis...may be seen as an effect of the discrepancy between the steady emergence of a new mode of Being and the failure to evolve adequate modes of knowing that would be proper to it.* [1]

I. LATE MODERNITY AND THE NATURE OF THE CRISIS

Today, disciplines struggle to form a sense of self in a world defined by the 'radicalization and intensification'[2] of the processes of modernity. A reflexive dialogue is necessary if the tension between thinking and doing, thinking and making, is to enable a more productive disciplinary discourse. Conventional discussions extending from this opposition — profession versus academy, conservative versus progressive, or business versus art — have long since ceased to be productive. These face-offs exist today simply as matters of habit. A more productive questioning of the dichotomy between thinking and making is the challenge before us, not just as members of this discipline, but also as members of late modern society.

'Practice' versus 'academy' dialectics lie beneath many current discussions on the state of the discipline. The profession accuses the academy of undertaking marginal and unnecessary activities providing no benefit to 'the public' (a.k.a. 'the client'). The academy holds the profession responsible for the senselessness of the mind numbing production lines churning out buildings that provide no sense of place for 'the public' (a.k.a. 'the collective'). This finger pointing is drastically reductive and clearly unproductive.

This paper investigates the significance of late modern conditions for our discipline. This is essential for understanding why the practice/education or conservative/progressive face-offs are no longer productive frameworks for debate. Dialectical frameworks, in general, are becoming increasingly less effective paradigms for reasoning in late modern culture. We must consider alternative frameworks that acknowledge the increasingly complex nature of the late modern world.

Johan Fornas's text, *Cultural Theory & Late Modernity*, guides this examination. It provides an overview of significant contributions to defining and studying late modern cultural phenomena. It also proposes 'a poly-dimensional sphere-related resistance theory' as an appropriate late modern cultural response. Fornas's advocacy for reflexive differentiation over de-differentiation, and his interest in both the social and spatial aspects of culture are important contributions. His third chapter, "Spheres," deals with the institutional

aspects of his study and addresses a widespread phenomenon — increasing disciplinary crises of 'legitimation and motivation'.[3]

II. LATE MODERN PROCESSES AND THE NATURE OF 'INSTITUTION'

Fornas identifies and discusses 3 characteristics of processes of change that combine to form modernization. These are:[4]

1. Irreversible dynamization:

Modernization processes 'are intense and cannot be easily reversed, even if they might take different forms.' This problematizes tradition — nothing can ever be repeated in quite the same way. Any relationship to tradition is thus seen as 'not a necessary but a desired continuity.'

2. Ambivalent rationalization:

Modernization processes 'promote a two-sided rationality with both positive (creative and emancipatory) and negative (destructive and oppressional) potentials.' Processes of rationalization are ambivalent towards their positive and negative outcomes.

3. Differentiating universalization:

Modernization processes are 'increasingly general and global in their capacity to create new pluralities by separating social and individual life-spheres.' Once a unity is separated into its differentiated, autonomous components, new means of establishing relationships between these components becomes part of constituting any subsequent entity.

We should not underestimate the unsettling effects of these processes. Fornas tells us, "Normality is being denaturalized in a world where few traditions or values are experienced as self-evident. The resulting norm-crisis of insecurity and confusion...breeds nostalgic longing for a world of clear-cut shared norms."[5] Relating the now differentiated and autonomous components, deciding if and how to repeat traditional patterns, and forming judgments of normal or deviant results requires constant, critical, reflexive thought.

These processes of modernization further exacerbate the norm-crisis confusion because they appear as 'exterior', as 'given'.[6] Assumptions of exteriority exist wherever criteria of validity exist—and criteria today include efficiency, truth, and normative righteousness. Institutions also appear exterior because they make recourse to these criteria as part of their processes of legitimation and motivation.

This exterior world is itself differentiated into the autonomous components of natural, social, and cultural forces, each with specific directives. Social market forces guide the movement of capital. Social state forces guide the movement of administrative power. Lifeworld forces guide the processes of the reproduction of traditions, social integration, and socialization.[7] (*See Figure 1.*)

World:	Validity Criteria	Use of Cultural Texts
	• efficiency: goal oriented success • truth: symbolic representations of external reality	• valued for ability to return profits • establishing and critiquing ideology and propaganda
social criteria		• used in marking status and identity, and shaping concrete relations
	• ethics: the ideal of the good life • morals: justice and rights	• 3 components: 1. stock knowledge reproduced by processes of tradition
cultural criteria		
	• normative righteousness • subjective authenticity • aesthetic well-formedness	2. norms reproduced by processes of social integration 3. individual identities reproduced through socialization

Figure 1: Summary of Fornas's Essential Elements of the Objective World.

Every institution, regardless of which element it aligns most closely with, must deal with all of these forces in their formation and continuation. As institutions work to recombine state, market, and lifeworld forces within their structures ('there are no pure systemic organs'[8]), they engage in acts which proportionally combine fusioning with fissioning, or uniting with separating. Every act 'which transgresses boundaries and creates communities, simultaneously 'marks differences and boundaries that deepen social rifts."[9]

Fornas sees institutions as 'spheres', which he defines in this way:

> *Spheres constitute a (physically or socially) spatial dimension, a network of ordering structures that the temporal streams of modernization unavoidably break against, but also gain momentum from. Temporal processes are framed by the spatial boundaries of spheres, but they are also given speed and direction by them... Structures are both obstacles to and prerequisites of changes. And conversely, it is movements that create and reproduce boundaries.*[10]

This follows from his definition of culture as symbolic communication,[12] which includes spatial production. Fornas says, "By collectively shaping such symbolic patterns we construct a world and give ourselves specific positions in it."[13]

The process of positioning includes inevitable experiences of 'disharmony' that emerge as we move between the conflicting demands of the spheres we encounter in daily life — work, school, family, friends, etc. This disharmony means we must make difficult choices as we negotiate the boundaries between spheres. This experience of disharmony thus serves to introduce a more or less conscious struggle between power and resistance.

Fornas's investigation of spheres and experiences of disharmony requires clarification of basic terms and concepts. He identifies what we might call 'typologies' of social and spatial relations — between general, conceptual terms (spheres) and concrete, physical terms (spaces). The summaries of these (*See Figures 2-4.*) fol-

low from his arguments, although certain leaps are made to obtain and maintain clarity.[14] Analyses of these forces, combined with understandings reached through the social and spatial typologies, might provide a more productive starting point for examining the disharmony we experience within our discipline and in our discipline's relation to the world.

Figure 2: Summary of Fornas's General. Conceptual Terms

general, conceptual - spheres, fields, and arenas

Spheres:

- are both social institutions and power structures
- are a globe or a ball (a three dimensional space of enclosure)
- have a center and a periphery, establishing an inside and outside
- 2 types of spheres:
  - periphery established by enclosing envelope
  - periphery established by sustaining nucleus

Fields:

- areas or spaces with a specific order or direction
- 2 types of fields:
  - cattle-field: a bounded area that does not have a clear center
  - battle-field: two separate but mutually dependent, opposite centers

Arenas:

- there are actors acting to audiences
- there are visible places of performance and hidden rooms of preparation
- scrutinizing glances, self-representation, and role playing add an aesthetic dimension
- combine both sphere and field aspects; a shared center side loads two separated fields

'Crucial aspects of spheres' deal with the visibility of fields of power relations in spheres.

1. *area*: originally refers to vacant ground; an area is a space that has been staked out and demarcated, and is thus at least mentally mastered through knowledge and surveillance
2. *domain*: implies ownership of a master
3. *territory*: a piece of land that is occupied, demarcated and guarded by someone

Figure 2: Summary of Fornas's General. Conceptual Terms

Figure 3: Summary of Fornas's Concrete. Physical Terms

concrete, physical - space, place, and room

Space:

- a stretch or an extension of something; the most general concept for three-dimensional expanses

Place:

- originally a flat area; today refers to a particular location

Room:

- an enclosed place or three-dimensional area

'Crucial aspects of spaces' also deal with viewing, for purposes of navigating fields of power.

1. an *aspect* is a way to look at something in a certain *direction* or from a certain *perspective*
2. a *perspective* is a *position* from which spaces and things are viewed
3. some spaces have discernible *levels* - up/down polarities

Figure 3: Summary of Fornas's Concrete. Physical Terms

ending on the clarity or diffuseness of forces at play
es 4 kinds of forces:

en, confine, order and separate

wer (hierarchy) and opposition
nposed of several pieces, are delimited, autonomous, and

ng
to offspring, concrete realizations of oneself
ved or taken from tradition
nething

ually determined by an individual's status in a society
ans or stratagems towards a goal
is to accomplish an end

Figure 4: Summary of Fornas's Shaping Forces

Processes of modernization and differentiation of 'external' forces have clearly unsettled our disciplinary foundations. Our once unified discipline has been differentiated into the essential activities (provisionally defined) of criticism, design, history, professional practice, technology, and theory — each now becoming increasingly rational, systemic, and autonomous in nature. It is this disciplinary complexity that the practice/academy face-off does not adequately address.

The dialectic framework is causing major problems on all fronts. It privileges design, technology, and professional practice concerns while marginalizing history to some extent, theory even more, and criticism the most. Cross-curriculum exercises, when they do occur, usually involve one aspect from another area being included as a component of 'studio'. The dialectical battle currently privileges reductive notions of 'doing' and marginalizes reductive notions of 'thinking'. Architects are not learning to communicate effectively or develop the adequate thinking skills necessary for negotiating the multiple overlapping spheres that constitute our everyday world.

Demands to specialize, required for obtaining work in practice or obtaining tenure in the university, complicate this problem. We work in increasingly specialized contexts that are becoming more interdisciplinary in nature. This in itself is a good thing, but our difficulty in moving between different uses of language and thought constructs, compromises our ability to effectively talk to anyone outside our immediate context. We must learn to speak to each other before the valuable lessons learned from interdisciplinary ventures are lost to the discipline. Thomas Fisher reminds us:

> *If we are to change the fragmented and adversarial nature of our relationships with each other and turn around the public's perception of our worth and value, we must become more vigilant of the language we use and the tacit messages we transmit. We spend much of our time designing and constructing the physical artifacts of communities... We now need to spend time building community within the industry, among colleagues and former adversaries alike. That must begin with the bricks and mortar of language, the words we choose and the way we use them.*[15]

There are schools working to counter the marginalization of history, theory and criticism, often to much criticism. History, theory, and criticism are practical matters if we hope to effectively initiate both the interdisciplinary and intradisciplinary discourses required to negotiate between the multiplicity of voices emerging in our rapidly changing world.

III. NEGOTIATION AND RESISTANCE

Fornas presents the concept of negotiation as, "a kind of metadiscourse where the rules for interaction are reflexively discussed and adjusted. They are often inseparably united with the social acts themselves, so that regular interaction successively redefines social relations."[16] Negotiation is 'a reflexive form of communicative action,' with two important associated opportunities and responsibilities.

First, these discourses take place through cultural expressions that are responsible for the investigation of emancipatory propositions through critique and the development of 'utopian potentials'. These utopias answer to what is lacking or inadequate in daily life. They oppose through posing alternative notions of lifeforms or patterns of interaction. Fornas thus delimits the ethical as well as critical and creative potential of cultural expressions.

This underpins negotiation's second opportunity and responsibility. He identifies aesthetic practices as particularly effective negotiation practices. Symbolic communication and media are incredibly successful means for marking status and identity, both within and between individuals, groups, and institutions. This explains the increasing reflexivity, mediaization, and aestheticization of new social movements and counter-institutions.[17]

The understanding of negotiation taking place through cultural expressions implicates ethics and aesthetics as co-conspirators in late modern discourse. The focus of 'practice' versus 'academy' fades from view when we realize the significant potential of the ethics/aesthetics partnership. It creates a space where 'Other(s)' voices can speak. This dialogue is necessary if one expects to move beyond the privileged terms of the reductive dialectic and initiate a more expansive notion of equality and participation.

Wherever any institution exists, there are terms of inclusion and exclusion set. Resistances emerge, movements develop, utopias imagine, and reflexive communication tests alternative patterns. Emancipation, the move towards equality, is not a simple question. Fornas reminds us:

> *It is essential to distinguish between equality and similarity: equal rights are only possible if differences are respected. Studies of youth, women, and ethnicity have emphasized the need to separate justice from standardization, and to avoid being stuck between separateness and likeness. ... There is a general need for learning to endure the insight that one's own way of life is far from the only legitimate one.*[18]

Our discipline must learn to endure the thought that all our different disciplinary activities are equally significant. Otherwise the possibility of ethical, aesthetic architectural contributions to the formation of late modern culture remains unrealized. Such contributions assume that the power/resistance struggle, inherent in negotiation processes, will be confronted with some level of consciousness and commitment. Fornas identifies resistance as a significant productive force in late modern cultural production. He states:

> *Power/resistance is an asymmetrical relation, associated with tensions between centers and peripheries in spatial and social spaces, where places, territories and borders are crossed by various flows and movements. In the complex global network of such center/periphery relations, various centers exert dominance across distance over multiple peripheries.*[19]

Fornas assigns to resistance a productive role in the formation of knowledge. Centers have more power than peripheries, but there are more peripheries than centers. Also, that which flows from center to periphery is different than what flows from periphery to centers. Fornas links resistance to Foucault's contention that the will to knowledge is the will to power. The nature of the periphery is therefore significant.

> *These peripheries cannot be reduced to the single function of being margins of some center. There are a multitude of margins...which have similar relations to some norm that institutes a center, but these margins are mutually very different and cannot be collapsed into just faces of a constant Other, though that is what the One center strives for.*[20]

It is this recognition of Others that is at the heart of the ethics/aesthetics partnership. The ethical goal of equality, which acknowledges difference, allows new, creative avenues for identity formation. Ethics and aesthetics are not new to such partnerships. If one traces the origins of either of these discourses, one finds themselves back at Plato and Aristotle. These discourses are both, by their natures, philosophical matters. Philosophical thinking is necessary if we are to develop new strategies for a productive ethics/aesthetics recombination. Alberto Perez-Gomez notes the problem related to the removal of philosophy from theoretical architectural considerations:

> *A simplistic view of human experience, derived from the projection of scientific models onto human reality, exemplified by certain aspects of behaviorism and positivistic psychology, has hampered our understanding of the essential continuity between thought and action, between mind and body. Because architectural theory is assumed to imply absolute rationality, it has been considered capable of standing on its own, free of all relations to fundamental philosophical questions.*[21]

Philosophy must be given a central place within any late modern discourse seeking to combine ethics and aesthetics. It is the only means for creating an effective conduit between thinking and making, between both our interdisciplinary and intradisciplinary discourses. It is the best hope our discipline has for rebuilding a sense of itself and its purpose within the late modern context. This also requires that we follow Perez-Gomez's challenge to notions that reduce theory to prescriptive rules of operation.

IV. RETHINKING DISCIPLINARY IDENTITIES

For late modern inhabitants, the release from traditional norms, the resulting necessity of negotiation to establish norms, and the increasing cultural reflexivity requires, "a model of identity that is mobile, open, composite and impure which is more appropriate to late modernity than some other models of petrified rootedness."[22] Fornas introduces diaspora, migration, and immigration as models of cultural identities formed outside bounded territories. Characteristics of these identity models include:

1. an absent source of historical inheritance;
2. connections with dominating host cultures occurring through painful hybridization processes.

They result from both 'a transgression of borders and as montage-like mixes of various elements.'

Fornas maintains the notion of a once pure origin to support reflexive differentiation over de-differentiation in the theory of resistance. De-differentiation, the loss of specialized form, 'results in an undifferentiated homogeneity where all are equally peripheral'. Reflexive differentiation, though, acknowledges that as some boundaries are transgressed, others are established. Orientation and belonging result from a series of interlacing webs not bound by static center and periphery relations.

It is in this context that he introduces Gramsci's concept of hegemony (a governing power winning consent to rule). Flexible alliances are key to maintaining power since the concerns of both power and resistance are involved in the negotiation of consent. Resistance makes margins and peripheries visible in this discourse. Resistance, when it reaches some state of critical mass, can result in the establishment of counter-institutions, objectively testing alternative patterns of interaction.

It is clear that a singular understanding of our discipline, or of its essential activities, does not address an adequate understanding of this cultural complexity. The criticisms of design culture, communicated as the session's theme, must be reexamined. It reduces all margins into a constant Other, and the multiplicity of centers to just one center. We must value open identity formation processes developed through acts of resistance, the formation of movements, and in the building of counter-institutions. We must consider these resistances in relation to power, especially in relation to the apparently objective forces of modernization. These forces may seem inhuman, but they are human creations and subject to human intervention, should the Other(s) be given a voice.

Cultural relevancy is the goal of Fornas's proposal for 'a poly-dimensional sphere-related resistance theory.' Since the result of globalization is not homogenization, but rather increasing universal differentiation, a prismatic cultural understanding results. It includes three theoretical concerns:[23]

1. increasing mobility, flexibility, dynamics, historicization, and modernization processes;

2. the problematizing of symbolic forms, language, communication, and the whole cultural dimension;

3. the necessity of differentiation, diversity, distinctions, and polydimensionality in late modern complex society, politics, and theory.

Resistances are particularly important for addressing these, since they are potentially 'transformative rather than just reproductive.'[24] They occur both within physical, temporal boundaries, as well as outside of them. Resistances first appear as localized emergences of alternative interaction patterns, established on various scales, through face to face interactions. The second takes place through mass media. This type of intersubjective interaction assists the formation of communities over distance, uniting those who would otherwise, in some way, be isolated.

The increase of mass media communications is a general cultural trend. (It is not theory's fault.) Clearly mass media exacerbate the differentiation of our disciplinary activities, but it also provides benefits as well. On the one hand, mass media provide a way for many of us to find communities where we see ourselves and our concerns reflected. The sense of comfort created outside space and time, though, enables a continuing shutting down and isolation between the intradisciplinary activities occurring in place and time.

We need to acknowledge the importance of both kinds of work if our discipline is to form more productive strategies of resistance, with transformative potentials productively reaching both inside and outside our discipline. It is essential for combating the isolation that many of us find in our daily disciplinary experiences. We urgently need alternative ways of relating criticism, design, history, professional practice, technology, and theory through thoughtful acts of recombination that might actually enable, if even for just brief moments, glimpses of rich, disciplinary possibilities. Both local architectural communities, and mediated ones, need to attempt these connections.

Fornas helps us imagine how that might work:

> *The new emphasis on dynamics, openness, crossings and hybridity as a normal identity condition implies that the social world consists of a series of interlacing webs, each with its center and peripheries. These networks are superimposed on each other, shaping intricate interference patterns. When one pattern hides another, critical reflection is needed to disclose the concealed domination forms.*[25]

V. MEDIATION AND THE REDEFINITION OF 'THEORY'

The poly-dimensional nature of late modern culture does not fit the model of dialectical crises whose resolutions are closed and composite by nature. The source of crisis today is in something other than the dialectical terms themselves; it is 'exterior' to the terms that delimit their domain. Resolution of a multiplicity of oppositions requires something that mediates tensions within late modern cultural conditions. It must allow for resistance, so that this mediation might be transformative and contribute to the disciplinary knowledge base.

In order to consider this kind of mediation, we must set aside the word 'theory', as it is conventionally used in disciplinary bickering. Fornas presents a more appropriate notion of 'theory', which provides a provisional step towards understanding this mediation. He says:

> *Theorizing starts from a pain or a want: an experienced pain which propels it forward, and lack of knowing which wants to be filled. Culture, society, subjectivity and nature all produce plenty of suffering in human life. A lack of happiness or meaning may find relief in the magic construction of models that*

open up new worlds of imagination where existence is recharged with fascinating significance: fantasizing about what exists also creates visions of what does not exist, pointing at what hitherto prevents it from becoming and thus starts a movement towards it. The lack of community forces people to invent their own imagined worlds by practices of writing, and these are no mere illusions but function as means of communication with others in interpretive communities: in theory you can develop being alone into meetings with others at a distance.[26]

This notion of theory, as a mediating force, is an effective response to late modern processes. It is autonomous and capable of operating according to its own internal and systemic logic. It creates time-space compression in its ability to separate and reconnect traditions. It generates and directs evolutionary movement. Its deployment requires both intentionality and critical depth if tradition, the 'problematized reproduction of intersubjective patterns,' is to be acknowledged and addressed. Fornas's proposal for a theory of resistance is thus a theory for theory. We must recognize theory at work when judgments concerning ethics, morals, or aesthetic well-formedness are entered into any discussion.

It is significant that this notion of theory insists on an experiential dimension. The sensual, emotional and intellectual, clearly differentiated in late modern life, are simultaneously called into play and recombined through this kind of mediation. It enables reflexive, symbolic communication that includes production of the material, spatial cultural domain. It is theory that salvages that necessity of the production of place, constituted through intradisciplinary acts of recombination, as essential for confronting the unsettling effects of late modern processes. Fornas tells us:

The temporal dimension may be contrasted with aspects of culture that are usually conceived in spatialized terms: the social spheres which simultaneously frame and enable cultural activities. The time-flows of modernization run into spatial spheres formed by order structures in the physical and social spaces of modernity: relatively fixed structures and institutions which, like sluices, delimit which human actions are possible. ...Cultural practices and communicative actions also move and transform the objectivized spatial frames within which they are born...[27]

It was a turn to cultural theory over 30 years ago that instilled self doubt into the legitimacy of our discipline's work in the world. It is a return to cultural theory today, that serves to remind us not only of the absolute, unequivocal necessity of architecture in the late modern world, but also begins to establish its primacy among cultural activities.

There are similar notions of theory making their way into architectural discourse. These need to be examined more closely if we are to truly rethink what we all really need to survive in this late modern world, where knowledge increases daily at dizzying speeds, and where alliances and entities, emerge, transform, and disappear, sometimes in the blink of an eye. Michael Hay proposes one such notion of architectural theory:

Architecture theory's mediatory function releases unnoticed complicities and commonalities between different realities that were thought to remain singular, divergent, and differently constituted... The world is a totality, it is an essential and essentially practical problem of theory to rearticulate that totality, to produce concepts that relate the architectural fact with the social, historical and ideological subtexts from which it was never really separate to begin with.[28]

NOTES

[1]Sanford Kwinter, "La Citta Nuova: Modernity and Continuity," in Michael Hays, ed... *Architecture Theory Since 1968* (Cambridge, MA: MIT Press), p. 607.

[2]Johan Fornas, *Cultural Theory & Late Modernity* (London: Sage Publications, 1995), p. 34.

[3]Ibid., p. 76.

[4]Ibid., pp. 18-31. See this section for his extensive discussion of these characteristics and their implications.

[5]Ibid., p. 57.

[6]Ibid., pp. 55-56.

[7]Ibid., pp. 56-57, 66-71.

[8]Ibid., pp. 74-76.

[9]Ibid., p. 57.

[10]Ibid., p. 50.

[11]Ibid., p.136. Geertz, Clifford, *The Interpretation of Cultures*, p. 5.

[12]Ibid., p. 43. He states: "On the one hand there is a social modernization of norms, groups, relations and actual interaction forms. On the other hand, there is a cultural modernization of meaningful symbolic forms, both in everyday aesthetics and artistic practices."

[13]Ibid., p. 1.

[14]Ibid., pp. 50-55. See this section for his attempt at term clarification.

[15]Thomas R. Fisher, *In the Scheme of Things: Alternative Thinking on the Practice of Architecture*, p. 112-113.

[16]Fornas, p. 58.

[17]Ibid., p. 79. He states: "New social movements do not function like unitary subjects - they converge and crystallize as collective actions out of a plurality of different motives, perspectives and relations. New movements are more than ever giving attention to information and culture, as an expression of general late modern tendencies towards reflexivity, mediaization and aestheticization of politics, economy and daily life."

[18]Ibid., p. 74.

[19]Ibid., p. 61.

[20]Ibid., p. 61.

[21]Alberto Perez-Gomez, Architecture and the Crisis of Modern Science. Cambridge, Mass: MIT Press, p. 8.

[22]Fornas, p. 62.

[23]Ibid., p. 124.

[24]Ibid., p. 126.

[25]Ibid., p. 124.

[26]Ibid., p. 15.

[27]Ibid., p. 49.

[28]Michael Hays, "Introduction," *Architecture Theory Since 1968.* Cambridge, Mass: MIT Press, p. xi.

Design Education Culture

Moderator: Ann Maki, University of Minnesota

in*Formation*:

The Collaborative Studio

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Beneath the Umbrella of the Hidden Curriculum:

The Underlying Premise, the Existence of Homogeneity, and the Deconstruction of Hierarchy

KAREN KEDDY
University of Wisconsin—Milwaukee

Jigs, Reels, and the Occasional Air:

Utilizing Irish Traditional Music in the Fundamental Design Studio

JOHN MAZE
University of Virginia

Product Design and Innovation:

Architectural Pedagogy as a Template for an Interdisciplinary Degree Program

FRANCES BRONET
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in*Formation:*
The Collaborative Studio

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IN*FORMATION:* THE COLLABORATIVE STUDIO

The question of interdisciplinary education is one of the primary challenges of contemporary higher education. Universities and colleges are being bombarded with calls to promote a more cross-disciplinary approach. Within architectural education, this pressure has focused most forcefully on the design studio, under the premise that the design studio represents a recognized asset in its collaborative atmosphere. Therefore, what better place to start than at the source of the design culture, the design studio. In reforming the design curriculum and reconsidering the design studio, the collaborative sensibility can be used as a lever to move in the direction of openness and connected-ness, promoting communication with other disciplines.

Clemson University's focus of interdisciplinary education has been realized in the University's architecture design studio. The design process of the new collaborative studio and its implementation offer the opportunity of an ongoing case study for other schools considering an interdisciplinary transformation. The elements necessary to successful change include vision, commitment and implementation at several levels-from the university to department, faculty, and student.

VISION

Cross-disciplinary education necessitates a fundamental shift in perception at all levels of the educational spectrum: the leadership of the university, departmental administration, faculty, and student. The process that Clemson followed in its establishing a new studio model (the Collaborative Studio) results from a vision of collaboration that incorporated multiple colleges, multiple departments and faculty from multiple disciplines.

Clemson University has undergone a transformation of its basic structure with a complete reorganization of the university's college units and a reconsideration of the general education requirements for an undergraduate degree. A wide range of disciplines has been combined. A key element of this transformation has been a commitment to developing a university curriculum focused on student achievement of communication skills. The view is of a future in which a strong foundation of communication skills is essential for academic and professional success. This effort has led to national recognition, singling out this University specifically for its Communications Across the Curriculum initiatives.[1]

The vision of the University and the College inspired a new vision within the Department of Architecture, leading to a complete redesign of the undergraduate degree program and the formulation of a new curriculum for architecture. The focus of the academic agenda was to take advantage of the structure and position in the new College of Architecture, Arts & Humanities, and to respond to the restructuring of the college with a strong multi-disciplinary approach. The rich mixture of disciplines within the College provides both depth and breadth in education unavailable in the department's programs. Effective communication skills are necessary for all disciplines to work together across specialized knowledge bases, and the architecture program has defined its position as a leader in this movement.

The earliest response to this change in mission in the architecture department was to shift away from the preparatory professional degree of Bachelor of Architecture, (with its technical emphasis and specialized courses of study,) to a new degree program with greater breadth. The Bachelor of Arts in Architecture was created to allow for a broader curriculum.[2] This change is directly in line with Boyer's recommendation for "a more *liberal* curriculum, a more *flexible* curriculum, and a more *connected* curriculum."[3] The new degree program continues to place the design studio as a primary resource and focus for architectural education: the true strength of the traditional studio model is the instilling of analytical, integrative and critical thinking—not specialized skills and technical knowledge, as was recognized in the Boyer Report.[4]

With this recognition, the redesign of the curriculum focused on the design studio as the place to implement the interdisciplinary goals of the University. The goals for the architecture department were to open architectural instruction to a broader cultural context. With this multidisciplinary focus, the redesigned curriculum incorporated additional courses from within the new College: two semesters of Western Civilization; four semesters of Languages; and a one semester Humanities Seminar. Core courses in communication were mandated by university general education requirements, and

seen as tremendous assets. Thus, a primary goal of the new studio model was to teach communication skills.

The emphasis on communication-both written and oral-makes sense in the education and development of professional architects. In the profession, architects are challenged with layered matrixes of information, for example, responding to client needs, project briefs, site conditions, opportunities of technology, questions of economics, etc. As the complex challenges of a highly specialized world exceed the abilities of technical expertise, the skills of connecting ideas across many disciplines are paramount

Written and oral communication skills and computer competencies were chosen as elements to weave into the fabric of the design studio. Thus the studio will become the new venue for teaching core communication skills as it has traditionally been used for teaching visual communication. Core communication and writing curricula are seen not as autonomous requirements, but as essential tools with specific relevance to architectural studies.

The vision of the new College is that crossing disciplinary boundaries enriches the entire curriculum connecting courses and disciplines. In addition, communication is recognized as a primary skill of the architect. "The ability to speak and write with clarity is essential if architects are to assume leadership in the social, political, and economic arenas where key decisions about the built environment are being made."[5]

Faculties from English, Speech and Communication Studies and Computer Science have been directly integrated into the studio syllabus. Therefore, in addition to traditionally accepted architectural design concepts and skills, interdisciplinary skills are taught as important, fundamental architectural skills.

Within the Collaborative Studio structure, instruction is incorporated directly, with components occurring throughout the studio sequence. University general education requirements define Oral Communication Competency as being achieved in a 3-credit Oral Communication course. The new studio sequence supplants this separate course by incorporating three 1-credit components of Oral Communication instruction within the studio over three consecutive semesters. In these three one-credit components, Speech and Communication professors teach oral competency and its applications directly within the studio: they are integral members of the studio team. Similarly, Written Communication Competency will be achieved in three 1-credit components within the studio over three consecutive semesters, again replacing a 3-credit course. Teaching writing competency and its applications will occur directly in the studio by English professors who are members of the studio team. Lastly, the 3-credit Digital Communication course is being supplanted by three 1-credit components taught within the studio over three consecutive semesters. With faculty from disciplines throughout the College joining the architecture faculty, the studio team clearly represents the multidisciplinary vision of the College, in the new studio model: the Collaborative Studio.

COMMITMENT

While institutional and individual vision is the impetus for change, the commitment to seeing it realized is essential. The work of transforming visions into reality turns on this very point. For this new studio model to come to fruition, the cooperation and commitment of individual faculty, departmental administrations, and the College hierarchy have been tested. The commitment of these parties creates the framework for implementation, supporting collaborative teams, and overcoming the challenges of bureaucratic boundaries.

In order for the Collaborative Studios to meet competency criteria and to be approved by the university as core communications course, the designers of the courses needed to have some understanding of collaborating disciplines. This necessitated meeting with individual departmental administrations and faculty to learn their specific teaching goals and methods, the expectations they have for general requirements, and how they might refocus methodologies to take advantage of the collaborative environment. Sets of guidelines and lesson plans were developed in conjunction with architecture and the other disciplines. In addition to the anticipated student benefits, this process educated the architecture faculty about methods and goals of other disciplines. Educating outside faculty about the architecture studio environment is another benefit of this collaboration. As a part of developing course ideas, faculties from other departments were invited into the studio to witness jury and desk critique situations. From these meetings, the course designers structured coursework to incorporate ideas and requirements of the various departments into studio pedagogy.

As the design studio has always been architecture's domain, it has been important to insure the collaboration was truly a two-way street. It is also important to acknowledge that other departments were essential to setting the foundation of the studio, the first step at achieving a truly collaborative atmosphere. The enthusiasm and initiative for this new model was not solely on the part of architecture: in fact, the collaboration with the English department was locked-in when, coincidentally, an English professor approached the architecture department about developing a collaborative composition and rhetoric course. Enthusiastically, this professor joined the team in formulating the Collaborative Studios. The respect and interest in including perspectives from other disciplines is necessary for this to be successful and ongoing. If it is not mutually beneficial to the faculty and departments of all disciplines involved, it is not likely to endure.

One of the primary structural impediments to creating and nurturing cross-disciplinary collaborations is the administrative difficulty of crossing departmental boundaries. The benefit of the new multidisciplinary College is the administrative leadership can more readily enable and encourage working relationships between departments. The challenges of connecting departmental administrative units must be met if collaborations are to be supported and collaborative teams are to be assembled. This means that methods of creating exchanges of departmental monies, of trading teaching credit hours and managing teaching staff need to be created. It is

not enough to recognize that the balancing of teaching loads must cross between departments, it is necessary to facilitate the creativity and flexibility necessary to compensate for non-traditional teaching loads. Combining varied disciplines into inventive collaborations begins and ends with commitment at the administrative level.

The formation of a new degree program and curriculum in architecture was a challenging process over an extended period. The actual implementation of the curriculum guidelines, the designing and approval of courses, the re-consideration of coursework and the staffing of the courses occurred over a relatively accelerated schedule.

IMPLEMENTATION

The collaborative studio is currently evolving and is in its second semester. Speech and Communication was selected as the first integrated component. Communication and presentation skills are discussed using design and architectural metaphors and references to architectural concepts are imbedded in Speech Communication lectures and activities. As is customary, all studio projects include a review session that requires students to orally present their work. In the collaborative studio, these reviews often include the participation of the oral communication professor. In addition to learning from the professor's expertise, the students are encouraged to critique one another's oral presentation as well as work. In effect, there is no distinction made between the presentation and the work. This creates a forum for further development of design ideas as well as the seamless integration of oral and visual communication skills that would typically not be addressed in the first year studio.

Integrating multiple disciplines into the design studio suggests changes to the structure of the class time. The oral communication component included a formalized weekly lecture led by the oral communication professor, as well as more informal lessons and discussions on oral communication as part of the typical studio environment. The students have been given exercises and assignments specifically targeted to further their presentation skills. One of the first design exercises they were asked to perform was to examine a Styrofoam shape (computer packing) and present it as a building model to their classmates in small groups. Each of the presentations was required to have a beginning, a middle structure, and an ending. This introductory exercise was structured to emphasize the components necessary for an effective, well-organized oral presentation.

More than simply offering lectures on oral communication, the integration within the studio allows direct and ongoing evaluation of presentation skills. As a requirement of the oral competency approval process, each student must have structured feedback on their presentations, which includes videotaping and analysis of student presentations. The presentation/feedback cycle follows a similar format to the methods of critiquing more traditional architectural communication modes such as drawings and models, illustrating the coherence between design and communication.

Experience has shown that the addition of the oral component facilitates more interactive and effective discussions within the studio environment. It is evident that a more thorough architectural understanding is developing through this new level of communication. In addition, visiting jurors-both faculty and architects working in the profession-have commented upon the improvement and effectiveness of the presentations. As the program develops, there will be videotaped data available for analysis of specific areas of improvement.

As a result of the successes of the first semester, the students are quickly becoming integrated into the design studio culture and school of architecture environment. This is important in that it encourages the students to be participatory in their education, establishing the connection between architecture, the broad range of influential disciplines, and the world in which they live. Expanding the curriculum has in turn expanded their expectations of their education.

CHALLENGES

It is important to reiterate that this project is still a work in progress, as its implementation has quickly followed the institution's momentum. The specifics of each class were created rapidly, in response to the needs of the course and students. As the faculty becomes more experienced and the collaborative team learns to work together, the teaching methods and activities will become more sophisticated and integrated. Still, the successes of the project to date have been many: the support of administration; the excitement and growth of faculty, both in architecture and in other disciplines; and the enthusiasm of students. Positive results in the studio, while still early to measure, have been clear. Of course many challenges remain.

Unfortunately, the difficulties in defining and implementing the computer component have been a continuing challenge. A number of elements were successfully accomplished in the other components (English and Speech and Communication) but were clearly lacking in the computer component. The shortcomings of this component stem from failure at all three levels-vision, commitment and collaboration. There have been failures of vision in defining goals and expectations of the digital communications component. Unlike the Speech and Communication and English Departments, there exist no set departmental guidelines for defining Computer Competency within the Computer Science Department.

There have also been failures of commitment in developing the computer component. While there has been a stated recognition of the value of collaboration, there has been resistance to the challenge of crossing departmental and college boundaries. No faculty has expressed specific interest or been designated for the studio collaboration from Computer Sciences. No initiatives to encourage faculty participation have been put forth by departmental administration.

The importance of the support of higher administration is specifically illustrated by this failure. While collaborations between Ar-

chitecture, Speech and Communication, and English departments occur within the administrative purview of the College of Architecture, Arts & Humanities, any collaboration with Computer Science requires crossing administrative boundaries at the college level: the differences between boundaries between colleges and boundaries between departments should not be underestimated. The involvement of not one dean but two introduces a layer of bureaucracy that has yet to be mastered. Thus, working out supervisory relationships, managing teaching credit hours, accommodating non-traditional teaching loads and resolving salary disbursements across colleges are more significant hurdles, requiring a more significant commitment on the part of all concerned.

Additionally, in fields that require specialized equipment, the collaboration must consider the economic impact of providing the technological tools. Without the computer hardware in the studio, it has been particularly challenging to incorporate digital communication.

Through the concerted effort of all parties, the studio has begun the successful integration of oral communication into the Collaborative Studio. The integration of the English component will be added next year. With the lessons of this success, we will continue to work at refining the computer competency aspect of the sequence. Certainly, there is some continuing momentum from past studio processes, but it is anticipated that the ongoing collaboration between faculty of architecture and other disciplines will inspire further transformations of the methods and results of the design studio.

CONCLUSIONS

This paper has presented a case study of a new studio model, the Collaborative Studio, an innovative foundation for multi-disciplinary architectural education. As we have shown, we set out to reconsider the design studio with the premise that to design is to *in*Form. The new collaborative studio is a model implementation of the integration of the disciplines of architecture and communication. As we enter the new millennium, we propose that this new studio model will better prepare future architects for the challenges of the Information Age and beyond.

FOOTNOTES

[1]Andrew Goldstein, "The Cutting Edge," *The Best College For You Time Magazine* (New York, New York: Time Inc., 2001 edition): 73-74.

[2]For further elaboration on these changes, see "As It Stands, a School in Balance," Robert A. Ivy Jr., AIA. *AIA Journal* (Washington D.C.: American Institute of Architects, August 1989 v 78 no 8): 42-49.

[3]Ernest L. Boyer and Lee D. Mitgang. *Building Community A new Future for Architecture Education and Practice* (Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching, 1996): 77.

[4]Boyer and Mitgang, 80.

[5]Boyer and Mitgang, 84.

Beneath the Umbrella of the Hidden Curriculum:
The Underlying Premise, the Existence of Homogeneity, and the Deconstruction of Hierarchy

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INTRODUCTION

Critical pedagogists in architecture caution against treating architectural students homogeneously. They advocate a deconstruction of the hierarchical power relations typically found in the design studio culture. I am proposing that because the critical pedagogist inquiry is located within an existing supposition that I call the *underlying premise*, these educators are restricted in fully attaining their goals. The underlying premise is that students will graduate to become professional architects who practice architecture in architectural firms. By assuming that an architectural education leads to a career in a mainstream architectural office, the homogeneous student continues to exist in critical pedagogist discourse. The underlying premise is demonstrated by what educators presume to be the student's career goals, an assumption about what constitutes the design process, and the underdeveloped discussion of classism in architectural education. Furthermore, I am proposing that the deconstruction of hierarchy can not be achieved without acknowledging three forms of hierarchy that have not been adequately explored in critical pedagogical discourse. First, there needs to be acknowledgement that a hierarchy continues to exist within the architecture field itself that posits designing award-winning architecture as superior to all other career choices. Second, there is a potential for asymmetrical power relations to operate within the dynamics of collaborative student work. Third, by maintaining an expert opinion of the educator in critical pedagogical teaching models, the student learns to be an expert as well.

The concept of the hidden curriculum has been discussed and debated in other disciplines, but it is a concept that has only recently been embraced by architectural educators. Since 1990, there have been several publications by architectural pedagogists that discuss the hidden curriculum in architectural education. These are the values, virtues, and desirable ways of behaving in architecture that are communicated in both subtle and obvious ways to the student. Cuff states that this enculturation process involves an intense indoctrination of the student body. (1) Dutton and Stevens unveil the hierarchical social relations typically found in the traditional design studio, as well as critique the homogeneous treatment of the student in architectural pedagogical discourse.(2) Dutton believes that the asymmetrical power relations found in society between genders, races and classes are reproduced in the classroom. Crysler states that teachers act as role models in transmitting the hidden curriculum to students.(3) Stevens claims that the concept of the *architectural habitus* favors certain types of students, those from well-to-do, cultivated families, at the expense of others, which sustains a certain social class in architecture. Stevens states that "Anyone who has experienced any form of discrimination - because of race, age, sex, or ethnic origin - is only too aware that failure is not necessarily failure to *know* something, but failure to *be* something." (4) In their study which focused on diversity in architectural education, Ahrentzen and Groat contributed a feminist perspective to the hidden curriculum in revealing the power relations among students and faculty.(5) These researchers point out that acquiring the architectural habitus of a white male may operate quite differently for women and persons of color.

The dominant view held by architectural educators that graduates will pursue a career in the architectural office generates a homogeneous treatment of the student. A study by the Carnegie Foundation for the Advancement of Teaching revealed the homogeneous treatment of the goals of architectural education.(6) Stevens claims that architectural education is intended as a form of socialization to produce a very specific type of professional.(7) Crysler contends that the primary goal of architectural education is to produce a professional architect equipped with a range of marketable skills.(8) Crysler states that "many recent graduates accept poor-paying jobs outside the profession while waiting for their first break at unstable, and often exploitive contract work in an architectural office." (9)

Learning how to work collaboratively has recently been viewed as a necessary skill in the contemporary architectural office. The underlying premise that graduates will work in offices, coupled with challenging the hierarchy in conventional design studio models, prompts critical pedagogists to advocate a collaborative model of working. The collaborative design studio model led by Dutton confronts issues related to disadvantaged groups in society. This implies an expectation that architectural graduates will be employed in a service-oriented profession, rather than in an artistic profession.(10) Later in this paper, I will explain why collaborative student work may not be a solution to the problem of asymmetrical power relations and may actually work against the critical pedagogists' quest for equality, democracy and the deconstruction of hierarchical social relations.

THE HOMOGENEOUS TREATMENT OF THE STUDENT

The Students' Career Goals

The reality is that not all architecture graduates intend to pursue careers in architectural offices. In 1993, The American Institute of Architecture Students discovered that there are 107 alternative career paths for students studying architecture, including jewelry design, facilities planning, yacht building, and computer software design.(11) Traditional practice in architecture firms accounted for only five of the possible options listed. It is this minority of career options that architectural education and especially the design studio is modeled after, preparing students to work in architectural firms and to produce buildings. As well, there are graduates who intended to pursue a career in an architectural office upon graduation but because of extended periods of unemployment, exploitation or other negative experiences typically found in an architectural office, these graduates choose alternative venues for which their education in architectural design is also appropriate.

In view of the report on career options for architectural graduates, Boyer and Mitgang stressed in their report that schools should not expect that all students will become licensed professionals.(12) They propose that curricula be flexible enough to allow students to pursue their own aspirations and specialties which is more important than ever in a job environment where many graduates are finding careers in fields other than the conventional architect's office.

The authors quote a faculty member as saying "architectural curricula should not be designed to 'keep up' with the profession and society. There is not a single way of practicing architecture and there should not be a homogeneous architectural curriculum. Schools should not expect that all students will become licensed professionals. .... An architectural education educates a student in a way of thinking and trains a student in particular techniques and practices." (13)

Ahrentzen and Groat found in their research from six schools of architecture that women and African Americans are more likely than their colleagues to consider a wider range of career choices outside of conventional architectural practice.(14) These researchers found that African Americans are more likely than other students to consider research or a private consulting practice, as their first choice of possible jobs upon graduation. Women are more likely than men to prefer working in an advocacy group, a non-profit firm, an interior design firm, or in a government agency such as housing. If architectural educators ignore the reality that outsiders to the architectural habitus are pursuing other avenues with their architectural education by choice or by necessity, then educators are treating the student as a homogeneous entity who is destined to work in an architectural firm. If critical pedagogists have a mandate to be inclusive of all voices in architecture, then they must acknowledge this growing reality in today's world.

Learning the Design Process

If several career options are available to the architectural graduate then the nature of the design process is even more important to define and identify. The discussion of the design process is treated homogeneously in critical pedagogist discourse in two ways. First, critical pedagogists fail to both define the design process and to reveal the philosophical view of design held by the educator. Second, there is a failure to identify the nature of the design process that one advocates. I contend that if one's philosophical view is influenced by the underlying premise, encouraging students to learn how to design on an individual level may not seem as imperative as it would if one's view is that the individual act of learning the design process provides a solid foundation for which the student may pursue many career options.

Boyer and Mitgang define architectural design as a way of thinking during which the many elements, possibilities, and constraints of architectural knowledge are integrated.(15) The authors state that the core elements of architecture education have relevance and power far beyond the training of future architects. Schon believes that the design studio education is an education in *making* things.(16) Malecha states that "the act of design is a process of establishing a value system and making choices in relation to the chosen values." (17) Though Malecha acknowledges the collaborative nature of design throughout history, he stresses that for the beginning student of design, an investment of time and energy into the formation of a personal philosophy is of extreme importance. As well, the process of design is not a linear path, but a tangled and interwoven network of ideas and thoughts. For students of design, learning how to manage the design process for themselves is necessary.

Defining the Design Process

Critical pedagogists fail to define what they ascribe to be the design process. Bose, in her content analysis of pedagogical models in architecture, defined philosophy in architectural design as the conceptualization of the design process and the driving force behind each conceptualization.(18) A comparison of models indicates that the philosophical or worldview of the educator is largely responsible for shaping the components of each method and the expectations of the role of the architect in society. The tangible aspects of the design process are examined but what is missing is a clear sense of the characteristics of the psychological process of design, on both an intellectual and creative level, that the student engages in when learning how to design. It is imperative that the design process is not treated homogeneously by neglecting to state what it is, nor should it be assumed to mean the same thing to every critical pedagogist. By examining what they believe to be the design process, critical pedagogists would enhance their own analysis and understanding of what the architectural educational experience means for the student.

Identifying the Design Process

There are two distinct dominant views in architectural education as to what the design process is and this polarity has been a subject of debate for decades among architectural educators. Crysler claims

that architectural faculty are divided in their view of architecture as a technocratic profession or as an art.(19) The proponents of the former insist that schools should primarily transmit practical and technical skills, while the latter argue that the school's primary function is to provide an education in different aesthetic ideologies. Furthermore, architectural design has been criticized in the last three decades by researchers and academics who believe that the education of architects needs to be more responsible to the social demands of contemporary society. (20) Salama states that the conventional approach to design has been challenged by many architects who feel that architecture is too rooted in self-expression with little involvement in social concerns.(21) Critical pedagogists appear to believe that the primary function of architectural education is to provide students with practical and technical skills that will be employed in a socially responsible manner. However, this is not clearly communicated and by not defining or stating one's position on the purpose of the design process, which is typical of many of the writings by critical pedagogists, a homogeneous treatment of architectural education is presented.

Crysler contends that the transmission model of transmitting knowledge to the student currently dominates architectural education.(22) He critiques the transmission model of education on the basis that it portrays students as passive and homogeneous subjects removed from social and political forces. Crysler refers to the concept of students being "empty vessels" and that the faculty have control over what students require to become "full" themselves. However, Crysler's depiction of students as "empty vessels" is a homogenous rendering of the student of architecture. He is assuming that students allow themselves to be empty vessels and does not discuss those students who resist or students who purposely or unconsciously integrate what they learn from a transmission model of teaching with what they learn from other models of teaching. A student may integrate transmitted knowledge with ways of knowing and knowledge that he or she already possesses. Nor does Crysler explore the possibility of a reciprocal relationship of teaching and learning between those with more experience and those with less. When Crysler posits his argument in the context of polarities, he misses potentially enlightening insights about how students learn.

Classism in the Student Body

There has been little exploration of the issues of classism in architecture, and what has been explored has been treated homogeneously, despite the intention of the authors to critique a homogeneous treatment of students. In particular, the complexity and fluctuating nature of 'class' in the context of students' lives is not addressed. The hierarchy and asymmetrical power relations found in the design studio that critical pedagogists aim to deconstruct can not be achieved without a comprehensive discussion of the impact of classism on the students' education process.

Stevens asserts that "by assuming that students are broadly homogeneous.....institutions of higher learning privilege the privileged, simply by ignoring their privilege." (23) Stevens states that it is possible to forget that the experience of university life affects students differently. Two examples that Stevens uses to support this claim are the differences between the student who has a family background of university degrees versus the student who does not, and the student who has a part-time job for extra money versus the student who has a part-time job to help pay for his or her tuition. Stevens chooses a generic presentation of class structure with high, middle, and low. I argue that the varying levels and fluctuations that occur over time within each class and between classes should be considered. The category of class that the architecture student fits into is not easily defined. The 'middle-class' student may be paying for her education with scholarships, by working as a teaching assistant, with student loans, or a combination of the above. Furthermore, each case has its own variable circumstances which are determined by such factors as having a stable monthly income, having a large sum of money deposited in one's account at the beginning of the semester, or having to deal with bureaucracy that delays financial support. A division of three classes and broad generalizations about one class can result in a homogeneous treatment of the student of architecture. A more complex addressing of the issue of class in architectural education would enhance Stevens' discussion of the acquisition of the architectural habitus in architecture school.

Just as educators ignore privilege, they too ignore the issue of student finances as it is assumed that all students have the same capacity to purchase the same architecture supplies and books. As well, some students' financial support systems can provide opportunities to work for famous architects, whereas other students can not even consider applying to these architects as they do not have the financial resources needed to take advantage of such opportunities. This perpetuates an exclusive class of students who work for a certain class of architects.

Crysler points out that within an education culture of continuous deadlines, that "only through the increased refinement of skills and competence within a given set of criteria can more time be obtained. Thus, an ability to excel is contingent on the student's ability to produce the time to do so." (24) In architecture school, emphasis is placed on meeting deadlines as efficiently and productively as possible. Hence, when a student has other responsibilities, such as working to pay her way through school, her ability to gain more time is not equal to that of the student who does not have financial concerns. Crysler considers time management as a pedagogical principle, a concept rarely discussed.

DECONSTRUCTING HIERARCHY

The Star System

A deconstruction of hierarchical power relations can not be achieved without acknowledging the hierarchy that continues to exist within architecture that places the design of award-winning *buildings* at the top and from there the value of what the student does with his or her architectural education decreases. There has been several articles published in the past two decades that discuss the impact of promoting designers of award-winning architecture in architectural

education, a process called the "star system". Ahrentzen and Anthony state that architectural educators must critically question the identification and glorification of stars in architecture.(25) They stress the political and gendered practices in both "gatekeeping and stargazing." (26) It is within this hierarchical framework that architectural education continues to exist and it should be recognized in any discussion that advocates alternative career choices. This is especially true for those who are marginalized in their attempt to acquire the architectural habitus. Although Boyer and Mitgang acknowledge that there are 107 possible career paths for the graduate architect to pursue, they do not discuss the hierarchy that occurs within the profession that originates in the culture of the school. (27)

Hierarchy in the Collaborative Model

There exists a potential for asymmetrical power relations to occur within the dynamics of collaborative student work that should not be dismissed in the quest for equality and the representation of all voices. The individual and creative freedom of working at a design problem by oneself has been negatively associated with pursuing a standard of excellence in a field defined by the star system in architecture. Working collaboratively in the design studio has been viewed as a counterpoint to this individualized process. However, this has often resulted in negative consequences for women who work collaboratively with males, in that the woman's contribution and voice has often been diminished or ignored altogether.(28)

Dutton claims that the traditional structure of the design studio is similar to the structure of contemporary workplaces in that hierarchy and competition are the norm.(29) Hierarchy has a strict division of labor, obedience, and competition that ensures work compliance and intensity. Dutton assumes that the model of collaboration is the counter model to the hierarchical model of working in the contemporary workplace. Ahrentzen and Groat cite Beckmans' premise that teaching students cooperative work skills is not a way of challenging capitalist values, because in the capitalist workplace, collaboration is one of the means towards the attainment of greater profit.(30)

In their desire to eliminate the negative aspects of hierarchy, critical pedagogists have turned to the collaborative work model as a means to rectify hierarchy. However, when advocating a collaborative way of working, critical pedagogists must consider the potential for hierarchy to exist within a group. Furthermore, one should consider at what level in a student's education is it appropriate for the student to begin learning how to design collaboratively. Having students work collaboratively later in their education process has the benefit of first providing the time for nurturing and helping develop the student's personal value system in design as well as his or her individual design process. I believe that one must first learn to work out design problems independently before one is ready to work collaboratively. A sense of confidence, competence, and a strong set of personal values in design will benefit any student who then participates in and contributes to a group design project. This would also appear to help decrease the intimidation process that can occur in group dynamics.

The "Expert" Opinion of Pedagogists

Too easily the transmission of the notion of expert can be transmitted to the student.(31) Advocating the expert opinion of the educator results in teaching the student to be an expert and perpetuates a hierarchical order within the profession of architecture. It is my contention that when proposing a breakdown of hierarchical power relations between teacher and student, the voice of the student must be represented. If the voice of the student is silent, then the critical pedagogist places himself or herself in a position of expert. The act of speaking for another does not support equality. Architectural educators must examine the issue of *voice* in architectural education more closely. Dutton stresses the politics of the narrative and that the notion of voice must represent a multiplicity of voices.(32) However, Dutton speaks for his students when he describes his model of the design studio in an architectural journal article.

Crysler reveals how paternalistic the transmission model is with its concept of experts and warns how easily the concept of expert can be transferred to critical pedagogy educational model. (33) Crysler cautions against any model of critical pedagogy in which the educators or participants become experts, as this perpetuates a hierarchical order. As well, Crysler cautions educators on the teacher taking on the role of leading students to emancipation, as Dutton proposes to do in his design studio. This insight by Crysler provides skepticism that Dutton's studio model actually achieves its goal of equalizing the power relations between teacher and student. According to Crysler, critical pedagogy is reduced to little more than a repression theory when it assumes that its goals will be achieved by replacing one authoritarian system with another that is somehow more multicultural.

CONCLUDING REMARKS

A more comprehensive examination of the underlying premise in architectural education and its suitability for today's graduate architect would contribute to the discussion centered on a diverse student body and the goal of dismantling hierarchical power relations in the architectural design studio. Critical pedagogists should question their assumption that graduates will become corporate architects and acknowledge that there are many design-related career paths that graduates may pursue, especially those students who do not fit the architectural habitus. By examining what they believe to be the design process, critical pedagogists would enhance their analysis of both the students' educational experience and what compels students to engage themselves so fully in the design studio.

Further exploration of the complexity and fluctuating nature of class in the context of architectural students' lives is recommended. By being inclusive of the star system in architecture in the discussion of alternative career options for graduate architects, a deconstruction of the hierarchical placement of options in postgraduate careers

begins. The probability that the dynamics of group work will parallel societal asymmetrical power relations can not be discounted. Facilitators of collaborative student work should be prepared to take measures to prevent an imbalance in power that can silence some members of the group. As well, delaying collaborative student work until later in the education process may prove beneficial to students in their personal development of the design process. Critical pedagogists should examine the notion of the expert more closely. Finally, if critical pedagogists have a mandate to be inclusive of all voices in architecture, then research that represents the voice of the student is an important place to start.

NOTES

[1]Dana Cuff, *Architecture: The Story of Practice* (Cambridge: MIT Press, 1991).

[2]Thomas A. Dutton, Introduction, *Voices in Architectural Education: Cultural Politics and Pedagogy*, ed. Thomas A. Dutton (New York: Bergin & Garvey, 1991).

Thomas A. Dutton, Cultural studies and critical pedagogy: cultural pedagogy and architecture, *Reconstructing Architecture: Critical Discourses and Social Practices*, ed. Thomas A. Dutton and Lian Hurst Mann (Minneapolis: University of Minnesota Press, 1996).

Garry Stevens, "Struggle in the Studio: A Bourdivin Look at Architectural Pedagogy," *Journal of Architectural Education* 49/2 (1995): 115-202.

Garry Stevens, *The Favored Circle. The Social Foundations of Architectural Distinction* (Cambridge: MIT Press, 1998).

[3]C. Greig Crysler, "Critical Pedagogy and Architectural Education," *Journal of Architectural Education* 48/4 (1995): 208-217.

[4]Stevens, *The Favored Circle*, 110.

[5]Sherry Ahrentzen and Linda N. Groat, *Roll Over Roark: The Myriad Meanings. Visions. and Experiences of Architecture in the Lives of Students* (in preparation, 1998).

[6]Ernest L. Boyer and Lee D. Mitgang, *Building Community: a new future for architecture education and practice: a special report* (Princeton: Carnegie Foundation for the Advancement of Teaching, 1996).

[7]Stevens, Struggle in the Studio.

Stevens, The Favored Circle.

[8]Crysler, 208.

[9]Crysler, 208.

[10]Dutton, *Reconstructing Architecture.*

[11]Boyer and Mitgang.

[12]Ibid.

[13]Ibid, 77.

[14]Ahrentzen and Groat.

[15]Boyer and Mitgang.

[16]Donald Schon, *The Design Studio: an Exploration of its Traditions and Potentials* (London: RIBA Publications for RIBA Building Industry Trust, 1985).

[17]Marvin J. Malecha, *The Study of Design. an Essay for Individuals at the Beginning* (Pomona: School of Environmental Design, California State Polytechnic University, 1986).

[18]Mallika Bose, "Methods of Studio Instruction: Hidden Agendas and Implicit Assumptions," Research Conference of the Architectural Research Centers Consortium (1997): 24-28.

[19]Crysler, 209.

[20]Ashraf Salama, *New Trends in Architectural Education: Designing the Design Studio* (North Carolina: Tailored Text & Unlimited Potential Publishing, 1995).

[21]Salama.

[22]Crysler, 210.

[23]Stevens, The Favored Circle, 192.

[24]Crysler, 212.

[25]Sherry Ahrentzen and Kathryn H. Anthony, "Sex, Stars, and Studios: A Look at Gendered Educational Practices in Architecture," *Journal of Architectural Education*, 47/1 (1993):11-29.

[26]Ibid, 14.

[27]Boyer and Mitgang.

[28]Ahrentzen and Anthony.

Ahrentzen and Groat.

[29]Thomas A. Dutton, The Hidden Curriculum and the Design Studio: Toward a Critical Studio Pedagogy, *Voices in Architectural Education: Cultural Politics and Pedagogy*. ed. Thomas A. Dutton (New York: Bergin & Garvey, 1991).

[30]Ahrentzen and Groat.

[31]Crysler, 212.

[32]Dutton, *Voices in Architectural Education.*

Dutton, *Reconstructing Architecture.*

[33]Crysler, 211.

REFERENCES

Ahrentzen, Sherry and Linda N. Groat. *Roll Over Roark: The Myriad Meanings. Visions. and Experiences of Architecture in the Lives of Students.* In preparation, 1998.

Ahrentzen, Sherry and Kathryn H. Anthony. "Sex, Stars, and Studios: A Look at Gendered Educational Practices in Architecture," *Journal of Architectural Education*, 47/1 (1993): 11-29.

Bose, Mallika. "Methods of Studio Instruction: Hidden Agendas and Implicit Assumptions," paper presented at the Proceedings of the *Spring Research Conference of the Architectural Research Centers Consortium*, Tempe, Arizona: Herberger Center for Design Excellence, Arizona State University (1997): 24-28.

Boyer, Ernest L. and Lee D. Mitgang. *Building Community: a new future for architecture education and practice: a special report.* Princeton: Carnegie Foundation for the Advancement of Teaching, 1996.

Crysler, C. Greig. "Critical Pedagogy and Architectural Education," *Journal of Architectural Education*, 48/4 (1995): 208-217.

Cuff, Dana. *Architecture: The Story of Practice.* Cambridge: MIT Press, 1991.

Dutton, Thomas A. Introduction, the Hidden Curriculum and the Design Studio: Toward a Critical Studio Pedagogy. *Voices in Architectural Education: Cultural Politics and Pedagogy*, ed. Thomas A. Dutton. New York: Bergin & Garvey, 1991.

Dutton, Thomas A. Cultural studies and critical pedagogy: cultural pedagogy and architecture.

Reconstructing Architecture: Critical Discourses and Social Practices. eds. Thomas A. Dutton, and Lian Hurst Mann. Minneapolis: University of Minnesota Press, 1996.

Malecha, Marvin J. *The Study of Design. an Essay for Individuals at the Beginning.* Pomona: School of Environmental Design, California State Polytechnic University, 1986.

Salama, Ashraf. *New Trends in Architectural Education: Designing the Design Studio.* North Carolina: Tailored Text & Unlimited Potential Publishing, 1995.

Schon, Donald. *The Design Studio: an Exploration of its Traditions and Potentials.* London: RIBA Publications for RIBA Building Industry Trust, 1985.

Stevens, Garry. "Struggle in the Studio: A Bourdivin Look at Architectural Pedagogy," *Journal of Architectural Education* 49/2 (1995): 115-202.

Stevens, Garry. *The Favored Circle. The Social Foundations of Architectural Distinction.* Cambridge: MIT Press, 1998.

Jigs, Reels, and the Occasional Air:
Utilizing Irish Traditional Music in the Fundamental Design Studio

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Music is your own experience, your own thoughts, your wisdom. If you don't live it, it won't come out of your horn. They teach you there's a boundary line to music. But, man, there's no boundary line to art. —*Charlie Parker*[1]

Artists have always explored the assumed limitations of their art. This is true for the sources of inspiration that fuel their creations, or the manner in which the work is generated. Architects have always found inspiration from within and outside the architectural world, yet how far does that inspiration propagate into the actual practice and education of architecture? Quite often the demands of any given career choice require that passions other than that of our primary occupations be forgotten, or relegated to weekend hobby, seldom to see the light of day through the garage door.

This sort of limitation can be quite frustrating in the arts when considering that the basis for much of western cultures' forms of art are quite similar in their inherent nature. We find in visual arts much overlap between the disciplines, finding at times expertise in sculpture and painting to be possessed by the same person. As architects and architectural educators we often find the study of the visual arts to be very beneficial to the design of the physical environment. Of course much of this is due to the graphic nature of the conveyance of our intentions: drawings. Drawing as a means to record our perceptions and work through an understanding of place, program, and space is the primary tool in architecture. Yet it does not convey our understanding of the world through senses beyond the visual.

Quite often one finds that the accepted boundaries of any profession can create a condition of resistance when there is an attempt to draw from sources of inspiration beyond them. As a designer and a musician I find myself frequently torn in two seemingly disparate directions. Not only is it inspiration that I draw from music, it is also a means of supplemental income other than that earned in practice and academia. Thus far in my career I have been able to achieve professional stature both as an architectural educator and a piper[2]. Yet as an architectural educator, I am determined to bridge the gap between these two pursuits in ways meaningful to the education of young architects and the profession.

While architectural design remains a predominantly visual field of study, our perception of the world involves a myriad of other interconnecting sensory experiences. Tactility and texture can be inferred visually, as can conditions of moistness and dryness. As influential in the design of the built environment as they are, taste, smell, and sound are not easy to graphically communicate. More often than not, the aural experience of the world is left out of the design equation. Unlike the visual arts to which there is little resistance in their utilization in the conception of space, there is much skepticism regarding attempts to bridge between them, the aural and architectural, the physical.

The educator has a responsibility to embark with the student on a scholarly journey of investigation and discovery, while providing the guidance and encouragement to ask questions and explore new ways of knowing the surrounding world. It is critical that the student and educator together expand intellect, process, and intuition, and learn to hone perceptual tools by questioning givens, doubting constraints, and challenging assumptions.

As complex and holistic of a tradition that it is, the discipline of architecture can be made more accessible to students if not clientele through analogies drawn from more familiar subjects such as art, music, cinema etc. Every one has had some relationship with music in their lives, whether lullaby, adolescent love song, or piano lessons. If this medium for expressing and remembering ideas and feelings can be tapped to convey both the intricacies of materiality and the broad cultural scope of architecture, we could better engage the students' minds and create young designers more prone to thinking outside the box.

As musical education has been proven scientifically to improve the cognitive development of students in other disciplines, the potential for improving perceptual and conceptual abilities in the creative arts is limitless. Looking to vernacular musical forms, one can gain insight into the cultural structure of a place perhaps more thoroughly than if one were to only consider the architectural vernacular. Parallels at the level of structural members, ornamentation, scale, color, texture, layering, narrative and context can be directly drawn between music and architecture. Further understanding these overlaps will foster a more enlightened view of the human condition, and what it means to practice architecture today. Thus, the proposal is that a study of the traditional Irish musical

vernacular will yield a unique holistic cultural and architectural understanding in the fundamental design studio.

VERNACULAR MUSIC & CULTURAL MEANING

Traditional Irish music as it has been played for hundreds of years is utilitarian music for the people and by the people.[3] Traditionally tunes were transferred from generation to generation by ear, shared and learned by playing them in groups called "seisiuns."[4] Thus, the identity of a specific tune's author was lost over the years, and the music was allowed to evolve and grow each time it was changed. There is a complex system by which tunes are named and passed on that in the interest of brevity I will not elaborate on thoroughly. Suffice it to say that one of the primary attractions to utilizing this particular genre of music is that it is free of the whims and designs of any singular voice found in most other musical forms such as classical composition. What this means is that in essence the music can be understood WYSIWYG[5], its inherent structure understood for just what it is without the necessity for comprehending a composer's grander intentions.

This musical form was previously called "utilitarian", which is not an entirely sufficient description. "Traditional music comprises two broad categories; instrumental music, which is mostly dance music (reels, jigs, hornpipes, polkas, etc.), and the song tradition, which is mostly unaccompanied solo singing but has come to include the transposition of *Sean nos* or old style singing to solo instrumental tunes called "Airs".[6] The functionality of dance music is somewhat obvious, serving to provide a musical basis for community gatherings in traditional Irish culture, the dance. The primary purposes of the song and air tradition are to tell stories, to educate, or to commemorate. Thus the "programmatic" requirements of each type of music group is fairly clear, and can be further specified within each category. Within the dance music genre alone, reels, which are the predominant type of tune, are dances for couples, jigs are dances for individuals, polkas are Germanic dances for couples, and hornpipes are technical showpieces for male solo dancers.

The *raison d'être* of many musical forms tell quite a bit about the cultural values of a people or area. What stories are passed down from generation to generation, what tunes from what region are played, and what types of instruments are traditionally used demonstrate historically what economic, political, and technological values are in place at very specific places and times. Dance music prevalently brought people together to share political, social, and familial experiences and inevitably those experiences made their way into the tunes (tune names) and songs of the time. Young designers learn that meaning can be hidden in every aspect of any analysis, whether it is site-related, programmatic, historical, or cultural. Exposure to the subtle way in which cultural values shape the world is imperative in the education of those who will one day help create the physical environment.

The practices of architecture and construction bear many similarities to the practices of composition and musicianship. Not only aligned as creative disciplines, the manner in which each profession operates is remarkably similar. The manner in which information is formulated, translated, and interpreted is only one of these professional similarities. Even the training and apprenticing commonly practiced or required of each is arguably consistent with one another. However professionally similar the practices may be, inherent to this study is a more extensive understanding of the structural ties that can bridge the boundary between what most would consider very different occupations.

DRAWINGS/SCORES

The most striking and useful professional similarity lies in the methodology by which compositional intentions are conveyed from inception to completion. Simply stated, there is an intermediary stage from composition to construction and performance in the form of a document that outlines how ideas are to be made manifest. Either a set of construction documents or a score is necessary to outline the main intentions or rules of a composition. This either can be seen as a communicative recording or approximation of how the composer/architect anticipates his or her intentions to be constructed. This forms the basis for a dialogue between allied practitioners, architect and builder (contractor), or composer and musician (conductor).

In most of these relationships the ways and means of construction or performance are assumed the responsibility of the contractor or conductor, thus the dialogue carried forth by the transcription of intent leaves much room for expression and embellishment. The exact relationship and sequencing between various trades or instrumentations is determined by the contractor or conductor, allowing for and encouraging the expertise of each trade to improve upon the framework set forth in the construction documents or score. In the case of either architecture/construction or music, virtuosity of manifestation is essential to the timeless success of any project, as historic masterpieces of either discipline will demonstrate.

PRACTICE, PRACTICE, PRACTICE

Virtuosity is encouraged and desired in the arts, including the practice of architecture or musicianship. Both disciplines use the model of practice as the primary vehicle to attain professional maturity. In the design studio (educational and professional), design projects are worked and reworked continually until a well-resolved solution is achieved (sometimes culminating in construction in the professional workplace). The education of an architect is based on much iteration of this process until an adequate mastery is attained, but only after much repetition of projects assigned in school, in internships, and over a period of time in practice often assumed to span decades. Many have been quoted to have hit their stride as practitioners in their late forties to sixties, and some continue to improve/practice into their nineties (i.e. Phillip Johnson).

One finds that the education of a musician requires a similarly repetitive model of continual practice and refinement often culminating in performance. Here as well, many are quoted as not achieving mastery until moderately late in life (i.e. Seamus Ennis, the famous Irish uilleann piper is quoted as saying it takes 21 years to become a piper: seven years learning, seven years practice, and seven years performing).[7] As in the discipline of architecture, students of the pipes traditionally begin their instruction with an instrument maker in their area. As proficiency was gradually gained, the student would serve as an apprentice to the maker, helping out in the shop. Mastery of the instrument coincided with the mastery of the craft; the apprenticeship often culminating with the production of the student's own instrument. This model has existed for hundreds of years.[8]

INTEGRATION

The use of music in fundamental design studios is beneficial to introduce and encourage different ways of knowing the built and natural world. Perception of the relationships between parts is a skill essential to the practice of either architecture or musicianship. In regards to the perception of any given architectural problem, the practitioner must understand how multiple layers of context (each highly complex) connect with programmatic, budgetary, code, zoning, and structural requirements and come together to form a complete picture. Similarly, a composer must be able to bring together the various instrument parts (roughly seventeen in a modern orchestra), musical genre, raison d'être, etc. to form a complete composition.

I have begun using basic musical theory to introduce the aspiring architect to design. Starting with a beginning student's first design studio and into more advanced architectural studios, music has served a multiplicity of purposes all in the attempt to both expand upon the student's prior life experiences and to demonstrate basic design and interpretive skills without the necessity to jump directly to buildings. It is the fundamental understanding of formal relationships (as can be found in music), connections, layering, hierarchies and space-time that one must start with in an architectural education. Perhaps a non-building based curriculum can introduce the tenants of architectural design and help design a highly effective methodology of perception and conception without the aforementioned jump.

PART TWO

Vernacular Musical Form

Irish music is a melodic musical form with little harmony if any.[9] Tunes are composed as sequences of individual tones (notes) with varying distances between and different time values. The melodic form can be abstractly thought of as a single line of notes, similar to just the right hand of a piano piece without chords. All players even in large ensembles play or attempt to play the same sequential set of tones (notes). The different range of different instruments including in what pitch and octave they are played adds depth to the tunes.

Tunes transcribed or orally passed between players are mere bare bones of that tune, allowing for much variation from person to person and performance to performance. Every performer will perform a specific tune differently, expressing the music in their own uniquely interpretive way.[10]Divergent applications of ornamentation and harmony allow for the music to change every time it is performed, while the melodic structure itself remains constant. Similarly, any architecture problem can produce an endless stream of solutions with equal clarity. Variation and interpretation (both encouraging individual creativity on the part of the student) can then be grasped fully, and the benefit of multiple solutions illustrated quite clearly.

Very often a constant underlay of tone is present, called a drone. This constancy is also present in various other musical forms, including not coincidentally northern Indian and Middle Eastern music (origins of the bagpipe). The Drone provides a tonic wavelength into and out of which other tone's wavelengths converge. It is created either by a dedicated drone pipe of the bagpipes, by continually bowing a string on a fiddle, or by holding a key on the accordion. The drone can be seen as a groundplane or context against which the melody takes place.

The time signatures of specific types of traditional tunes are constant. Various types of jigs, for example, use time signatures of 6/8, 9/8, and 12/8 (referring in 6/8 time to six quarter notes per measure of music). Reels all use 4/4 time (four quarter notes per measure), and so forth. These strict time signatures and the tune types associated with them allow for all players to play tightly together, even those new to a particular seisiun. As previously mentioned, each of these tempos corresponds to different types of dance, whether solo, duo, or mass. Demonstrating the specificity of each time requirement can be analogous to the programmatic requirements of a project, such as those prescribed by building codes, ADA, zoning, etc. It is of obvious importance to illustrate early in an architectural curriculum that project restrictions are not only important to observe but can also be exploited in positive ways as design determinants.

This particular musical form is ancient, highly structured but constantly evolving, anonymous but uniquely named by its different practitioners over generations, and tightly comprised but with sometimes very elaborate ornamentation. Irish music and similar musical forms are melodic, diatonic, highly rhythmic, with an accompanying drone but with little if any harmonics.

This diatonic structure, which predates much of western music, (most likely rooted in early Chinese and Greek vernacular musical forms[11]) is straightforward enough for students to easily understand the tonic relationship between notes without the necessity of introducing a lot of musical theory. There are usually only two octaves of possible notes in any given tune, with a maximum of 15 diatonic tones or notes with only two standard semi-tone variations (charac-

teristic of either the key of D or G).[12] This rigid structure limits the otherwise great expressive nature that such musical studies can posses, and requires that precision and constant modules of construction be utilized. This sort of restraint would otherwise be a difficult concept to convey to students, particularly those beginning their architectural education.

Design Studio Methodology

This proposal aims to combine experiential translation of musical form with compositional translation of musical form in such a manner as to create a relatively different understanding of space and structure. Once the student masters the transformational process, particularly the translating of perceptions into abstract form, it can be repeated using any urban, suburban, or rural context in place of the Irish musical context. When a physical site is reconstructed using this transformational methodology, the intricate layers extracted from the existing qualities and characteristics of the site can be used to form the conceptual framework within which architecture can be placed.

This methodology focuses on a system of translations that allow for context and content to be read, scrutinized, and reconceived. Existing streetscapes are subject to specific patterns and intervals of party wall and aperture spacing, as well as the spaces carved by streetscapes. In the end, students can be taught to diagram any physical site and its context using this abstracted musical theory and its accompanying notation. The substitution of vernacular music for vernacular architecture allows for context to be understood in abstract, precise layers of structural interpretation free initially of loaded architectural and cultural meaning. While essential to eventually comprehending all aspects of the world within which the students will work and live, the meaning to the components of a streetscape can overwhelm the beginning architecture student. By first focusing on the physical existence of a place and gradually digesting the determinants of that particular existence through abstraction and distillation, the student can better organize this information into a prioritized set of design intentions.

Once this basic structural system is understood abstractly, it is then possible to introduce a non-building design process by which the aural construction of the music is then systematically made into a physical construction. In essence what is being taught, is the systematic and interpretive method by which any component of an architectural problem can be fully analyzed as individual layers of determinants and as a gestalt. Any architectural site urban, suburban, or rural can be studied and transformed abstractly in the same fashion as music. Once the student learns the process, it can be recreated and reapplied throughout their careers to fully understand a set of conditions so that they can work within them appropriately.

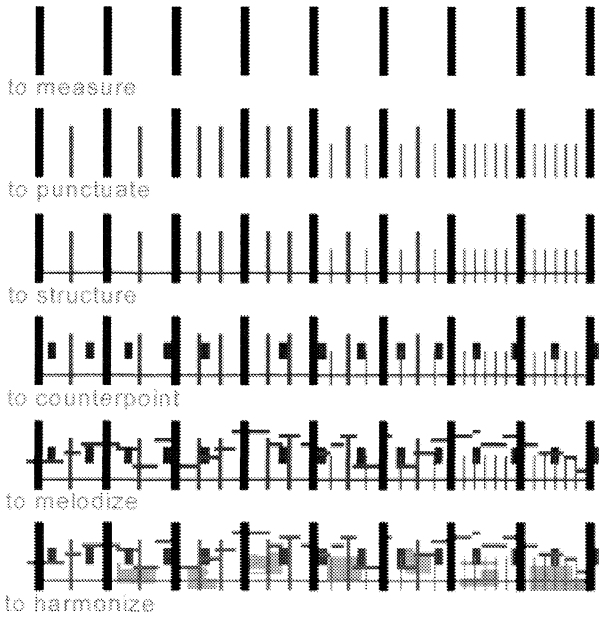

fig. 1: Verb List. Drawing inspiration from the work of Richard Serra, strategies were derived to translate from music to architecture.

Transformation from music to architecture is accomplished primarily through a decoding system. Equivalent compositional elements are assigned to one another across the disciplinary boundary in an initial attempt to structurally create a physical and spatial manifestation of the musical composition studied. What was once aural can now be made physical by breaking it down into its specific systems and parts.

The uniqueness of this proposition lies in the utilization of this very strictly structured traditional musical form to derive (without the dependence of buildings) basic architecture composition: space, structure, material, context, connections, and layering. Most studies to date have dealt with composers who very deliberately used design strategies common to the visual arts and architecture (i.e. Bartok and Mozart with their use of the golden mean)[13]. This study looks to the vernacular form that music, like architecture, can take over centuries of accretion and amalgamation. The tenants of fundamental architectural design that this approach fosters are elementary composition, structure and meter, layering and connections, in conjunction with an abstracted palette of contextual existences for any architectural project. Any context can be analyzed in this fashion, whether it is of deliberate form or a more organic nature.

Studio Project

This is a three-step translation from analysis, to abstraction, and finally design. The process begins with the analysis of one of the aforementioned traditional musical forms, either an air or jig. The above list of translating terms allows for first a drawing and then a model of the particular tune to be created. Using the quarter note or quaver as the primary structural meter of the tune, we equate a standard construction module of 48 inches. Any material or structure system at this fundamental educational level will be divisible by this module. Of course, it can also be broken into three modules of 16 inches, four modules of 12 inches, two modules of 24 inches, and so forth.

The most difficult term to equate between music and architecture is the essential building block of each. What is architecture in its most primary form but the shaping of space? This is of course a flagrantly broad assertion, but for the purposes of fundamental design education it works. The same question when posed to music has to achieve an answer of sound. In fact, many music teachers use space as a metaphor for how to play. Anne Santoro, a former Carnegie Hall performer (clarinet) states that she was taught to play expressively in spatial terms. Certain passages of pieces would require her to fill a vertical space, as in a cathedral. Other times, she was encouraged to play to one side or the other in a more horizontal manner. While it may be impossible to understand this technique fully, suffice it to say that the connection between the spatial and the aural is not completely novel.[14]

Students are first asked to discern the space occupied by the tune, following the melody line as it climbs and descends in section, first documenting the space created by the melody, and then the detailed relationships within the melody. The relative distance between each tone corresponds to a similar sectional change as the tune is drawn to scale. Legato and staccato describe a connected transition from tone to tone and a separated transition respectively. The idea of these tonal connections and the practice of ornamentation occurring between and separating tones can be ascribed then as how each element on the page relates to others.

The tempo or time of the tune is measured using the 48" construction module as a basis for a structural grid to be drawn. As described before, specific types of tunes have very specific timing. This corresponds to the number of notes or beats that will occur in equal divisions of the tune. For example, the double jigs that students worked with have a time signature of 6/8, meaning there are six eighth note beats to each measure of the tune. Variations within this occur allowing for quarter notes to take the place of two eighth notes (commonly called quavers), or dotted quavers taking the place of three eighth notes, and so forth. This adds variation to the tune, and in the case of a double jig, an emphasis to certain parts of each measure of music. How each note or tone then aligns to the structural grid then creates different conditions of overlap and synchronicity. Translated architecturally, relationships between the spatial unfolding of the music can express the structural grid, or deviate from it accordingly.

fig. 2: Sliabh na Mban. A traditional Irish Air transcribed from the playing of the author (learned from fiddler Kevin Donleavy)

fig. 3: Sliabh na Mban. First step of translation is the section. Drawing by Peter DePasquale

Further structural characteristics beyond simply the melody and tempo must also transform in order for sufficient complexity to be achieved. While relatively infrequent in traditional Irish music, harmony affords the possibility of further layering to occur, whether it is spatial or formal. Logic dictates that as the melodic translation results in spatial articulation, then as harmony is fundamentally a secondary or tertiary melodic layer, then it too should translate as spatiality. Depending on the relative tonic relationship between the melody and the harmony at specific points, the harmonic spatial layer can occur parallel to, oblique to, tangential, or within the primary melodic spatiality. Whether the melodic tone and the harmonic tones are in or out of phase can determine whether there is a volumetric connection between the two (or more) spatial constructions. This process can continue to encompass as many layers of translation as desired, and can be taken to as small a detailed level as appropriate to the level of students involved.

After every additional aspect of the students' observations is conveyed to paper, the tune must again be analyzed in order to extrude or interpret the drawing into the third dimension. The diagrammatic tunes are then given volumetric sustenance and built as abstract armatures of limited materiality. Students are encouraged to not uniformly extrude the tune from the paper as a base, but instead to work simultaneously with negative and positive heights for elements. Similarly, elements on the paper are allowed to remain as additive elements in the built armature, or as voided elements, as long as there is consistency to the logic. One method of determining what is additive and subtractive is the defining of a datum extracted from the music itself. For example, the particular tone that separates two octaves can serve as the datum, placing the lower octave below this level and the second octave above. Tones in phase with the background drone can be treated as either additive or subtractive, while tones out of phase can be treated as the other. The importance is that the student interprets a system of prioritization, and uses it consistently throughout the development of a project.

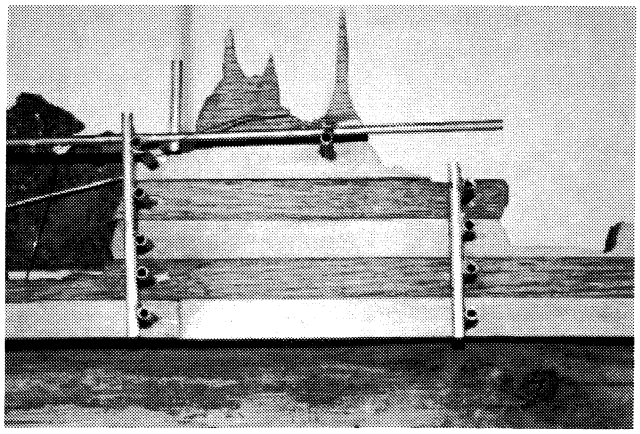

fig. 4: Sliabh na Mban. Detail from model of Air. Model by Elizabeth Magalis.

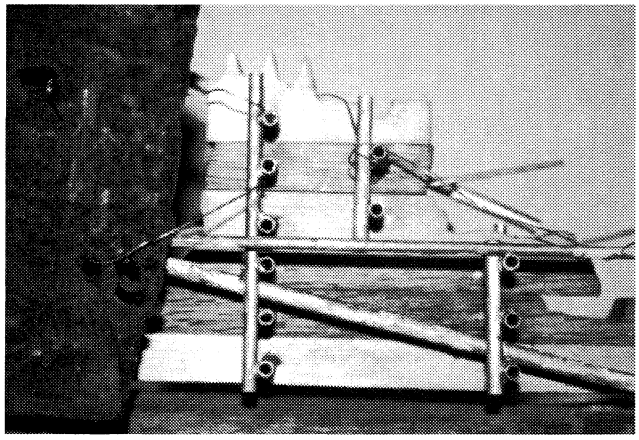

fig. 5: Sliabh na Mban. Detail from model of Air. Model by Elizabeth Magalis.

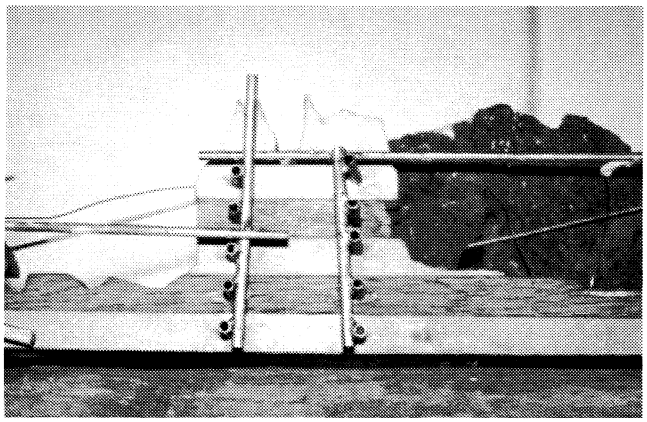

fig. 6: Sliabh na Mban. Detail from model of Air. Model by Elizabeth Magalis.

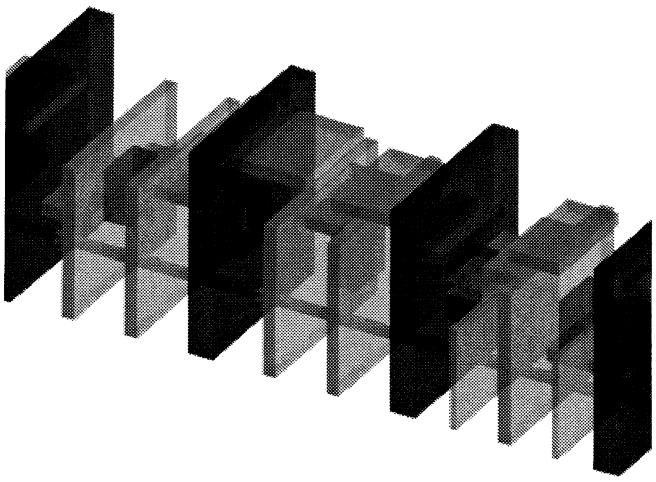

fig. 7: Sliabh na Mban. Detail from digital model of Air. Model by author.

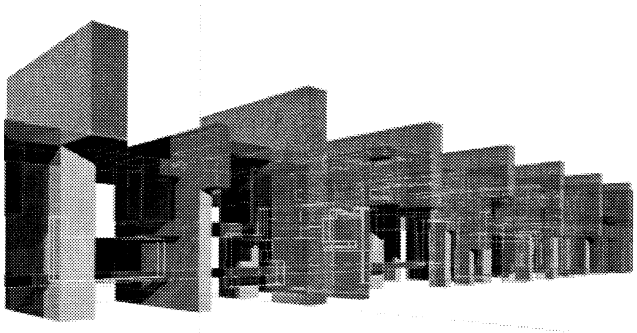

fig. 8: Sliabh na Mban. Detail from digital model of Air. Model by author.

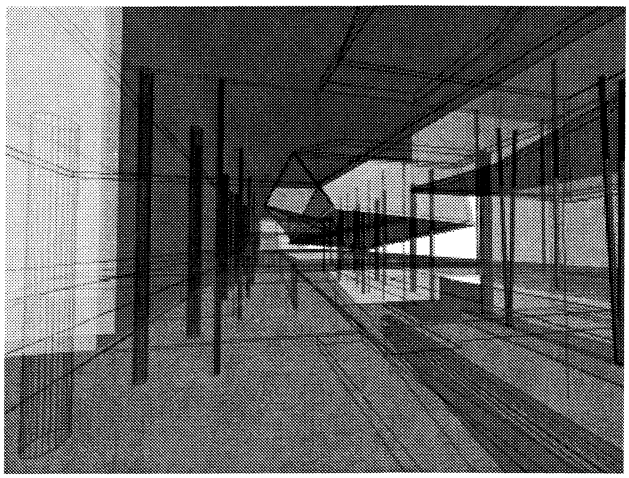

fig. 9: Sliabh na Mban. View through digital model of Air. Model by Pete DePasquale.

Students are asked to decide how to attach the various layers of their constructions to one another, using rules that they have developed in drawing the relative relationships between notes and notes, notes and the beat, between the melody and any harmony, etc. One method for attachment utilizes the notion of melodic ornamentation, "extra" notes added to a tune in order to separate two like notes when playing legato style, to express or draw attention to a specific passage, or to add a texture to the music unique to traditional Irish music. In many cases, a highly evocative tectonic is developed that can serve as a basis for the next step of the translation.

The tune armatures are then recreated on the computer, allowing for space to be sculpted within the material solids. Using form Z as our digital modeler, students constructed their armatures digitally, ascribing material thickness to each element. What was treated as a solid element in the physically built armature now becomes volumetric with membrane thickness. Since passage through the constructions is now possible, an architectural procession can be mapped through the projects, and space can be hierarchically gradated from public to private, thus continuing to ascribe specificity to the spaces and allowing for further "inhabitation." Using the walkthrough capabilities of the program, students can now study how spaces connect and flow into and through one another, and can continue to design the details of thresholds between disparate layers.

In the end, one can virtually occupy the tune as one would occupy a building, but without the imposition of preconceived ideas of windows, doors, stairs, etc. This allows for the design to remain in an abstract, conceptual stage and encourages the avoidance of default architectural (or building) elements being imported into the project. The transformation from concept to physical manifestation also allows for relationships between seemingly disparate elements of a design problem to be discovered and exploited positively. Unfamiliar subject matter in a project's determinants can be made comprehensible through this process, enriching the students' collection of design determinants. Complexity and contradiction can be understood and commandeered within any contextuality, further opening up the possibilities for new avenues of architectural investigation. The translations are intended to operate experientially and compositionally in the students' designs.

Dissecting a subject in this fashion is beneficial to understanding both the compositional and the gestalt nature of the perceivable world. Architecture, the amalgamation of endless determinants, ideas, ideals, trades, constraints, restrictions, and endless frustrations can be embraced as a very fruitful and positive way of experiencing life. By simply learning to think of the world in more holistic terms, not singularly as an architect, musician, doctor, or carpenter, but as a complete human being, and by enthusiastically imparting this open attitude to our students, we can positively address conditions of restraint in the profession and in academia, while ensuring the success of future generations of practitioners, clients, and teachers.

NOTES

[1]Horovitz, Michael Children of Albion: Poetry of the Underground in Britain, "Afterwords," sct 3, Columbia Dictionary of Quotations, Columbia University Press, 1969.

[2]As a member of the National Uilleann Piping Society of Ireland (Na Piobairi Uilleann) and the newly founded Arizona Uilleann Piping Society, I have been able to publish internationally an article about the instrument as well as participate in various international conferences and gatherings. As rare as uilleann pipers are (only a handful documented I each state in the USA) I have been able to gain a reputation as a piper and teacher in Virginia.

[3]Manuscripts dating back to 1171 during the reign of Henry II document the existence of Irish musical form similar to what is presently known as traditional Irish music. Further evidence demonstrates that it is relatively unchanged since the dark ages.

"The attention of this people to musical instruments I find worthy of commendation, in which their skill is beyond comparison superior to that of any nation I have seen, for in these modulation is not slow and solemn, as in the instruments of Britain, to which we are accustomed but the sounds are rapid and precipitate, yet at the same time sweet and pleasing...delight with so much delicacy, and soothe so softly that the excellence of their art seems to lie in concealing it... Flaherty, Bernard, Trip to Sligo, Purcell Print, Boyle, Co. Roscommon, 1990, page 1.

[4]The term "sesiun" is the Irish term referring to a frequent gathering of musicians. The English term "session" as in "jam session" very likely is based on this word.

[5]WYSIWYG is the computer anagram for "what you see is what you get" referring to a variety of software relying on intuitively based graphic tools to input data rather than the input of data in text or code form.

[6]Carson, Ciaran, Irish Traditional Music, The Appletree Press, Ltd., Belfast, Northern Ireland. Page 5. This small but prolific guide to Irish Traditional Music focused not only on the instruments and structure of the music, but on the historical and sociological meaning of it.

[7]Seamus Ennis was quoted as saying this about the education of a piper. Ennis was a prolific collector of music and folklore, and is considered the master of Irish traditional master as a singer, dancer, whistle player, and above all a piper. While there are various sources for the quote, I refer again to Carson's Irish Traditional Music, page 16-17.

[8]Even now master pipers and pipemakers such as Davy Spillane, Seth Gallagher, and Kevin Rowsome carry on this tradition. They are only three examples of pipemakers, teachers, and performers continuing with the traditional model of apprenticing with a master, often a father or grandfather. There are may such examples too numerous to thoroughly cite throughout the recent history of traditional Irish music. However, the point is that this relationship between master and apprentice, between practice and education exists nowhere more clearly than in architecture and music.

[9]There is very little harmony (tonic combinations that share converging and proportional wavelengths resulting in a pleasing sound) with most Irish musical traditions. Most practitioners in fact discourage harmonic accompaniment, although some rare instruments actually can accompany themselves (melodeon, accordions, uilleann pipes). Over hundreds of years, Irish piping tradition, for example, has developed a bagpipe that allows for a melody to be played with the hands, harmonic chords to be played with the wrists, and a constant drone to be played via a complex system of reeds, valves, and pipes. As in most Irish music, the melody is the focus of the piper, but at times the piper can in essence accompany him or herself. This can be performed with the wrist keys to create harmonic chords, a second melody, or a "vamping" contrapuntal rhythm of tones in synchropation with the primary melodic structure of the tune. Thus a simple melodic structure can become quite rich with complexity and contradiction the more a tune is explored. Vamping refers to the utilization of harmonic chords or single notes in a rhythmic manner to add texture or momentum to a tune, specifically by an accordion player or a piper. Finbar Furey is famous for this technique which he acquired from the playing of Johnny Doran, Patsy Touhey, and Seamus Ennis. When asked why he played as fast (referring to both the chanter and vamping) he often replied "Because I can."

[10]Gil Hocker, noted American uilleann piper states quite clearly that it Is the ornamentation that is the essence of Irish music. While I am not in full agreement with Mr. Hocker, the unique ornamentation of the uilleann pipes does distinguish them as a very mellifluous, evocative instrument. Various instruments have different "paths" between notes, and thus different ornamentations or embellishments that can occur between notes differ from instrument to instrument. Some ornamentation has a specific syntax universal to all instruments. Similarities in texture and time can exist between instruments, but some are very unique to specific instruments. Some experts argue that the essence of Irish music lay in the ornamentation, but others maintain it is the strict rhythmic quality that is its beauty.

[11]Irish music is diatonic in nature (composed in a key based on an uneven progression of whole tones and semitones), as opposed to chromatic (composed in a key based on an even progression of semitones alone). It is thus conceivable to spatially understand a melody as a sequence of specific intervals with highly specific dimensions (spacing). Every tune is made up of the exact same notes with vary little variation. This diatonic scale for reference is invariably either D or G (denoting the bottom note of the scale). Bernard Flaherty writes in Trip to Sligo (Purcell Print, Boyle, Co. Roscommon, 1990, page 1)"These gapped scales are said to have their origins in ancient China and even Pythagoras, the Greek mathematician, is considered to have been the originator of one such scale."

[12]Flaherty, page 2.

[13]May, Mike, "Did Mozart Use the Golden Section?", American Scientist-March-May 1996 (http://www.sigmaxi.org/amsci/issues/Sciobs96/Sciobs96-03MM.html). "In the October 1995 issue of Mathematics Magazine (68(4):275-282), Putz described his investigation of whether the golden ratio appears in Mozart's piano sonatas. According to Putz: "In Mozart's time, the sonata-form movement was conceived in two parts: the Exposition in which the musical theme is introduced, and the Development and Recapitulation in which the theme is developed and revisited.... It is this separation into two distinct sections ... [that] gives cause to wonder how Mozart apportioned these works." That is, did Mozart divide his sonatas according to the golden ratio, with the exposition as the shorter segment and the development and recapitulation as the longer one?

Putz represented the two sections—the exposition and the recapitulation and development—by the number of measures in each. In the first movement of the Sonata No. 1 in C Major, for instance, the exposition and the recapitulation and development consist of 38 and 62 measures, respectively. "This is a perfect division," Putz writes, "according to the golden section in the following sense: A 100-measure movement could not be divided any closer (in natural numbers) to the golden section than 38 and 62." An equally good approximation to the golden section exists in the second movement of that sonata. The third movement, however, deviates from the golden section.

A clear answer to Putz's question required looking at more than one sonata. So Putz examined 29 movements from Mozart's piano sonatas-the ones that consist of two distinct sections. Then he plotted the number of measures in the development and recapitulation versus the total number of measures in each movement, which is the right side of the golden—section equality as given earlier. The results reveal a stunningly straight line-so straight that its correlation coefficient equals 0.99, or nearly the 1.00 of a perfectly straight line. Moreover, the distribution of the ratios of the number of measures in the development and recapitulation to the total number of measures in each movement lies tightly packed and virtually on top of the golden ratio." Steven Holl is quoted in an interview with Progressive Architecture (PA November 1992, page 57) that he was "particularly influenced, as the design for this[Stretto House] house developed, by listening to the *Music for Strings. Percussion. and Celeste*, by Bela Bartok, who used golden-section relationships in his compositions." This assertion appears in other sources as well, but seems most appropriate in an article about architecture.

[14]Anne Santoro was a student of mine in the summer of 2000. She is a classically trained and award winning clarinet player. Her symphony orchestra was asked to play Carnegie Hall prior to her coming to the University of Virginia. Because of her tremendous musicianship and scholarship (Anne is an Echols Scholar, majoring in both religions studies and architecture) we have been able to share ideas about the integration of music and architecture. It was this integration in fact that has encouraged Anne to transfer to the school to architecture upon completion of her religious studies degree.

REFERENCES

Bohlman, Philip, The Study of Folk Music in the Modern World, Indiana University Press, Indiana, 1988.

Breathnach, Breandan, Folk Music and Dances of Ireland, Ossian Publications, Inc., Cork, 1971, 1996.

Carson, Ciaran, Irish Traditional Music, Appletree Press, Ltd. Belfast, 1986.

Carson, Ciaran, Last Night's Fun: In and Out of Time with Irish Music, North Point Press, New York, 1996.

Cowdery, James R., The Melodic Tradition of Ireland, The Kent State University Press, 1990.

Fintan Vallely, The Companion to Irish Traditional Music, New York University Press, 1999.

Flaherty, Bernard, Trip to Sligo, Purcell Print, Boyle, Co. Roscommon, 1990.

Foy, Barry, Field Guide to the Irish Music Session, Roberts Rinehart Publishers, Boulder Colorado, 1999.

Harp, David, Music Theory Made Easy, Musical I Press, Inc., Montpelier Vermont, 1994.

Martin, Elizabeth, "Architecture as a Translation of Music", Pamphlet Architecture 16, Princeton Architectural Press, 1994.

O Canainn, Tomas, A Lifetime of Notes: The Memoirs of Tomas O Canainn, The Collins Press, Cork, 1996.

O Canainn, Tomas, Traditional Music in Ireland, Ossian Publications, Inc., Cork, 1978, 1993.

Perloff, Marjorie, and Junkerman, Charles John Cage, Composed in America.The University of Chicago Press, 1994.

Seashore, Carl, Psychology of Music, Dover Publications, Inc. New York, 1938, 1967.

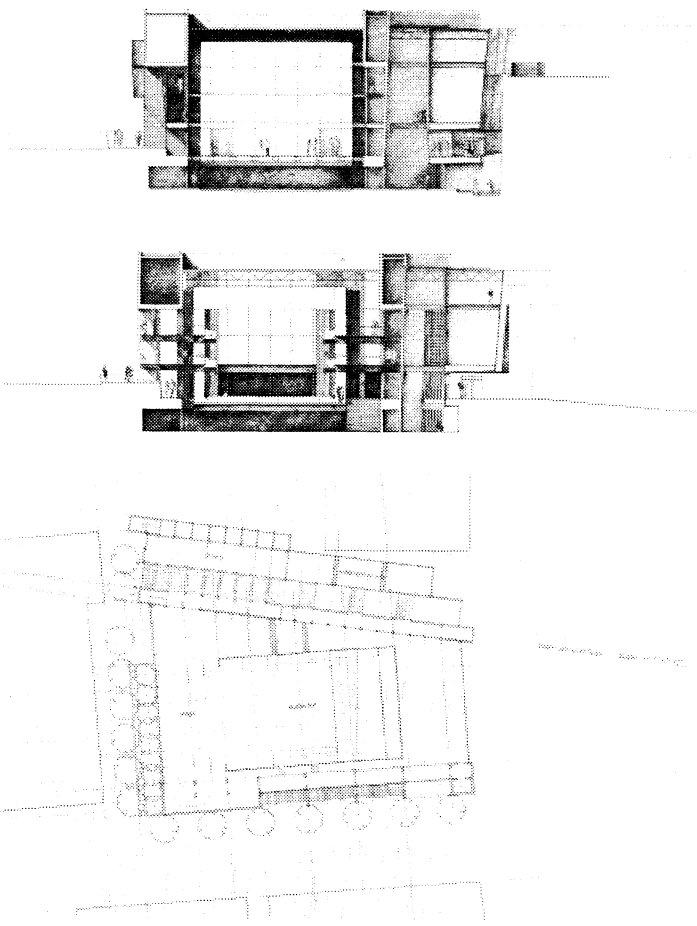

fig. 10: Kid on the Mountain. Petersburg Performing Arts Center based on translation of traditional Double Jig "Kid on the Mountain. Drawings by Andrew Burdick.

Product Design and Innovation:
Architectural Pedagogy as a Template for an Interdisciplinary Degree Program

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BACKGROUND

The pace of technological change is unprecedented and the impacts of technological innovation are often profound. Concurrently, there is a growing recognition that significant challenges await us if the nation is to compete successfully in a highly aggressive global economy, while also seeking to share social well being and restore the natural environment upon which all life—and technology—depends. While uncertainty and insecurity clearly exist, so do opportunities for innovative and creative thinking; traditional disciplinary boundaries are more permeable, and new connections can be forged. The complex, multidisciplinary challenges of the twenty-first century demand leaders able to integrate diverse perspectives into creative design solutions.

Encouraging future engineers to "contemplate their work in the larger context," NSF Acting Deputy Director Joseph Bordogna [1] enlists philosopher José Ortega y Gasset to support his call for a greater emphasis on integration. Ortega writes, "The need to create sound syntheses and systemization of knowledge...will call out a kind of scientific genius which hitherto has existed only as an aberration: the genius for integration. Of necessity this means specialization, as all creative effort does, but this time the [person] will be specializing in the construction of the whole". With this as his inspiration, Bordogna asserts:

> *Design becomes the leverage point of determining a product's impact on our lives. In this sense, when we educate [for] the incorporation of technology we must instill not only technical expertise but also lead them to examine and question the goals and value-system of the society they are being prepared to build. And, we must also help them recognize that their skills as constructors, technologists and engineers allow them to alter dramatically the present and future direction of that society.*

To achieve these goals engineering design education must provide concrete experience in integrating first-rate technical competence with a thorough understanding of the social and cultural context of technologies and the design processes that shape them. The School of Architecture and the School of Humanities and Social Science (H +SS) saw this as a call to action for a proposal that could inform the general engineering community around us. This multidisciplinary approach to building science and engineering design education demands that the relevant knowledge base be expanded to include facility and expertise not currently being required of engineering students. What is often taken for granted by architectural educators, the collision of the formal with the social and technical through design, is a radical shift for engineering pedagogy.

Over the past eight years professors from the Schools of Engineering, Architecture, and H&SS have been working together to develop an inter-school, multidisciplinary design pedagogy. According to a survey that we conducted of industrial and product design programs around the country[2], similar programs fall into two categories: one stresses technical or engineering expertise (housed in an engineering school), and the second stresses aesthetic or arts expertise (housed in an arts and/or architecture school). Since there is little, if any, overlap, they fail to integrate the insights and expertise of each other. Moreover, neither specifically incorporates into the curriculum an expertise in how products shape social and cultural relationships and how these relationships shape products. The challenge is to provide models and experience in integrating all three kinds of expertise as equal components of design education: the technical, the social/cultural, and the aesthetic.

Industrial Design (ID) is concerned with a broader spectrum of design activity, spanning everything from graphics and package design to exhibit and environmental design. Typical Industrial Design training entails a broad art education that does not delve into any one subject most interested in the skin of products but not the actual inside workings.

The primary concern of engineering design is the application of analysis to achieve some function with the optimal use of resources (materials, money, energy). Most engineering design problems are not concerned with developing the initial needs for a product, nor are they typically concerned with the interdependence with society. The technical challenges of making a product function safely and efficiently—as if the product could be disconnected from the social/cultural context in which it will come to life (e.g., crash tests of air bags with an average male body)—are typically of most concern to an engineering designer.

The innovative product designer is able to observe the world from a perspective informed by both understanding technology and "seeing" (or "reading") the mutual shaping of technology and society. The strong technical education allows the product designer to understand the "inner workings" of technological products or systems, as well as to imagine how the elements of these inner workings—entirely new elements or "technological enablers"—might be put to work in previously unrecognized ways. The strong education in the social sciences helps understand ways of life deeply enough either to anticipate a future need in those lives or to escape being trapped by everyday inertia.

Rensselaer's strengths in its Schools of Engineering, Architecture and the Department of Science and Technologies Studies (STS) in H&SS, serve as the foundation upon which to base a totally new approach to product design education. STS includes faculty from six disciplines—anthropology, history, philosophy, political science, psychology, and sociology—all of whom work on understanding how science and technology shape society and how in turn society shapes science and technology.

Our inter-school program in Product Design and Innovation (PDI) integrates these basic ingredients of design education: a sense of creativity and visualization; sensitive perceptual and communication skills; hands-on modeling and drawing skills; an understanding of the human body and its ergonomics; a design sense, including an understanding of problem formulation, idea generation, and solution itertion; the ability to work well on teams; technical skills, including machining, rapid prototyping to computer aided design (CAD); an understanding of basic engineering science and manufacturing, with the art of functional analysis; an understanding of the basic disciplines in science and technology studies, featuring the art of reading a culture (ethnographic methodology); an understanding of how a product is/will be situated in our lives, or rather, the art of reading a user; basic market and human factors analysis skills; an ability to work at all scales of a product's context and life history; and presentation skills to convey all of these ingredients at once.

The design experiences in the program are intended to cultivate in students the ability to function effectively in new situations and unfamiliar environments, to collaborate with a diverse constituency to formulate and analyze problems of varying complexity, and to work individually or in teams to produce innovative design solutions that reflect this "genius for integration." Even for the architects, the joining of a rigorous pursuit of STS and deep engagement with technology pushes the limits of our discipline.

THE BASICS OF PDI

The institutional and administrative infrastructure for the PDI program are two dual-degree programs- one jointly offered by the Schools of Engineering and of Humanities and Social Sciences (H + SS) and the other by the School of Architecture and H + SS. Students will satisfy the requirements for the Bachelor of Science in both Engineering Science/Engineering or Building Science and STS.

The core of PDI is the design studio that students take every semester, giving them a hands-on opportunity to bring together the major curricula. The studio acts as the melting pot and arena for interdisciplinary contamination by the students of engineering, architecture and humanities and social sciences.

THE FIRST DESIGN STUDIOS

PDI 1 is based on the premise that disciplined, creative design is learned through the act of doing and making in the studio experience. PDI design studios seek to develop active, dynamic drivers of innovation, and strive to uncover, and get rid of, overt and tacit barriers to creativity within each student. The central concerns of this semester are to open up ways of being in the world - through sensory awareness, through experimentation and physical engagement with artifact, client, site and program and through working methods for suggestive and precise communication. These studies are meant to encourage curiosity and risk while maintaining exhaustive rigor and investigation. The development of reflective judgment is a significant aspect of this course. At the same time, the first design studio (PDI 1) begins the process of building a toolkit—primarily on the exploratory and aesthetic side—that the student will use throughout the entire program.

1. Keeping a design notebook
2. Seeing and visual exploration
3. Values and objectives
4. Drawing and spatial constructs
5. Creativity exercises: wire modeling exercises
6. Negotiation – reaching for consensus
7. Problem identification and definition
8. Design by scenario
9. Short design projects
10. Course capstone project

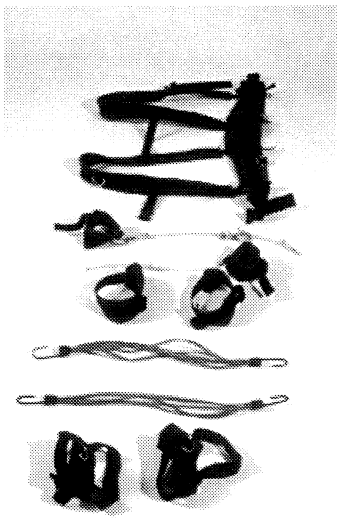
Figure 1. Topics in PDI Design Studio I.

There are ongoing seminars and assignments in freehand drawing and computing parallel to the main design studies that are linked to the main design studies in varying degrees and at various times. They are designed to give students multiple modes of understanding and delving into design processes. We emphasize challenging preconceived assumptions and encourage processes that set up opportunities for their defamiliarization. In developing the pedagogical framework for this new curriculum, many issues and concepts that we, as architects, take for granted had to be put on the table again.

While practical creativity is the primary emphasis of PDI 1, a concern for the social context of design is introduced in each assignment's review process. For example, in the first iteration of PDI 1 the students were broken up into four teams and challenged to design something to improve the space of their own studio. No explicit reference was made to the social relations or tacit assumptions of the students and faculty. (One team, for example, had designed a new kind of table, but for exactly the number of people in their own group, as if this number were sacred, not to be questioned).

A good example of how we want the students to explore design issues is the wire model exercise. Take some wire and try to model the motion of some part of your body, say, a hand reaching to open a door by turning the door's knob. Because of the inherent complexity of ergonomics, to understand the human body requires at the same time to defamiliarize the human body, to become, as much as possible, aware of it at all times, especially for those aspects of body which have long ago disappeared from consciousness.

The semester continued with the students working with a local camping gear manufacturer – Tough Traveler (TT)- to explore new uses for TT's existing technologies and to develop their product line. The students produced drawings and conceptual models, from which the seamstresses and structural formworkers generated working prototypes.



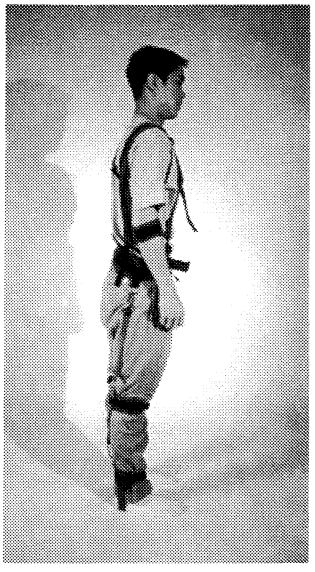


Figure 2. Components of the Passive Exerciser. Figure 3. The Passive Exerciser in situ.

The Passive Exerciser uses existing bungee cords and straps to bind parts of the body. The straps are embedded with a chip rendering the straps "smart". These chips can be removed, sent to a physiotherapist to be analyzed and appropriate exercises appended to this "passive" exercising can be supplemented for a complete physiological workout.

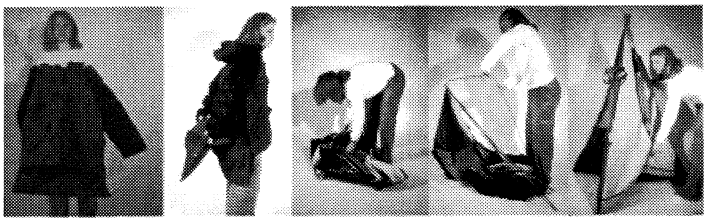


Figure 4. "Jacket into Tent" project.

The next iteration of the studio began by developing an imagined topological construction that addressed very specific, but open-ended constraints where we were looking carefully at the relationship between form, construction, fabrication and renewable resources.

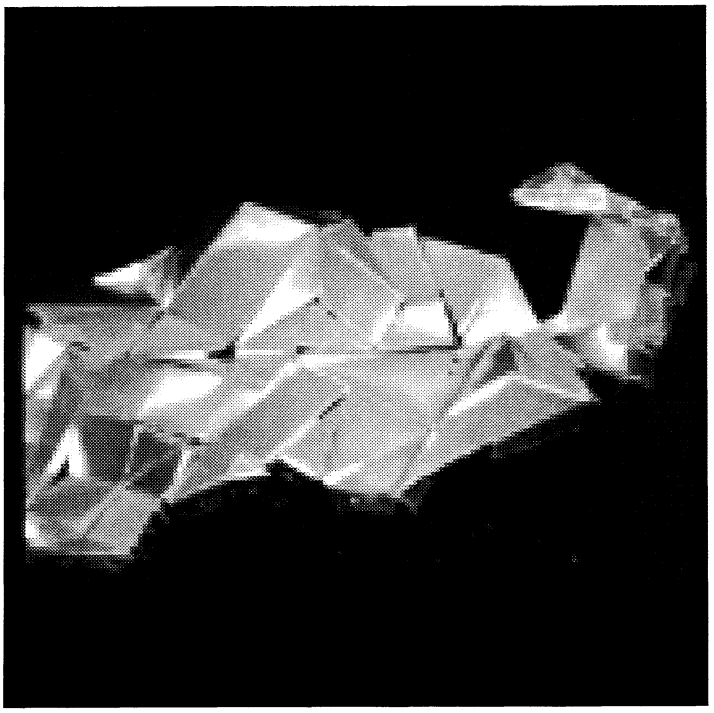


Figure 5. Topological exploration.

In the second half of the semester we developed prototypes for local farmers' market structures. The purpose was to develop an expandable/collapsible/portable system of display, shelter, attachment, layout, etc. for the vendors' goods and could be secured to the site.

After a two-part research phase including the examination of the existing Troy Waterfront Farmers' Market and documenting existing expandable displays, tents, connections, advertising, baskets/

carrying devices, layouts etc. as precedents, the students generated full scale working prototypes for an actual day in the working market. In this way they were able to address many aspects of their manufacturability as well as their usability and spatial consequences.

Figure 6. The Booja transportable shelving unit.

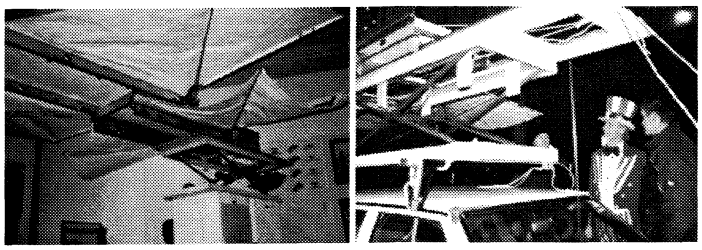


Figure 7. The "Wing-It"-an expandable tent system attached to the car.

The new possibilities inherent in the interplay of the social and the technical received a more explicit focus in PDI 2. PDI 2 was led by Edward Tenner's, "How the Chair Conquered the World" [3]. How many of us in the USA have any awareness of what it means to be in a culture that does not typically have/use chairs? What happens when chairs are introduced, and gradually adopted throughout the culture? Tenner tells us, "In Japan, where many households have maintained both tatami and Western rooms, younger people are finding it increasingly difficult to maintain traditional ground-level seating positions." It also established an even larger "generation gap" as the elders occupied the floor, and the youngers the space above.

The major design project of PDI 2 became the design of a chair to be manufactured from cardboard (again, an obvious project for architects vis a vis Frank Gehry, in his study of materials and ergonomics through an investigation of layered corrugated cardboard). The students were presented with the Tenner article as well as other related articles. To bring out all the social and cultural aspects of this design experience, the students were presented with the basics of doing ethnographic research, particularly conducting interviews.

Along with this social study of sitting, the students progressed through a series of (perhaps typical architectural) design explorations aimed at understanding how cardboard could be used as a building material. The intensity of the social study of sitting as well as the manufacturing and production of chairs challenged fundamental perceptions that could open up the material questions of "What was the effect of laminating it, of peeling it apart to form a new material, of wetting and forming it, or of weaving? How could it be joined to make new kinds of joints?" What difference does the technical make to the social?

The third PDI studio focused on the intersection between ethnographic techniques of data gathering and information technology (IT) design. Ethnographic methodology includes participant observation, explorations of the social dimensions of technology, participatory design, and other anthropological perspectives that illuminate both the design process and the potential social impact of the finished product. IT includes both hardware and software, and ranges from new forms of communication (internet, intranet, infrared, etc) to new aspects of the human-machine interface (detection of body movement, sound, light, heat, etc). By training students to think about the synthesis between these two themes - ethnography and IT - they are able to explore mutual collaborations between product design and the knowledge of lived experience.

This semester's projects were based on design of educational toys. The field site that allowed students to learn ethnographic skills was at an elementary school with significant numbers of low-income children, which allows for consideration of wider social issues such as ethnic identity and economic class. Design students 0conducted four phases of ethnographic experience:

1) Participant Observation: actively participated with students in the classroom and playground. They were directed to record field notes that included learning challenges, emotional changes, spatial patterns, and other behaviors, and then follow up with an interview with the teachers.

2) Design probes: required the creation of a design which would produce some response in students that illuminated the aspects of learning and play that would (hopefully) be manifested in their final design. Here the value of the ethnographic technique became clear, since most of their predictions and expectations were wildly off, and many new directions were inspired. By the time prototypes were produced, a keyboard device had turned into a floor mat; a series of weighted balls became a video game, and a video game had turned into a "sensor glove" that turned light patterns into sound.

3) User feedback: working prototypes were brought back to the school for a final round of observation and refinement. Feedback from teachers on various aspects of the designs, from safety concerns to special learning needs, were also invaluable in the final assessment.

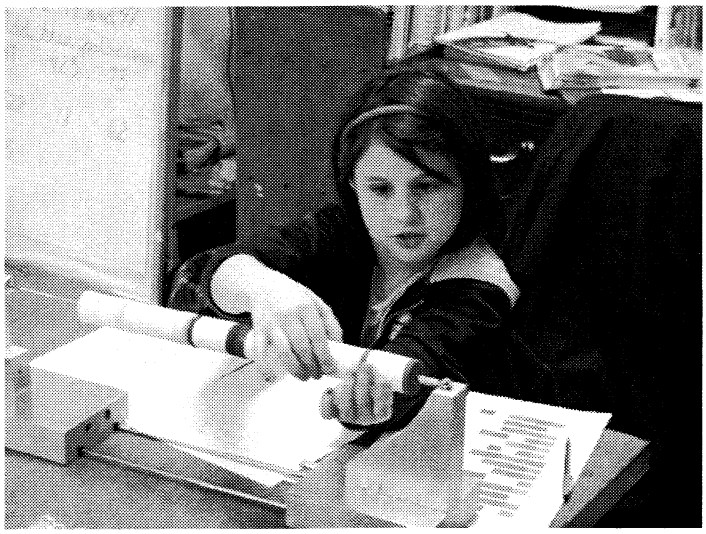


Figure 8: The Sentence Stick – an example of IT. automatic writing and toy: navigating grammar through color.

PDI 4 is an existing core engineering studio that works across all engineering disciplines. PDI 5

is an industrial design studio devoted to exploring the relationship of abstract ideas and values, particularly esthetic, to industrial design and its presentation. The students take "General Manufacturing Processes" along with this studio and creating a compelling coupling of the abstract and the produced.

The ethnographic approach envisaged for PDI is distinctly different from what is traditionally referred to as market research. Responding to this, our sixth studio addresses a specific goal of the program, which is to educate designers with a strong sense of advanced technology and the tools for employing new technologies into design. As new technologies emerge, new, unanticipated products often emerge as well. This design studio focuses on developing new product ideas that utilize emerging technologies that are being developed on campus. Students investigate the range of research efforts currently under way at RPI from nano-technology interventions, to polymer development, to optical simulation devices, select technologies that hold particular interest for them, match them to a particular societal need, and then develop a new product idea through a series of prototypes.

Acknowledging that the program needs many real connections to industry, for good student placement, for realistic up-to-date and cutting edge manufacturing sensibility, pairs of industry person-theory person will be running particular studios (e.g. medical equipment designer and sociologist of medicine on a neonatal instrumentation). The interpolation between these radically different realms, and also towards material embodiment without relying on formal esthetic descriptors (i.e. most product designers) brings us to PDI 7 and 8 that are centered around the Multidisciplinary Design Lab. The students bring their STS and engineering backgrounds to bear on industry sponsored design projects. They work as members of a multidisciplinary design team comprising different engineering and non-engineering disciplines in the solution of a design problem posed by an industry sponsor. Students pull from their backgrounds in engineering and STS. It is in the demand to fulfill the sponsor's expectations and look at previously unconsidered conditions of social, political, cultural and economic frameworks that make this capstone significantly different from normative engineering curriculum industry-run projects. Numerous meetings, presentations and reports are required to document student findings. Topics include robotics, injection molding, computer numerically controlled, machines, metal-processing systems, nondestructive testing, and industrial safety. Both industry sponsors and theoretical analysts critique the prototypes. This provides a forum for corporate and academic interaction.

THE REAL CHALLENGE

Every product tells a story. Our students need to learn how to 'read' products, including their technical, social/cultural, and aesthetic dimensions. To illustrate what this means for the challenge ahead, reconsider the wire model exercise.

Suppose that someone is trying to model the motion of a hand reaching out to turn a door's knob. Crucial will be raising to consciousness what it is to twist the arm, wrist, hand, and knob. Imagine a student reaching out time and time again, slowly and painstakingly trying to figure out how to work the wire to express what he or she is feeling from inside out.

But suppose we step back from this level of the twist. Can all of us perform the twist, for example? One striking innovation in our lifetimes is barrier-free design. What can we 'read' from a culture that has only knobs that need twisting on its doors, and then gradually begins to replace knobs with, for example, levers to open doors by pressing with one's elbow? What *is* involved in the breakthrough that ushered in barrier-free design? Notice that here we are asking about a hole in a culture, where a breakthrough can take place. (The ability to 'read' such a hole is the other side of the coin of the ability to 'read' an existing product.) How do we create a design studio in which students ask and understand such questions?

One thing is surely to foster an understanding of a person's disability as *between* that person and the world rather than 'in' that person. If we rearrange the world in a suitable way (replace knobs with levers), the disability disappears. But a suitable rearrangement of ourselves may equally well remove a disability: just imagine stationing at every door a person whose job it is to open and close the door for those who cannot twist its knob! And who has trouble twisting a knob? Sometimes this too is due, at least in part, to how we arrange ourselves. Imagine a person carrying a child in one arm and groceries in the other. But most importantly, notice that to illuminate the relations between us and the world several viewpoints are necessary. Even in the relations between the human body and a door knob or lever we will already need the whole variety of perspectives in PDI. What part of the human body will we use to get through doors, and how does it work/move? If we choose a lever, for example, how much pressure should the lever require in order to move, and what sort of mechanism will work? Where on the door is it, and what kind of door is best? Then again, perhaps we should

not have a door at all, or alternatively, a door-person to open and close it. The sociology of a door-opener/closer is actually famous in STS circles, as Bruno Latour (1995) has written a revealing piece about the social and cultural trade-offs between a person and a mechanism for opening/closing doors: we learn how to 'read' products such as knobs by treating them as 'actors' who play a role in our lives.

DIFFICULTIES

For engineers and other technologists we may need to begin in a way where we can see technology as a kind of social institution. For the arts-based designers we need to work in a way to have the technology embedded in the social from the very beginning. It is as difficult for our arts-oriented students to address this reciprocity between technology and culture or social institutions as it is for the engineers. Neither constituency has yet been involved in setting up alternative social contexts as initial conditions in their lives and it is very difficult for them to conceive of the technical penetrating every aspect of their "creative" designs. This was as complex for the faculty as the students. The engineering faculty, although intrigued by the breadth of architectural or industrial design proposals, sees our work as abstract and not resolved enough with respect to the fabrication or the implementation. The architects see the engineers as moving too quickly to analysis and preconceived solutions in order to get a fix on the completion of the project.

A recurring problem that our experience has taught us is that successful multidisciplinary experiences for the students require a faculty that are themselves multidisciplinary and understand the associated issues. Unfortunately, these qualities are not always cultivated in a research university where accomplishments and recognition in one's own discipline is what is often most prized. We faced this issue in defining the PDI program, which attempts to truly bridge the gap between the humanities, architecture and engineering to create a new kind of design education for our students. The challenge of the core group of faculty who could see the value of a stronger connection between the disciplines became, how to convince the other faculty?

We developed a charrette based on the "Deep Dive' design exercises made popular at the firm IDEO to involve faculty in a multidisciplinary experience aimed at educating them on the benefits of this type of approach to design education. When you lock 8 faculty from diverse backgrounds in a room for a week and ask them to design something, as architects know, something incredible happens. In this case, the faculty designed a product for a 90 year old senior housing resident who called her 40 year old nephew on a regular basis to help her get stuff off the top shelf in her kitchen. At the start, social scientists brought to our attention that asking for specific help was more socially acceptable than nagging for a visit. Engineers looked at ease of access and adaptability and architects at how this fit into contemporary kitchens and whether the room itself should be reevaluated. By the third day, the boundaries and areas of insight were not so clear and the groups became informed teams.

We are developing an advisory board that links industry, government, international firms and academies. As Natalie Jeremijenko has noted, "a recent talk at MIT/STS demonstrated to me that there aren't that many Science Studies types who think that there can be a material practice that results from/is informed by STS nor are there many looking at how engineers develop design intuition. It would take another paper to evaluate how the formation and critical review of this fledgling curriculum is affecting the restructuring of the architectural school. Suffice it to say that the criterion of a 1:30 faculty:student ratio in PDI and 3 disparately disciplined faculty at the helm is just the beginning of a cathartic look at design education. We are hoping that this paper will generate feedback that guides it even more.

REFERENCES

[1]Bordogna, Joseph. 1997. "Engineering the Future: Making Choices," Address at Oklahoma State University, Stillwater, Oklahoma: http://www.nsf.gov/od/lpa/forum/bordogna/jbosu2.htm.

[2]Howard, Jeff. 1997, In Search of the Sweet Spot: Engineering, Arts, and Society in Design Curricula, Department of Science and Technology Studies, Rensselaer Polytechnic Institute.

[3]Tenner, Edward. 1997. "How the Chair Conquered the World," Wilson Quarterly, Spring: 64-70.

[4]Bijker, W. E., and J. Law, eds. 1992. Shaping Technology, Building Society, MIT Press.

[5]Bucciarelli, Louis L. 1994. Designing Engineers, MIT Press.

[6]Cockburn, Cynthia, and Susan Ormrod. 1993. Gender and Technology in the Making, Sage.

[7]Dym, Clive. 1994. Engineering Design, Cambridge University Press.

[8]Ferguson, Eugene. 1992. Engineering and the Mind's Eye, MIT Press.

[9]Latour, Bruno. 1995. "Mixing Humans and Nonhumans Together: The Sociology of a Door-Closer," in Susan Leigh Star, ed., Ecologies of Knowledge, State University of New York Press: 257-277.

[10]Margolin, Victor, and Richard Buchanan. 1995. The Idea of Design, MIT Press.

[11]Star, Susan Leigh, ed. 1995. Ecologies of Knowledge, State University of New York Press.

[12]Ulrich, Karl T., and Steven D. Eppinger. 1995. Product Design and Development, McGraw-Hill.

[13]Warriner, Ken. 1995. Architectural Design 1 Studio Handout, Rensselaer Polytechnic

[14]Bronet, Gabriele, Schumacher. 1998. NSF Submission for PDI.

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URBAN DESIGN CULTURE

Moderator: Nathaniel Belcher,
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Urban Renewal of an Urban Fabric Approach:
A Case Study of Nanjing, China

ZHONG DEKUN
CHEN XI
Southeast University, Nanjing, China
XIAOYING WINSTON YAN
University of Nebraska—Lincoln

The Magical Realism of Barragan's *La Casa Gilardi*

SHERYL TUCKER DE VAZQUEZ
Tulane University

Balancing Forward:
Notions of Continuity in the Shifting American City

AMY MURPHY
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INTRODUCTION

Urban renewal in inner city areas often presents a great challenge to architects, city planners and policy makers. The challenge becomes much greater when it takes place in cities of developing countries. A lack of financial resources, high population density, and decades, if not centuries, of under-development in inner city areas are just some of the problems. The problems are often further compounded when historical cities are involved in urban renewal. The question of whether and how to carry on urban and architectural heritage of historical cities in the course of urban renewal has been the subject of public and intellectual debate ever since the end of World War II.

Since the 1980s, booming economic development has turned cities in China into centers of extensive reconstruction. Through the course of the reconstruction came massive urban renewal efforts in many of its historical cities. Most, if not all, of the historical cities in the country were substantially underdeveloped prior to the new wave of reconstruction due to decades of wars as well as other social and political factors. Unlike some historical cities in the west, inner city areas in most of the old, historical cities in China were largely occupied by residential neighborhoods. For many cities, to renew their inner-city areas means to construct new apartment buildings and neighborhoods.

Largely due to financial and business considerations, most inner-city renewal projects in China today are carried out through an approach that is often marked by a large-scale demolition of old houses, followed by construction of new apartments. For developers, this is the most profitable approach. While new apartments provide residents with much improved housing quality and upgraded infrastructure, the plans, spaces and forms of the new residential neighborhoods have had very little to do with the old they have replaced. Old houses and neighborhoods are demolished and super blocks of six- to seven- story apartment flats are constructed. New residential neighborhoods are developed with apartment buildings often laid out in a rigid linear or grid pattern, quite similar to urban construction and reconstruction in the west after World War II. Inevitably, gone with the demolition are characteristics of traditional house and neighborhood forms, as well as the original social fabric and cultural meanings that were associated with the old houses and neighborhoods.

Based on the experiences of an experimental urban renewal project for the Gao-Gang-Li neighborhood of Nanjing, China, and a subsequent study, this paper discusses a mini-scale approach of urban renewal that was used in the Gao-Gang-Li renewal development. The approach was adopted in light of the historical context of the neighborhood. The project was carried out in 1992 by the authors of this paper. The subsequent study to investigate its current conditions was conducted in 2000, eight years after completion of the project. The paper suggests that the mini-scale Gao-Gang-Li approach provided a valid alternative to common practices in urban renewal. It can be especially suitable when historical cities are the concern, as it could help better preserve and carry on the heritage and social structure of traditional residential neighborhoods in historical cities.

THE CASE OF GAO-GANG-LI

The Gao-Gang-Li neighborhood is located in the southern part of the inner-city area of Nanjing. The city of Nanjing was one of the most historical cities in the country that flourished during the Ming

Dynasty in the seventeenth century. The Gao-Gang-Li neighborhood is part of the historic Nanjing. The renewal development covered a residential area of about 5,800 square meters (or approximately 13 acres). Virtually all of the houses in the area were traditional one-story courtyard houses. Other than a large courtyard compound, the Pang's house, built in the late Qing Dynasty around the end of the nineteenth century, most of the courtyard houses were built in the early 20th century. The Pang's house was on the city's list of registered historical sites, and therefore relatively well preserved. Due to a lack of up keeping and remodeling ever since they were constructed, the courtyard houses in the neighborhood were in extremely poor shape, and housing conditions were substantially below today's standards.

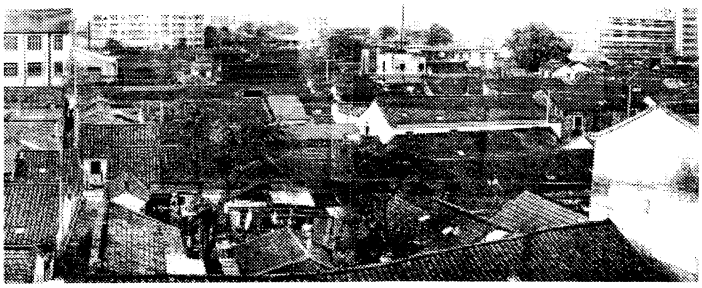

Fig. 1. A birdseye view of the neighborhood before the renewal.

In addition to the old courtyard houses, the history of the neighborhood was also evidenced by its pedestrian circulation system made up of small lanes, streets and outdoor yards that were organically interwoven with the courtyard houses they served. In fact, the layout of somewhat zigzag streets and lanes was the result of centuries of spontaneous construction and reconstruction of residents in the area. The layout and form of the streets and lanes were the residents' responses to natural conditions of the area such as climate and terrain. They also reflected the influences of social and cultural needs of societies throughout history. However, like the houses in the neighborhood, decades with little upgrading effort left streets and lanes in the neighborhood in very shabby conditions.

Like many other neighborhoods in inner city areas, the Gao-Gang-Li neighborhood had a high population density prior to the renewal project. It was as high as about 46 people per acre. There were about 120 households in the neighborhood with a population of about 576 before the renewal project took place. Most of the households in the neighborhood were low and low-middle income families. A large percentage of households in the neighborhood were multi-generation families. The multi-generation occupancy of households was partly due to a lack of other choices as most residents of the neighborhood were from low-income families. In addition, it was attributable to a Chinese cultural tradition that was for a long time in favor of a "large family", i.e., families of three, or even four, generations of direct kinship living together as one extended family. It was not until very recent times that the tradition fell out of favor.

The social, economic and historical context of the neighborhood challenged the renewal project on several fronts. On one hand, the old courtyard houses in the neighborhood represented characteristics of local vernacular architecture and urban form. They were developed through spontaneous creations of its residents over centuries and generations. Complete demolition of the neighborhood would certainly do the city of Nanjing a disservice in its preservation efforts. On the other hand, the conditions of houses, streets and infrastructure in the neighborhood were so poor that extensive upgrading and reconstruction were demanded, and in fact the only choice. In addition, lack of sufficient financial resources to re-develop the entire area was yet another problem.

In order to find an alternative way to tackle the issues stated above that were by no means unusual to the city of Nanjing as well as many historical cities in the country, the renewal development was set to achieve the following objectives. First, it intended to experiment with a new approach through which not only architectural characteristics, but also urban fabrics of the old traditional neighborhood were preserved and carried on in new construction. The urban fabrics included layout of the original streets and lanes and some common outdoor spaces that helped facilitate social activities of the neighborhood through its history. Second, it intended to develop a new housing form that reflected vernacular house styles and forms so that the renewed neighborhood would to certain extent carry on the original sense of home for the residents. The renewal project rejected a common approach at the outset that would have demolished every urban physical installation in the neighborhood, and then built six- to seven-story apartment flats in a linear or grid pattern.

Several unique steps were taken to help realize the objectives. First, it examined and investigated the neighborhood house by house, area by area, lane by lane, to determine what was the most appropriate renewal concepts for each of the sub-areas in the neighborhood. In other words, it took a much-individualized approach to find out what architectural and planning characteristics and systems could be preserved and/or carried on in new construction and what needed to be demolished and/or discarded.

Secondly, to increase the square footage of houses as a way to improve housing quality, three-story, courtyard type of houses were developed to replace the old traditional one-story courtyard houses. At the ground level, a courtyard and a bicycle storage space were provided. The courtyards were still a shared space among immediate neighbors as they were before the renewal. Since the traditional indoor and outdoor spatial relationship was preserved in the renewal project, residents were able to maintain their family lifestyle and culture that utilized the setting of courtyards as an extension of houses and homes. A roof terrace was provided on the third floor through setting back its indoor space. The terrace was to be used for pot landscape and birds cages that were part of local culture and a tradition of the city of Nanjing. Because neighboring terraces were within a talking distance and were connected through corridors, they were designed to become a place where casual talk among immediate neighbors could take place. Once again, it was a design

consideration that tried to help sustain some aspects of local cultural and social tradition.

Third, because the renewal project took an area-by-area and lane-by-lane approach, a large part of the previous layout of streets and lanes in and around the neighborhood were kept in their original forms with necessary upgrading to its infrastructure. Once again, it rejected a common approach that would have superimposed a modern grid system to the neighborhood. As a result, many residents were able to still take their familiar ways to leave their houses for work, to come home and to visit their neighbors in the renewed neighborhood.

The renewal project was financed jointly by subsidy of the municipal government of the city, payments of the residents and subsidy of the district government (a low-level government below city municipal government in Chinese government structure). The subsidy provided by the municipal and district governments was partly due to preservation consideration. It is fair to say that without the subsidy the project would perhaps never be materialized. In addition, the faculty of the Southeast University Department of Architecture and its students provided the in-kind design service that also helped financially to bring the project to reality.

The project took about two years to complete from 1992 till 1994. Research and design work took much of the first year and construction lasted during the second year of the project. It started with a household survey of each individual house in the neighborhood to obtain information about existing physical conditions of the houses and needs of their residents. The survey helped decide whether the house requires modeling or reconstruction depending on physical conditions and household needs. An area survey of streets and infrastructure was also conducted at the early stage of the project. Based on the surveys, a master plan was developed for upgrading and renovation of the street and infrastructure systems of electricity, tape water and sewage disposal. It was after all these steps that the design for preservation and renovation of each individual house in the neighborhood began. While the remodeling usually took a few months, new construction generally took about one year from design to completion.

Figure 2 presents a site/floor plan of a portion of the neighborhood after the reconstruction. Figure 3 and 4 show floor plans, sections and elevations of two types of the new courtyard houses. Figure 5 presents a view of the new construction with adjacent old houses still in the neighborhood.

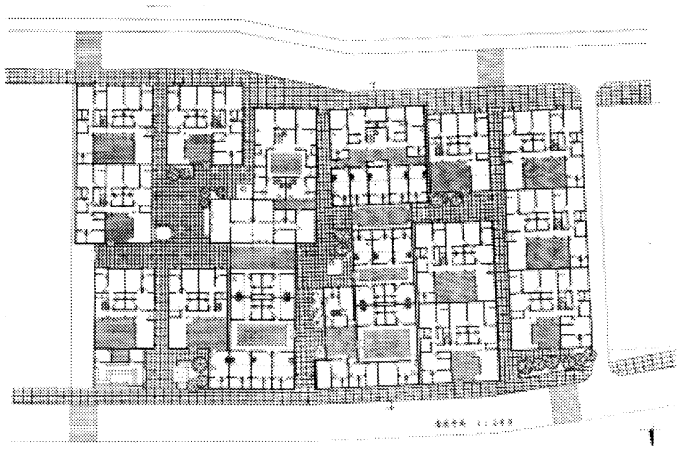

Fig. 2. Site/floor plan of part of the renewed neighborhood.

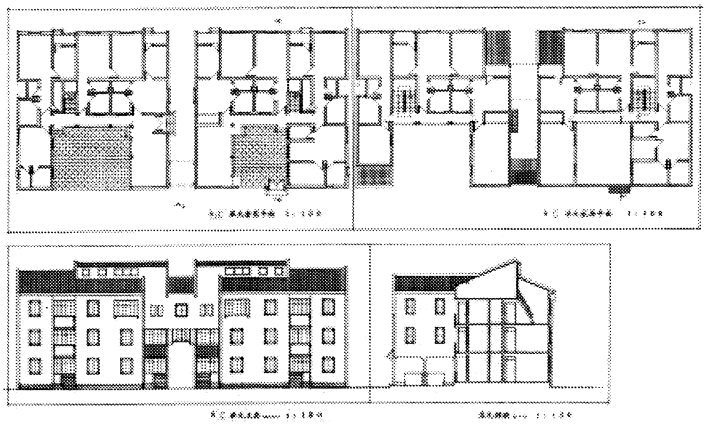

Fig. 3. Plans, section and elevation of type one new houses. (Clockwise from top left: first floor plan, second floor plan, section and elevation.)

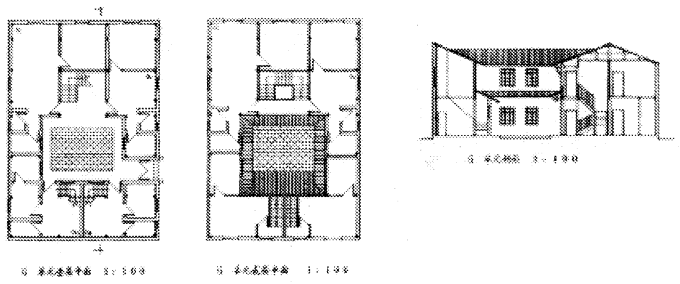

Fig. 4. Plans and sections of type two new houses. (Clockwise from left: first floor plan, second floor plan and section.)

Fig. 5. A view of the new houses amid adjacent old neighborhoods.

After the renewal project was completed, one hundred percent (100%) of its original residents opted for relocation back into the neighborhood where their families had lived for a long time. Among them, one-third (1/3) of the families were able to move back to live in their original but much improved houses. Table 1 presents a comparison of some aspects of housing conditions before and after the renewal.

Table 1 Comparison of Housing Conditions before and after the Renewal

	Population	Number of Households	Number of People/family	Size of Houses	Floor area/ House (m^2)	Floor area/ Person (m^2)
Before Renewal	576	120	4.8	1 bedroom	25	6.9
				2 bedroom	45	7.2
After Renewal	595	192	3.1	1 bedroom	25-28	13
				2 bedroom	32-42	12
				3 bedroom	52-55	15

As the table shows, the floor area per capita increased from 6.9 to 13 square meters for one-bedroom houses, and from 7.2 to 12 square meters for two-bedroom houses. For the new three bedroom houses, they had 15 square meters per person. The project also resulted in a slight increase in total population in the neighborhood from 576 to 595 people. The total number of households in the neighborhood also increased from 120 to 192. It should be interesting to note that the number of people per family dropped from 4.8 before the renewal project to 3.1 after the project. Apparently, some of the multi-generation families opted for multiple households when they moved back to the neighborhood. However, because the new housing was not like apartment flats that were more often than not completely separated from each other, it offered a courtyard-based residential setting in which some common space existed. Our investigation indicated that small families that were originally part of multi-generation families often live nearby so that they still share courtyard even though each has its own house now. The shared courtyard space allowed them to still feel a sense of togetherness, while maintaining individual family privacy. The subsequent survey also revealed that in general elderly residents were more satisfied with remodeled houses, while young residents were more with reconstructed new houses.

DISCUSSION

The Gao-Gang-Li approach distinguishes itself from the most common urban renewal approach that often involves a large-scale demolition, followed by construction of new apartment flats. In this approach, no consideration is given to architectural and urban forms and characteristics of the old. It simply replaces the old with the new.

The mini-scale approach that the renewal of the Gao-Gang-Li neighborhood took was quite painstaking. What is the value of doing so? Was it only to satisfy nostalgic feelings of its original residents? The approach was based on a theoretical notion that architectural forms, space and characteristics are physical manifestations of historical, cultural, and philosophical meanings. Only when the old is physically preserved and the new physically inherits traditional principles, forms and characteristics, can cultural meanings embodied in the physical entities be better preserved. (Yan, 1996) As Vincent Scully stated, "There is no way to separate form from meaning; one can't exist without the other." (Venturi, 1977) Nor was house form only a response to climatic conditions or functional and utilitarian needs. House form is a manifestation of a culture of a family, a local neighborhood, a city and a region in which a particular house form is created and has evolved. As Rapoport concluded in his acclaimed book, *House Form and Culture*, "the house is an institution, not just a structure, created for a complex set of purposes." (Rapoport, 1969) According to him, "because building a house is a cultural phenomenon, its form and organization are greatly influenced by the cultural melieu to which it belongs." Almost from the very beginning, the house was more than just shelter for primitive man. House form never lacked cultural, social and religious meanings throughout the history of human civilization.

The Gao-Gang-Li approach also differs from a renewal approach that shares the same objective of carrying on the heritage of traditional architectural and planning principles and characteristics in new construction, though in a different way. The Ju-Er-Hu-Tong project of Beijing, China, which won the 1993 United Nation's World Habitat Award, exemplifies the approach. The Ju-Er-Hu-Tong project renewed a residential area in the inner city of Beijing that is known for its traditional courtyard houses and neighborhoods. The most unique aspect of the project is that it replaced the old courtyard houses with new quasi-courtyard houses. Articulating its context, the architect designed a few types of "quasi courtyard houses" that were three to four stories tall and significantly expanded in sizes (Wu, 1993). They are in fact "magnified" traditional courtyard houses. By doing so, it intended to preserve and carry on the architectural heritage of the old courtyard houses. Like the modernist approach, however, the project also involved a complete demolition of the old houses and neighborhoods in the area, and replaced them with new ones that may help remotely remind residents of the architectural identity and heritage of the area. While the project is a quite remarkable achievement in terms of its efforts to preserve and carry on the heritage, there are some limits. It did not help preserve urban fabrics of the old courtyard neighborhoods that were perhaps no less significant than the houses themselves. Nor was it able to escape the influence of the modern design and planning

practice. It, too, developed a few typical plans and forms that were laid out in a way that had little to do with the urban fabrics that existed there before. A lack of transitional space between the public and private space in the new courtyard houses, which was part of the old structure that facilitated some neighboring social behavior, is another limit of the approach. (Dong & Dong, 2000)

Unlike the Ju-Er-Hu-Tong project, the Gao-Gang-Li approach is more individualized, as opposed to demolishing the entire area and replacing it with a few "standardized" new courtyard types of houses. It was because of the approach that one-third (1/3) of its original families were able to live back in their "old," but much improved houses. The approach facilitated a continuation of residents' personal memories that were associated with old houses and homes. It helped forge a sense of continuation of the belonging and placeness of the area where their families lived for generations. It is this aspect that marked one of the significant differences between the Gao-Gang-Li and Ju-Er-Hu-Tong approaches.

The Gao-Gang-Li approach becomes more meaningful when considering a Chinese cultural phenomenon relevant to urban renewal. It is not unusual for temporarily relocated residents to move back to their old neighborhoods after renewal construction is completed in most cities in China. Part of the reasons is that inner-city areas offer advantages of proximity to city centers and various civic and municipal services and establishments, compared with new residential neighborhoods in suburbs. The Gao-Gang-Li approach certainly helped make the moving back a more desirable thing.

Using the terms of "tree" and "semi-lattice," Christopher Alexander discussed the difference between "artificial" cities deliberately created by designers and planners and "natural" cities made by more or less spontaneous actions of citizens over many, many years. (Alexander, 1965) His discussion was made in the wake of massive post-War-World-II town and city reconstruction in many parts of the world. He went on to state that, "It is more and more widely recognized today that there is some essential ingredient missing from artificial cities." He argued that modern design and planning concepts destroyed tangible and intangible urban fabrics of traditional cities that were the result of centuries of spontaneous actions of citizens. "When compared with ancient cities that have acquired the patina of life, our modern attempts to create cities artificially are, from a human point of view, entirely unsuccessful." When the modernist urban renewal approach trades the richness of "natural" cities of the lattice structure for a conceptual simplicity that only benefits developers, designers, planners and administrators, the city takes one step further toward dissociation.

Alexander's discussion, though made in the 1960s, is apparently quite relevant to common practice of urban renewal in China today in general, and to the Gao-Gang-Li project in particular. Instead of superimposing a new neighborhood of the "tree" structure to the area, the project adopted the mini-scale concept that helped preserve the tangible and intangible urban fabrics that existed there for centuries. The preserved pedestrian-friendly lanes and outdoor spaces, for instance, help facilitate the social and neighborhood life the residents were familiar with.

By virtue of the mini-scale design process, the Gao-Gang-Li project presented an urban renewal solution that facilitates an opportunity of great diversity. As Figure 2 shows, the renewed neighborhood does not have a superimposed "tree" structure. Instead, it has kept the original spatial configuration and structure. The mini-scale approach also allowed for more area or house specific designs, as opposed to a few standard layouts and forms. In doing so, it surely helped diversify layouts and forms of residences in the renewed neighborhood as illustrated in Figure 2.

The mini-scale approach, however, was quite design intensive. It required a careful house-by-house and area-by-area survey and design study. In the case of Gao-Gang-Li, because the project was carried out by academics at the Southeast University Department of Architecture in part as its community service, it was not a serious issue. For a commercial design firm, feasibility of the mini-scale approach would certainly become doubtful. But, the difficulty of the approach from a business point of view should not diminish the usefulness of the approach as an alternative.

It is not the intention of this paper to suggest that the "mini-scale" approach is better than the more common one of large-scale demolition and construction in every aspect. It has its own caveats. While it is a valid process for reconstruction of individual houses and small areas of neighborhoods, it often limits development of an overall comprehensive plan for renewal of infrastructure that penetrates houses and neighborhoods. Similarly, while preserving existing streets and alleys helps residents have a sense of continuity and tradition, the approach makes it harder upgrading the street and infrastructure systems to meet needs of contemporary society. Last, but not the least important point, is that there is a large percentage of areas in the inner cities of developing countries in which conditions are so poor that any renewal efforts without large-scale demolition becomes unfeasible. The case of Gao-Gang-Li neighborhood possesses two unique aspects that rendered the mini-scale approach a good alternative. First, it was a neighborhood of long history and manifested part of the local culture of the region. Secondly, many families affected by this renewal project had lived there for generations. There was a desire by the city authority and residents to preserve some architectural and planning characteristics of the neighborhood that they not only enjoyed, but also nostalgically liked.

CONCLUSION

The mini-scale Gao-Gang-Li approach is in contrast to the modernist concept of city renewal often marked by large-scale demolition that completely discards every aspect of old urban fabric and building forms. The approach has a clear intent to carry on the heritage of both urban fabrics and house forms of traditional residential environment and neighborhoods.

The Gao-Gang-Li approach also presents an alternative to a common practice of architectural preservation that either literally, or symbolically, or abstractly resembles

characteristics of the tradition. It provides a way to preserve both characteristics of diverse building forms of the tradition and urban fabrics of historical areas and cities. It is the latter that makes the approach unique. The fact that one hundred percent (100%) of its original residents opted for moving back into the neighborhood speaks for the success of the approach.

The Gao-Gang-Li approach has some limits and limitations that one should not overlook. First, it is quite design intensive. It demands a careful survey of the existing and individualized design study of the new. Secondly, unless the mini-scale approach is preceded by an overall master plan for an entire area, it may result in problems in upgrading infrastructure and circulation system for the area as a whole. The mini-scale approach can become disastrous if it is not executed within an overall plan. The last, but not least, important issue is that in taking the approach one should never overlook the fact that the social and cultural context in which architecture takes shapes and forms is itself never a constant. It, too, changes with time. Any attempt to preserve and carry on architectural heritage has to acknowledge the fact that changing culture demands changes in architecture and city forms. Otherwise, it could suffocate the growth of culture that is no less important for architects, planners and policy makers than preservations.

REFERENCES

Alexander, C., "A City Is Not a Tree", *Architectural Forum* 122: 1 & 2 (1965).

Dale, O. J., Urban Planning in Singapore: the Transformation of a City. New York: Oxford University Press, 1999.

Dong, H. and S. Dong, "An Investigation about Usage Evaluation of Ju'er Hutong", in *Towards Human Environment: the Proceedings of the First International Symposium for Environment-Behavior Research.* Nanjing, China, 2000.

Rapoport, A., *House Form and Culture.* New Jersey: Prentice-Hall, Inc., 1969.

Scully V. "Introduction", in Robert Venturi, *Complexity and Contradiction in Architecture*, 2nd ed. New York: the Museum of Modern Art, 1977, p.11.

Taylor, J. and D. Williams, Urban Planning Practice in Developing Countries. New York: Oxford University Press, 1982.

Wu, L. Y. "Protection, Development and Creation of the New Building in the Sector of Historical Area", *Journal of Architecture* 2 (October, 1993).

Yan, X. W. "Carrying Forward Heritage: A Review of Contextualism in New Construction in Beijing", *Journal of Architectural Education* 50:2, (1996).

Zhong, D. and X. Cheng, "Continuity and Development of Neighborhood Structure in Urban Renewal: A Case Study for Gaogangli Neighborhood in Historical Area in Nanjing", in *Towards Human Environment: the Proceedings of the First International Symposium for Environment-Behavior Research.* Nanjing, China, 2000.

The Magical Realism of Barragan's *La Casa Gilardi*

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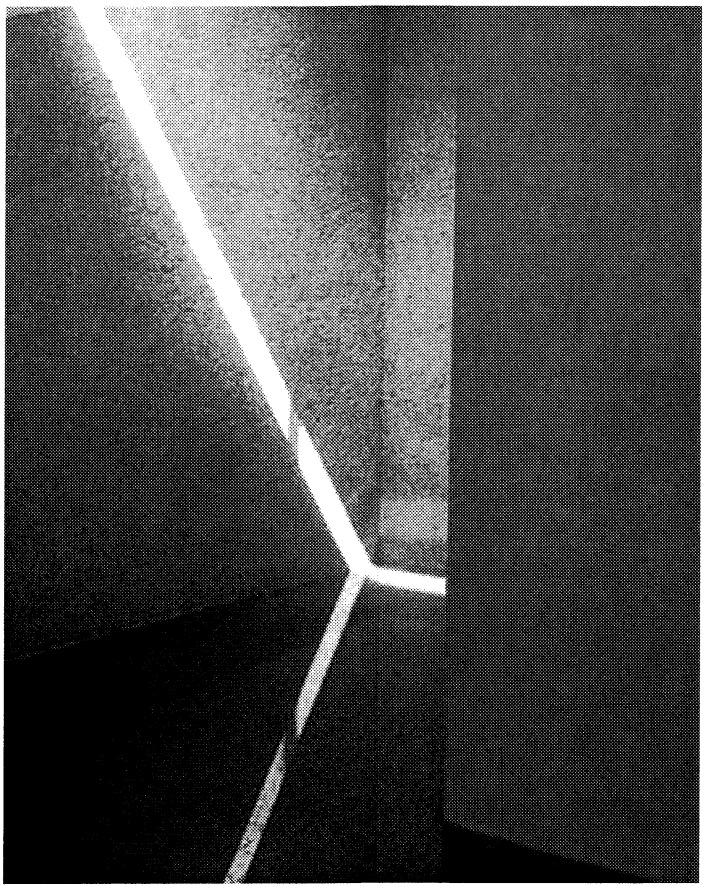

Figure 1 ***indoor pool at la Casa Gilardi.***

> *"On Wednesday night, as they did every Wednesday, the parents went to the movies. The boys, lords and masters of the house, closed the doors and windows and broke the glowing bulb in one of the living room lamps. A jet of golden light as cool as water began to pour out of the broken bulb, and they let it run to a depth of almost three feet. Then they turned off the electricity, took out the rowboat, and navigated at will among the islands in the house."*

As with the fantastic imagery suggested by Gabriel Garcia Marquez in "*Light is like Water*," Luis Barragan fuses light into water at the

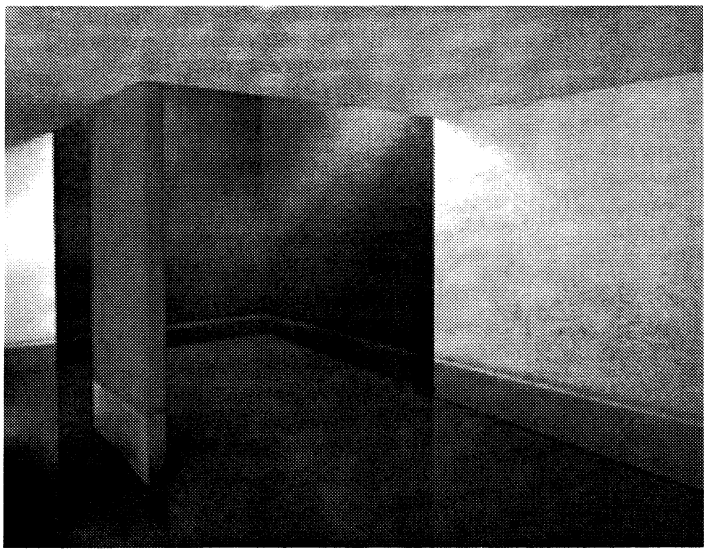

Figure 2 ***indoor pool at la Casa Gilardi.***

indoor pool of La Casa Gilardi in Mexico City. (Figures 1,2) Through this melding of water and light, writer and architect reveal to us the liquid quality of light that might be perceived through child-like eyes of wonder. Like Marquez, Barragan uncannily isolates water from nature within the confines of domestic space to reveal its essential property of fluidity. In Marquez's short story, light *pours* from an electric light bulb and in a similar fashion, at La Casa Gilardi, a slot of light seemingly pours from a tiny skylight forming a pool of water below. To support this illusion, Barragan reduces the saturation of color at the base of the vividly painted wall planes. The resulting spatial-temporal experience is surrealistic or *Magically Real*, eluding Western modern and post-modern categorization.

While architectural critics have recognized the recurring theme of solitude in Barragan's work, its indebtedness to Mexican vernacular traditions, its "surrealistic" tendencies and its relationship to the metaphysical paintings of Georgio de Chirico, critics have failed to acknowledge the more ontologically based Latin American tradition of the 'fantastic' that has come to be known as *Magical Realism*. Although critics have not connected Barragan's work to that of the Latin American Magical Realist genre, Barragan, in his 1975

Figure 3 **indoor pool at la Casa Gilardi.**

Pritzker Prize address, referred to magic as an essential ingredient in his architecture: *"I think that the ideal space must contain elements of magic, serenity, sorcery and mystery."*

According to literary historians, the term Magic Realism was coined in the 1920's by German artist and art critic, Franz Roh, to describe post-expressionist paintings that revealed the "*uncanny inherent in and behind the object detectable only by objective accentuation, isolation and microscopic depiction.*" This pictorial expression later came to be largely associated with the de-familiarization of common place elements "*that have become invisible because of their familiarity.*" The expression *Magic Realism* was used at various times to describe the fantastic nature of the work of artists ranging from the German writer Franz Kafka to Italian painter Georgio de Chirico. Literary critics have traced the introduction of Magic Realism in Latin America to the publication of *Revista de Occidente* in 1927. By 1955, Angel Flores had appropriated the expression "*Magical Realism*" to describe that which, in the 1940's, Luis Borges had deemed the *fantastico* to describe the "*outsized reality*" of Latin America. Gabriel Garcia Marquez explains: "*Magical Realism expands the categories of the real so as to encompass myth, magic and other extraordinary phenomena in nature or experience which European Realism excluded.*"

Unlike the surrealist imagery of odd juxtapositions derived from individual dream states and visions, Magical Realism, as appropriated by Latin American writers, articulates a collective "*expectation of the miraculous in everyday life.*" This collective sensibility is born from the unique historical, cultural and physical landscape of Latin America. In Mexico, as in all Latin American countries, the restructuring of feudal systems of land ownership did not take place over the course of several centuries as in it did in Europe, nor was there an industrial revolution. Instead the relatively recent and rapid development of Latin America has led to rather sudden shifts in a myth-based traditional society. Adding to this abrupt societal transformation, these sudden transformations in social structure, land ownership and technology were overlaid atop a "mestizaje" society that included Indian, Spanish and African ethnic groups. Cuban author Alejo Carpentier describes the resulting fantastic landscape as the "*Marvelous American Reality*" and tells us,

Figure 4 **Inoccent Erendira** *Mexican ex-voto illustrating the supernatural visitation of a patron saint.*

> *"The fantastic is not to be discovered by subverting or transcending reality with abstract forms and manufactured combinations of images. Rather the fantastic inheres in the natural and human realties of time and place, where improbable juxtapositions and marvelous mixtures exist by virtue of Latin America's history geography, demography and politics, not by manifesto."*

Mexican painter, Frida Kahlo makes a similar distinction between the rationally derived "irrational art" of the surrealist movement and the "fantastic" nature of her work. In the 1930's Andre Breton, founder of the Surrealist movement, described Mexico as the "*surrealist place par excellence*" and claimed Mexican painter Frida Kahlo as one of their own. But Kahlo, Barragan's artistic contemporary, exerted that the fantastic tendencies in her paintings was not the stuff of surrealist dreams, but born from her Mexican reality: "*I never painter my dreams, I painted my own reality.....I never knew I was a surrealist until Andre Breton told me I was.*"

In Kahlo's *Self-Portrait with Thorn Necklace*,(Figure3) she freely mixes images alluding to both Aztec and Catholic beliefs. According to art critic, Sarah Lowe, the black monkey perched on Kahlo's left shoulder is symbolic of the Aztec belief that gods could trans-

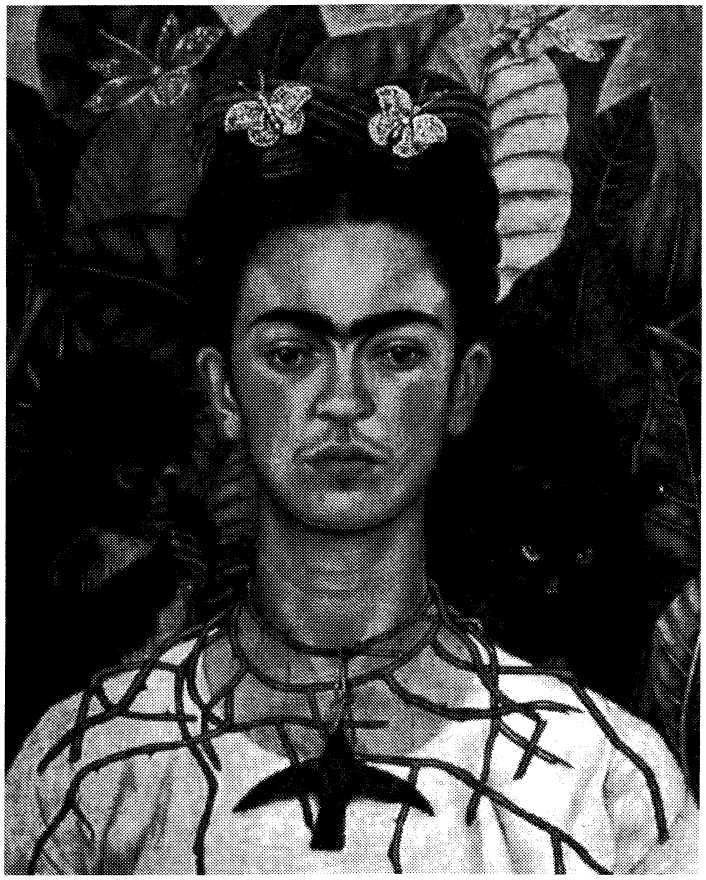

Figure 5 **Self-Portrait with Thorn Necklace,** Frida Kahlo

form themselves into their animal altar egos. A backdrop of dense foliage suggests that Kahlo, like the fictional Magical Realist character Eva Luna, came *"into the world with the jungle on my breath."*

Kahlo's references to Aztec mythology and its' ancient past are interwoven with symbols of her Catholic faith. The necklace of thorns around Kahlo's neck alludes to the death of Christ, while its attached bird amulet suggests flight and transcendence. A black cat staring at the observer is symbolic of the ever present reality of death, but butterflies, in various states of metamorphosis, hover above Kahlo's head alluding to the resurrection. One of the most potent readings that emerges from this painting eludes the traditional western separation of mind and body, self and world. Kahlo's self-portrait gives us an identity and subjective reality that cannot be separated from collective memories and belief systems. Kahlo's tells us that her *"own reality"* is informed by a complex web of past and present, of the collective and the individual of the physical landscape and the interior landscape of her own psyche.

Kahlo also alludes to the intertwining of self and world in her painting *"The Accident,"* which describes her miraculous recovery from a nearly fatal street-car crash when she was a teenager. In this painting, Kahlo draws upon the format of the ex-voto, the Mexican vernacular images painted on tin, canvas, and wood that depict two simultaneous realities - the earthly, portrayed with a journalistic clarity, and the divine presented in the form of a patron saint. Intertwining fact and faith, the ex-voto depicts an image of divine intervention to commemorate one's miraculous recovery from a sickness or an accident. as in all myth based cultures, the purpose of the art image is not to give voice to individual expressions or to realistically depict a subject, but exists instead to allow its maker and its viewer to participate in natural or cosmic processes. Muralist Diego Rivera, Kahlo's husband, comments on the significance of the ex-voto: *"...believing only in miracles and the reality of beings and things, he paints both of these in the retablo (ex-voto) ... he makes miraculous events ordinary and turns everyday things into miracles."* Kahlo uses this unique relationship between image, maker, and viewer to articulate a unique Latin American identity.

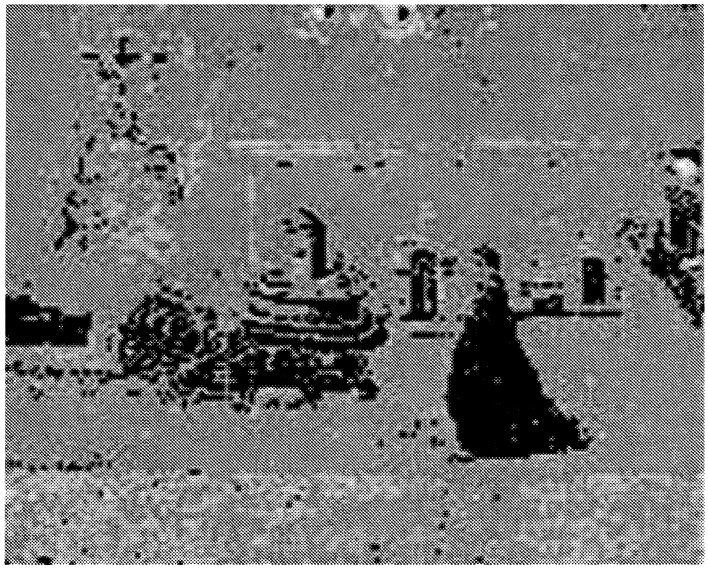

Figure 6 **"Our Lady of Anguish"** *Traditional Mexican ex-voto illustrating the super-natural visitation of a patron saint.*

As the ex-voto reveals, the melding of the ordinary and the everyday with the mysterious and esoteric is the nature of the Mexican landscape. In his book The Architecture of Mexico: Yesterday and Today, published in 1969, Hans Beacham wrote:

> *"Nearly twenty years ago, during a rainstorm in the Isthmus of Tehuantepec, we were invited to take shelter and refreshments with an old shepherd and his wife. His thatched hut was warm, dry and impeccably clean. On the wall hung a small plaster statue of the Virgin, painted pink and blue. Illuminated by a candle, she was standing on a half-moon. To her left hung a bright chromium-plated hubcap from a 1935 Plymouth. The combination, though startling, did not seem incorrect."*

Barragan, like Kahlo, was also very much informed by this faith-oriented society in which the invisible plane of existence merges and co-mingles with daily life. Barragan stated in his Pritzker Prize acceptance lecture, *"The irrational logic harbored in the myths and in all true religious experiences has been the fountainhead of the artistic process at all times and in all places."* In Barragan's private residence, Calle Francisco Ramirez 14, the Catholic cross, as an expression of Barragan's private faith, emerges in a variety of forms and is integrated with its domestic surroundings. A view of the courtyard is framed by a large glass picture window from which subtlety emerges a cruciform. As is typical of most Mexican homes,

Figure 7 ***La Casa Barragan***

Figure 9 ***Corridor to indoor pool***

sculptures of saints and other religious icons are placed throughout Barragan's house and garden. On the roof terrace the cross takes the form of a relief. This unexpected juxtaposition of spiritual images with everyday life articulates the interconnectedness of faith and life in Mexico and throughout Latin America. In the following passage, Alejo Carpentier recalls a series of historic events of mythic proportions that reveal how faith informs the Latin American perception of reality.

> *"The marvelous real is found at every stage in the lives of men who inscribed dates in history of the continent .... [There is Mexico's] Benito Juarez's little black carriage, in which he transports the whole nation of Mexico on four wheels over the country's roads, without an office or a place to write or a palace to rest, and from that little carriage he manages to defeat the three most powerful empires of the era. Juana de Azurduy, the prodigious Bolivian guerrilla, precursor of our wars of independence, takes a city in order to rescue the head of the man she loved, which was displayed on a pike in the Main Plaza. Haiti's Mackandal makes thousands of slaves in Haiti believe that he has lycanthropic powers, that he can change into a bird or a horse, a butterfly, an insect, whatever his heart desires, and foments one of the first authentic revolutions of the New World."*

Carpentier's passage reveals the commonly held Latin American belief systems that intertwine the simultaneous realities of the earthly and the divine and accounts, at least in part, for recognized affinities between the work of Kahlo, Barragan and the Italian metaphysical (or Magic Realistic) painter de Chirico. De Chirico, like Kahlo and Barragan, sought to reveal the invisible plane of existence behind the visible plane of day to day life. Utilizing the Russian Formalist strategy of de-familiarization to emphasize common elements that have become "invisible" because of their familiarity, de Chirico sought to create a momentary "lapse in conditioned thinking" that allows one to see things ordinarily beyond one's perception. De Chirico explains *"under the shadow of surprise, one loses the thread of human logic – the logic to which we have been geared since childhood. ....faculties forget, lose their memory."* Exaggerating the normal conditions of light and shadow, de Chirico placed commonplace fruits and vegetables in vast, otherwise empty, melancholic spaces to create a disturbing and unsettling sensation. Barragan's architecture of stark, empty courtyards with strong con-

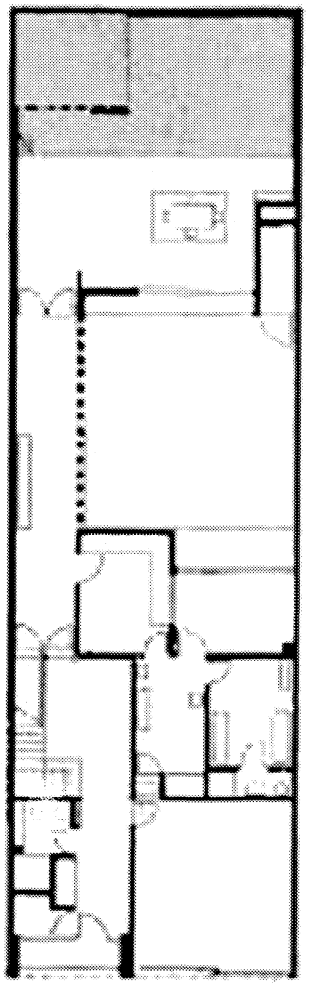

Figure 8 ***La Casa Gilardi - plan***

Figure 10 ***Dining Table off of pool***

trasting shadows resonate with the empty, melancholic piazzas of de Chirico's paintings. This strange and unsettling quality also appears at Barragan's private garden, Avenida San Jeronimo, where headless torsos, removed from their normal context and arranged in and around a waterfall, appear as alienated from their surroundings as do the eerily mute mannequins in de Chirico's *Disquieted Muses.*

The Gilardi house, one of Barragan's last projects, was designed for an art collector, Francisco Gilardi, between 1975 and 1977. The house occupies a small lot - 9.6 x 30 meters - and included two other small buildings. The general layout of the house was formed around a central courtyard to maintain an existing tree. Unlike many of Barragan's residential plans, the focal point is not the interior courtyard, but an indoor pool located off of a dining room and connected to the main house by a light-filled corridor (Figures 1,4). One approaches the pool through a corridor of glowing yellow light where one experiences, as at Barragan's Thalpan, the almost tangible thickness of light and color.

At the end of this corridor, Barragan reveals a pool of water uncannily isolated from nature within the confines of domesticity. At a precise moment during the day, a shaft of light enters the dark interior from above and seemingly pours from the ceiling forming a pool of water below. Barragan's reduction of color saturation at the base of the pool's sculptural red column and its surrounding walls reinforces the illusion of light melding into water (Figures1, 2). Critics have alluded to Barragan's Catholic faith and his use of filtered light, as at Thalpan, to allude to the presence of the Divine, but like the work of Kahlo, Barragan's imagery reflects a complex, interweaving of both latin American and Catholic visual imagery, belief systems and world views. The luminous red wall/column, surrounded by light-filled water, takes on an other-worldly, seemingly magical aura that resonates with what Latin-American cultural critic Lois Parkison Zamora calls the *Mythic-Physicality* of traditional meso-American imagery. In her essay, *"Quetzalcoatl's Mirror,"* Zamora proposes that Mythic-Physicality is Magical Realism's visual counterpart. She writes, *"In Western culture, both formulations are contradictions in terms: myth is ordinarily considered the obverse of physicality, as magic is of realism."* In her discussion Zamora ref-

erences the writings of Serge Grunzinski, scholar of pre-hispanic visual imagery:

> *"Mexican images were designed to render certain aspects of the divine world physically present and papable: they vaulted a barrier that European senses are normally unable to cross."*

Zamora suggests that traditional Meso-American images did not serve to *represent* its subject, as in the western conception of the word, as much as to *re-present* it, that is to give it a tangible presence in the physical world. Pre-conquest Latin-american imagery, Zamora writes, existed rather *"to allow its creator and viewer to participate in natural and cosmic processes."* With narrow concrete steps inviting the viewer into the pool of water, the indoor pool at la casa gilardi transcends the suggestion of a private baptismal, to echo the ritualistic imagery of pre-conquest Latin America that conjoins creater, viewer and the divine.

The intangible, elusive presence of the divine that Barragan evokes at Thalpan is at la casa Gilardi rendered concrete and tangible in the "body" of water below. This mythic-physciality eludes the western conception of image/object separation and brings us once again, in the words of Zamora, "to the question of magic," that echoes the surrealist qualities of european art. Like Kahlo, Barragan depicts an uniquely Latin-American perception of the world.

Barragan's poetic connection between light and water is also revealed by Marquez in *Light is Like Water*:

> *A jet of golden light as cool as water began to pour out of the broken bulb, and they let it run to a depth of almost three feet. Then they turned off the electricity, took out the rowboat, and navigated at will among the islands in the house.*

Marquez, in *Light is like Water*, anchors the miraculous event of light melding into water within the confines of domestic space to give the fantastic the quick believability of the everyday occurrence. David Darrow explains: *"Magical Realism locks the fantastic into the familiar with such subtlety that the sense of reality is not lost but heightened."*

> *The following Wednesday while their parents were at the movie they filled the apartment to a depth of two fathoms, dove like tame sharks under the furniture, including the beds, and salvaged from the bottom of light things that had been lost in darkness for years. The sofa and easy chairs covered in leopard skin were floating at different levels in the living room, among the bottles from the bar and the grand piano with its Manila shawl that fluttered half submerged like a golden mantra ray. Household objects, in the fullness of their poetry, flew with their own wings through the kitchen sky.*

Barragan's spatial arrangement of la casa Gilardi is not unlike Marquez's fantastic imagery of various household objects suspended mid-air in a light-filled space now estranged from their normal surroundings. The "serendipitous fit" of the modernist language, particularly the free standing wall plane, to the mexican vernacular allowed Barragan to subtley subvert a western vocablulary to articulate a uniquely Latin-American way of being in the world. Isolated from its familiar utilization as a system of enclosure, the free-standing column's object-ness is intensified by its vivid red pigmentation. Barragan further exaggerates the isolation of the column by surrounding it with a shallow pool of water. (Figure 2) This is a stategy also used by Barragan at San Cristobal ranch where a wall, split into two planes, acts a water fountain to fill a surrounding man-made pond.

Adjacent to the pool of color and light is placed a simple wooden dining table from which one has a view out to a stark exterior courtyard containing a single tree. A sense alienation of the table from its context is heightened by its reflection in the adjacent pool which creates the momentary impression of its floating like the islands of furnishings in the narrative of *Light is Like Water*. (Figure5) Like Marquez, Barragan isolates and enlarges the everyday and the ordinary to articulate its mythic or magical potential. Column, tree and table are isolated in an uncanny, supernatural space of light and water and emerge as do Marquez's furnishings, in the *"fullness of their poetry."* the everyday experience of eating a meal is transformed into an otherworldly event. Like the ex-voto, Barragan makes *"miraculous events ordinary and turns everyday things into miracles."* In the words of Marquez - *"Why be so surprised? all of this is life."*

But the real "magic" of the experience of the Gilardi house lies with the faith-based ability of the perceiver to *"see."* Magical realism, is not the result of an aesthetic or intellectual movement, but commonly held belief systems, rituals and practices throughout Latin America. Utilizing a unique Latin American relationship between physical and psychological phenomena Barragan bridges the Western chasm between perception and world. Anthony Vidler, in the Architecture of the Uncanny writes:

> *"the uncanny is not a property of the space itself - nor can it be provoked by any particular spatial conformation: it is in its aesthetic dimension, a representation of a mental state, of a projection that precisely slide the boundaries of the real and the unreal in order to provoke a disturbing ambiguity, a slippage between waking and dreaming (or between the earthly and the spiritual realms).*

Architect and author, Emilio Ambaz wrote of Barragan, *"it is only among architects that [Barragan] feels himself a stranger. Not for any anti-intellectual bias, but because he feels their education has estranged them from their own intuitive capacities."* To more fully comprehend and critically access the work of Barragan, Western critics must develop what Latin American cultural critic Zamora calls "second sight" - sensitivity to interacting cultural and social structures. *Barragan, in his final statement of the Pritzker Prize address attributes his mastery of the "difficult art of seeing,"* to "naïve" painter Chuco Reyes: *"It is essential to an architect to know how to see: I mean to see in such a way that the vision is not overpowered by rational analysis. And in this respect I will take advantage of this opportunity to pay homage to a very dear friend who, through his infallible taste, taught us the difficult art of seeing with innocence."* In *"Light is like Water,"* Marquez uses the narrative of the text to explain what Magical Realism is – "the difficult art of seeing with innocence." The fundamental revelation of both Marquez's fiction and Barragan's architecture is the wonder of our everyday existence.

Balancing Forward:
Notions of Continuity in the Shifting American City

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The American urban landscape, regardless of location, has always been the material representation of the American ideology of progress. When economies were local, the urban landscape reflected local conditions and connections. Because economies now defy regional boundaries, our cityscapes speak of that extremely non-specific reality. The region that most consistently represents this sense of placeless-ness remains Southern California. As cultural historian Carey McWilliams states, "Californians are more like the Americans than the Americans themselves."[1]

In current architectural practice, there seems to have emerged two distinct way to respond to such a condition. The first embraces architecture's potential as a cultural barometer; its ability to represent in concrete form the ideological landscape of the current heterotopic reality. The second strategy embraces not the ability of architecture to represent a specific present reality, but its ability to represent past conditions prior to the globalization of time and space. It advocates a return to the local and to history. While both responses have some degree of validity, the first often ignores the negative practices of advanced capitalism; while the second offers a type of resistance to certain negative conditions, but too often in the form of ineffectual nostalgia.

In this paper I will argue for a third attitude for making architecture in a global city such as Los Angeles. It is based on a different type of contextual response to 'place,' emphasizing a balance between the past and the future rather than *choosing* between the past and the future. It depends on a condition of oscillation between continuity and invention rather than promoting either nostalgia or blind optimism. In short, I will argue for an architecture that supports an urban morphology that holds within it elements that are intentionally about continuity and transformation, and other elements that are intentionally about erasure and temporal flux. This contextualist response asks us not to judge our landscape for how much it represents place or placeless-ness but how much it represents both; thereby advocating a general strategy of 'balancing forward.'

PATHOLOGICAL VERSUS PROPELLING PERMANENCES

The notion of seeing the city not as one but actually two strategies draws directly from Aldo Rossi's writings in *The Architecture of the City* (1982). In this text, Rossi illustrates a binary condition of urban permanences first theorized by Marcel Poète in the sixteenth century. Here he states,

> *Permanences present two aspects: on the one hand, they can be considered as propelling elements; on the other, as pathological elements. Artifacts either enable us to understand the city in its totality, or they appear as a series of isolated elements that we can link only tenuously to an urban system.*[2]

Propelling elements are such that they remain vital to the urban structure beyond the purposes for which it was originally built; whereas pathological types can become obsolete once their specific function ceases and/or the ideology upon which they were based shifts.

Rossi cites the Palazzo dell Ragione in Padua as an example of a propelling urban element. It represents a building where "the physical form of the past has assumed different functions and has continued to function, conditioning the urban area in which it stands...."[3] He contrasts this example with that of the Alhambra in Granada, which having housed Moorish Kings, no longer acts in its original manner and has ceased to be part of the present city or its future.

As Rossi states, "It stands virtually isolated in the city; nothing can be added. It constitutes, in fact, an experience so essential that it cannot be modified."[4] In America, the distinction between such building types is not between a basilica and a castle, but instead between the warehouse and the corner gas station. In contemporary revitalizations of the urban core, the former typology is receptive to transformation and revitalization; whereas the latter type is so pathological, so about its original function, that developers would tear it down rather than transform it.

Unlike the traditional city where there is a balance between the two conditions, there exists very little development of propelling building types in the contemporary city such as Los Angeles. Instead the vast majority of the urban fabric is comprised of highly pathologi-

cal building types. Whether the car wash, the gas station, or the fast food establishments, these buildings are pathologically limited on three levels: their specific functionalization, their iconographic form, and their material impermanence. Such pathology is in direct response to the global capitalist economy, which demands a physical environment that maximizes corporate iconography and changing consumer desire. In this environment, buildings become icons for the products they are selling; thereby becoming as disposable as what is sold within them.

As illustrated by the transformation of the Alhambra, pathological buildings either become monuments to a past era or are destroyed when their cultural function becomes obsolete. In a landscape representing economic efficiency and global flux, few buildings remain as monuments in Los Angeles, where most pathological building types are eventually destroyed. As a result, our landscape is not one of transformation and re-generation but complete erasure; not one of memory and place, but forgetfulness and placeless-ness.

In the few instances when these pathological buildings are transformed beyond their original use, the cultural memory associated with the object disallows the building from transcending its original function. In our global capitalist culture, when buildings become corporate icons of certain products, the cultural memory of their original marketing intent inhibits any future existence beyond their original function. We all can imagine the IHOP that has been transformed into a sports bar, car dealer and/or drycleaner; each time equally without success. No matter how thorough the physical transformation, it will in essence always remain more of an IHOP than anything else.

Propelling buildings operate in a wholly different mode. Through palimpsest and limited physical modification, these building types are only temporarily co-opted by their new function, retaining enough of their original ontological structure to allow for future modification. For example with the Puebla Nuevo School designed by Daly Genik, a mini-mall has been transformed into a vibrant parochial school taking advantage of the existing corner lot typology. Or in the case of Frank Gehry's Temporary Contemporary in downtown Los Angeles, an obsolete factory building now houses an extension of the Museum of Contemporary Art. In these rare instances, the original typology was accommodating enough to allow the transformation of meaning and function without significant recollection of previous programs. While these buildings house schools and museums today, they could easily be transformed once again to hold an equally diverse set of functions.

AN ARGUMENT FOR THE PROPELLING TYPE

I would argue that the lack of place-fullness in American cities such as Los Angeles is not due to the stylistic lack of 19th century building fabric, but instead due to the imbalance of pathological and propelling building types. It is not necessary to combat the forces of what Werner Oeschlin calls 'economic functionalism' through re-establishing past typologies, but by bringing forward a more diverse attitude toward specialization and functionalization.[5]

Through re-balancing our landscape so as to include a significant number of building types that allow for future reuse, a sense of permanence and transformation could be re-established without resorting to stylistic nostalgia. As Alberto Perez Gomez writes,

> *Today we live in an age when a new radicalized faith in applied science has become increasingly international and trans-cultural, fueled by ever more efficient systems of communication and information, blurring traditional boundaries and, with them the qualities of specific places engaged in everyday modern life.*[6]

And while it is true that we should try to arrive at an architecture that is of this place and time, there must remain in architecture the ability to posit a critical discourse against that which is reactionary and prescriptive. The inscription of propelling building types within the sea of commodification and specialization is, I believe, a form of critical resistance; a form of what I would generally call 'productive antagonism.'

On one level, this strategy of productive antagonism is in fact a type of broad contextualism. In a landscape which offers only the pathological (as seen in this example of a typical Los Angeles commercial strip), the insertion of a propelling element seems most appropriate toward establishing a balance of place and placeless-ness, local and global, permanence and flux. In the atypical landscape such as the loft/warehouse district of downtown Los Angeles, where a vast landscape of propelling types exist, the insertion of a pathological fragment such as a gas station, restaurant, or cultural monument would work towards a more balanced morphology in that particular context. And although the traditional city can be read as a set of fabric and object buildings, the distinction I am proposing is inherently not formal in nature. Pathological buildings can be fabric elements or object elements. Propelling buildings can be objectified or establish an edge condition. Instead this notion offers only a way to think about permanences and transformations within an urban fabric, rather than re-instating traditional formal opposition between supporting fabric and monuments.

What is one of the most interesting potentials of this strategy is that, unlike pathological elements such as the City Hall or any Carl's Jr., the propelling element does not create a sense of place through iconography but through morphological influence. As Rossi clarifies,

> *An urban artifact determined by one function only cannot be seen as anything other than an explication of that function. In reality, we frequently continue to appreciate elements whose function has been lost over time: the value of these artifacts often reside solely in their form, which is integral to the general form of the city; it is so to speak, an invariant of it.*[7]

In a city of pathological types, there is no relation between things. Each element is unique and typically autonomous. In a city that contains propelling typologies, on the other hand, a sense of conditioning and potential connectivity can occur as these elements endure over time. These types provide an alternative way to think about place-making without the need to import the iconographic

imagery of 'place' with all of its inevitable trapping and ideological difficulties.

A NOTION OF MATERIAL PERMANENCE

For this idea of a critical resistance to become manifest, one has to address the material permanence of the building fabric. For the pathological type, the culture at large will determine its ability to remain in the landscape. If it is conceived as a monument a priori like the Walt Disney Concert Hall or St. Vibianas Cathedral (both in downtown Los Angeles), it will remain as a vital monument as long as its constituent culture feels that it is vital.[8] If a building like the original McDonald's is built to be replace but becomes a monument, it too will be saved even if its materiality does not suggest such permanence. The propelling type, on the other hand, demands an idea of material permanence beyond its current lifespan in order for it to be in essence propelling.

In some ways, one might argue that the distinction I am offering in this essay is not dissimilar to Venturi's distinction of a duck and decorated shed; the duck being pathological and the decorated shed being in a sense propelling. Yet, both types in Venturi's definition lack a sense of materiality as a condition for their understanding. And as a result the temporal impermanence of Venturi's shed will always make it economically more feasible to remove it from a context than to re-use it. Instead what I am arguing for is that the propelling type should take on the condition of material permanence as a critical stance against erasure. As Kenneth Frampton states:

> *The tectonic reemerges as a critical category today because of the current tendency to reduce architecture to scenography. This reaction arises out of the universal triumph of Robert Venturi's decorated shed, that is to say from a prevalent tendency today to treat architecture as thought it were a giant commodity.*[9]

In a strategy that depends on a future transformation of a building beyond its initial function, a building's material condition must be considered essential to its potential success. If a building is too immaterial or insubstantial, the future layer would most probably not be one of addition or layering but one of obfuscation and erasure.

In order to critically oppose the tendency of buildings to be merely advertisements for products, some urban fabric must transcend the condition of architecture as only representation, and commit to the fact of architecture as an essential thing prior to any specific function or meaning. As Frampton argues:

> *Building remains essentially tectonic rather than scenographic in character and it may be argued that it is an act of construction first, rather than a discourse predicated on surface, volume and plan.... Thus, one may assert that building is ontological rather than representational in character and that built form is a presence rather than something standing for an absence. Following Martin Heidegger's terminology we may elect to think of it as a "thing" rather than a "sign."*[10]

In electing to make a building a thing rather than a sign, the building becomes not an extension of transient merchandise, but a thing that is of its place through conditioning its surroundings and being conditioned by them over time.

At some level, this issue of what I might call the 'smart' box, i.e. a propelling and functionally non-specific entity with material integrity, is already being addressed in different ways by Norman Foster, Renzo Piano, Rafael Moneo, Herzog de Meuron et al. As architect Peter Zumthor writes, "Architecture has its own realm...I don't think of it primarily as either a message or a symbol but as an envelope and background for life which goes on in and around it, a sensitive container..."[11] The architecture here is not valued as an extension of the commodification phenomena (i.e. Gehry's Bilboa, where an architect's artistic pursuits are co-opted as an advertisement strategy for the city), but as a means to create a physical realm on which meaning is attached more tenuously and more ineffably. Life and meaning can transform, while the architecture exists in a type of poetic resistance. As Zumthor continues,

> *Architecture is not a vehicle or a symbol for things that does not belong to its essence. In a society which celebrates the inessential, architecture can put up a resistance, counteract the waste of forms and meanings, and speak its own language.*[12]

I believe this type of resistance is consistent with a general strategy of productive antagonism. Our cities will be richer environments when a state of balanced opposition is achieved between buildings that are temporally, functionally and culturally specific and buildings that are temporally, functionally and culturally non-specific in their essence.

CONCLUSION

In the end, I would argue that there is an important distinction between that which is enduring and that which is traditional. The most interesting elements of a traditional city are not those that remain traditional but those enduring elements that continue to be contemporary. Through the 'strangeness' of odd temporal juxtapositions and layers of palimpsest, such urban fabric is allowed to hold the memory of the past and the hope of the future simultaneously. In a project such as Inner-City Arts School by Michael Maltzan, where an old autobody shop has been transformed in a urban oasis for at-risk children, one can find the play between the enduring and the temporal, the primary and the attached, the ontological and the representation. This type of collaborative practice, which is so familiar in art (as can be seen in Asger Jorn's paintings on top of found paintings), must be imported more rigorously in architectural practice.

To create an urban infrastructure in a place such as Los Angeles that is more balanced in terms of permanence and temporal flux, home and homeless-ness, this strategy must be extended beyond what we consider 'adaptive reuse' projects. It requires a shift in the notion of authorship, running quite counter to the training and philosophy taught in most architectural schools. Studio after studio

students investigate the functionally and culturally specific rather than the propelling or potentially enduring. Whether it be a house for a psychologist or a cinema for Fellini, students are taught to make wholly pathological building types rather than investigating any notions of urban permanences. Under the guise of critical thinking, the students actually are perpetuating the extremely uncritical strategy of current capital development. Through investigating the notion of propelling permanences we can begin to apply a true critical counter-pressure to what Alan Trachtenberg calls the "incorporation of America."[13]

NOTES

[1]Carey McWilliams, California: The Great Exception (Berkeley and Los Angeles: University of California Press, 1999), p. 87.

[2]Aldo Rossi, The Architecture of the City, Diane Ghirardo and Joan Ockman, trans. (Cambridge, MA: MIT Press, 1982), p. 59.

[3]Ibid., p. 59.

[4]Ibid., p. 59.

[5]Werner Oechslin, "Premises for the Resumption of the Discussion of Typology," in Assemblage no. 1 (Cambridge, MA: MIT Press, 1986), p. 37.

[6]Alberto Perez-Gomez, "The Modern City: Context, Site or Place for Architecture?" in Malcom Quantrill and Bruce Webb, eds., Constancy and Change in Architecture (College Station: Texas A&M Press, 1991), p. 82.

[7]Rossi, Architecture of the City, p. 60.

[8]With a new cathedral now being built by Rafael Moneo, there exists great debate about the future of the historical St. Vibianas Cathedral. In the end, saving such a 'pathological' building can prove to be very difficult if its inherent cultural value is at all in question.

[9]Kenneth Frampton, "Rappel à l'Ordre: The Case for the Tectonic," in Malcom Quantrill and Bruce Webb, eds., Constancy and Change in Architecture (College Station: Texas A&M Press, 1991), p. 3.

[10]Ibid., p. 5.

[11]Peter Zumthor, "A Way of Looking At Things," Thinking Architecture, Maureen Oberli-Turner, tran. (Basel: Birkhäuser, 1999), p. 11.

[12]Ibid., p. 26.

[13]See Leo Marx, "The Idea of 'Technology' and Postmodern Pessimism," in Merritt Roe Smith and Leo Marx, eds., Does Technology Drive History? (Cambridge: MIT Press, 1994), p. 246.

ENVIRONMENT

Land & Place

The Paradox of Eco-Tech

LAND & PLACE

Moderator: Mary Guzowski, University of Minnesota

No Here There

TED CAVANAGH
Dalhousie University
no manuscript available at press time

Mark the Earth Lightly:

A Permaculture Framework in Graduate Design Studio

JULIE E. GABRIELLI
University of Maryland

Placing Architecture, Presencing Architecture

KAZI KHALEED ASHRAF
University of Hawai'i at Manoa

Etruscan Settlement:

Nature, Beliefs, and Creation of Space—Comparative Study with Native American Settings and Field Investigations at Vasanello, Italy

ALESSANDRA VERALDI
Architect, Rome
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University of Colorado at Denver

Mark the Earth Lightly:
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University of Maryland

PREMISE AND ORGANIZATION OF THE STUDIO

The intention of this studio was to change students' mindsets by challenging the inherited paradigm that sees humans as separate and apart from the workings of nature. This linear mode of thinking is instead substituted with an emphasis on interdependency and cyclical thinking. The notion that we would do well to imitate natural processes has great potential for architecture, at all scales from buildings to communities. Permaculture design principles, grounded in ecology and related disciplines, are rooted in the careful observation of the natural patterns of a particular site. The daily work of permaculture involves integrating human environments with natural cycles using ingenuity, manual labor, common sense and appropriate technologies. This design studio gave students the opportunity to learn from practicing permaculturists, and to work firsthand with these principles.

The project itself is the design of a master plan and residences for Heathcote, a 112-acre intentional community north of Baltimore, Maryland. As part of the School of Living, the members are committed to providing a working model of cooperative, sustainable living. They both practice and teach permaculture. Having just acquired 68 of the 112 acres, they need to formulate a master plan to accommodate growth and to organize the component functions of living, community, and education. They intend both existing and new buildings to be models of sustainable design, made of natural and/or recycled materials and utilizing sustainable technologies.

Teams of students researched different choices for materials and systems, such as strawbale, underground, reclaimed post and beam, structural earthen systems, alternative energy, energy efficiency, composting toilets, greywater, rainwater storage, "living machines," and recycled materials. The compiled information was evaluated for cost, availability, and feasibility. This data, detail drawings, and recommendations were presented to Heathcote members for use during the design charrette and later design stages.

Students then worked with community members and several professional technical advisors during a design charrette to explore different master-plan scenarios. The advisors included experts in natural building, renewable energy, ecological site planning, water resources, integrated design process, and energy efficiency. Each group consisted of a couple of students, one or two technical advisors, and representatives of Heathcote working together. At the end of the day, the groups presented their designs for a general discussion. The integration of different disciplines resulted in complex yet elegant proposals, with several themes running through the work.

One group analyzed both natural (immutable) and human-created (potentially mutable) systems influencing the site. They mapped existing and potential agricultural sites, forest cover, soils, steep slopes, water, septic areas, solar access, and zoning constraints. The interrelationships suggested by these overlays became the starting point for a master plan design. Another group thought about the natural hydrology of the site, using buildings to collect rainwater and greywater uphill from gardens in need of irrigation. Planners also suggested regenerative ideas such as planting the stream with a forest buffer to improve water quality. Ultimately, all acknowledged the importance of knowing the site well, including its soils, prevailing winds, microclimate, and solar access. This knowledge must be balanced by clear aspirations and a sense of what is sacred about the place.

Following the charrette, students worked on individual parts of the master plans. One team chose to focus on strengthening the heart of the community as a research and learning environment, centering on the existing barn, carriage house, and historic mill. Others looked at new enclaves of housing and community space, stepping up the hill from the stream valley. During this process, students struggled to integrate what they were learning about permaculture ethics and techniques. They had to work between specific practices and general underlying principles. The first half of the semester had focused sustainable design criteria more directly on architecture, but this project presented a much wider framework.

ECOLOGICAL ETHICS – QUESTIONING OUR PLACE IN THE WORLD

> *"By [ecological design] we mean design for human settlements that incorporates principles inherent in the natural world in order to sustain human populations over a long span of time. This design adapts the wisdom and strategies of the natural world to human problems. Implicit in this study there is a larger question – what is the role of humanity in the greater destiny of the Earth?" (Todd 1984, 1)*

We typically see ourselves at the top of the food chain, in charge of managing the planet, making liberal use of its plants, animals and minerals (which we lump together and call, "resources"). The author Paul Hawken has observed that this attitude has grave consequences. Modern industry is ruining the planet. We are, in essence, fouling our own nest. Every living system on earth is in decline and the rate of decline is increasing. However, Hawken is optimistic that business can solve these problems, and help bring human enterprise into balance with the natural world. (Hawken 1993, 3)

To succeed, we need an alternative way of understanding our place in the world. We can borrow from native or indigenous peoples, who see themselves as a part of the web of life. Whatever we do to the web, we do to ourselves. The key is to see our environment – both built and natural – as a single system, in which everything is interrelated. We can learn to emulate natural systems, such as the ability to recycle all wastes so that nothing is considered a useless throwaway. Permaculture design principles rely on this ancient wisdom to *think* and *act* responsibly in relation to each other and the earth.

One could say that these principles derive from ecology. Humans are indeed beholden to ecological laws, the same as any other lifeform. The most irrevocable of these laws says that a species cannot occupy a niche that appropriates all resources; there has to be some sharing. Any species that ignores this law winds up destroying its community to support its own expansion. (Benyus 1997, 5)

Essentially, ecological thinking accepts the interrelatedness of all elements within a given system, and seeks to understand how they influence and interact with each other. David Orr defines ecological design, as "the careful meshing of human purposes with the larger patterns and flows of the natural world and the study of those patterns and flows to inform human purposes. [This] means maximizing resource and energy efficiency, taking advantage of the free services of nature, recycling wastes, and . . .incorporating intelligence about how nature works. . . into the way we think, design, build, and live."(Orr 1994, 104)

The author Janine Benyus refers to the practice of biomimicry, which uses an ecological standard to judge the "rightness" of our innovations. It is a new way of viewing nature as model, measure, and mentor. (Benyus 1997) If we are a part of nature, then it follows that our creations themselves are "natural." The question is, are they *well adapted* to life on earth? Life on earth has learned everything it needs to live here without mortgaging its future. And it can do amazing things – fly, circumnavigate the globe, build soil, clean water, harness the sun's energy, live on the bottom of the ocean or at the top of Mount Everest. Life has essentially learned to create conditions conducive to life. Do our own artifacts do this? (Benyus 1999)

PERMACULTURE PRINCIPLES IN PRACTICE

An architecture grounded in permaculture principles would be based on the observation of natural systems, the wisdom contained in traditional human systems, and modern scientific and technological knowledge. Although based on good ecological models, permaculture creates a *cultivated* ecology, which is designed to create a comfortable and productive environment for human life. (Mollison 1991, 1) Permaculture is grounded in many disciplines: botany, biology, agriculture, horticulture, geography, architecture, anthropology, economics, and finance.

This type of integrative thinking is not new to the discipline of architecture. Vitruvius, in Chapter I of his Ten Books, details cross-disciplinary learning as a necessity for architects. He first emphasizes that architects must have a thorough knowledge of both theory and practice. He then enumerates the many fields in which architects must be well-versed: drawing, geometry, history, philosophy, music, drama, mathematics, medicine (for an understanding of the health effects of climate), law, and astronomy, in order to understand the path of the sun. (Vitruvius, 1st C. BCE, from Dover edition, 1960, 5-10)

Bill Mollison sums up permaculture as a practice of working with, rather than against nature; of protracted and thoughtful observation rather than protracted and thoughtless labor; and of looking at plants and animals in all their functions, rather than treating elements as a single-product system. He coined the term permaculture as a contraction of "permanent" and "(agri)culture." "The aim is to create systems that are ecologically-sound and economically viable, which provide for their own needs, do not exploit or pollute, and are therefore sustainable in the long term." (Mollison 1991, 1) The core of permaculture is design, the connection between things: "It's not water, or a chicken, or the tree. It's how the water, the chicken and the tree are connected." (Mollison 1991, 5)

Observing patterns is the basis for intelligent design. One should observe the patterns in a landscape daily; these are easily understood and repeated. For example, by watching snow melt across a field, one learns about solar aspect and microclimates. This helps determine where to plant lettuce vs. corn vs. tomatoes. Or where to site a resting place in the shade. (Bates 1998)

Permaculture principles may be broken down into seven major categories: conservation, stacking functions, multiple or repeating functions, appropriate scale, diversity, reciprocity, and giving away surplus. Similarities with another "canon" of ecological design, William McDonough's Hannover Principles, will be explored, as will the applicability of the principles to architectural practice.

CONSERVATION

Efficiency is the watchword with the practice of permaculture, which translates to conservation of energy in all its forms. According to teacher and practitioner Albert Bates, the idea is to design and create systems that allow the designer to pull back further out of the system as time goes on, eventually eliminating the need for a designer. Hence, the greatest amount of effort is expended at the earliest stages, with diminishing inputs following thereafter, as the system reaches its own self-regulating equilibrium. (Bates 1998) The key to efficient planning is the zone and sector system, which is summarized briefly here.

Zone planning means placing elements according to how often or intensely they are used or serviced. Zone 1 refers to the daily center of activity, usually a house, but at a larger scale it could be a village. (Mollison 1991, 9) Zone 2 is the immediate surroundings, where we work and play daily: the garden, studio, and other places of human interaction. Zone 3 is fully agricultural at a broad scale. It is still removed from daily activity and may be visited once a week. Zone 4 may be sustainable forestry, just slightly below wild, because it is managed. Zone 5 is wilderness, a "human exclusion" zone upon which we depend, but in a hands-off way. (Bates 1998) This diagram has much in common with Ebenezer Howard's Garden City, which also worked with concentric functional rings.

Sectors deal with the wild energies, the elements of sun, light, wind, rain, wildfire, and water flow (including flood) on a site. These all come from outside the system and pass through it. Sustainable site planning involves understanding and working with these energies, using them passively (such as natural convection), and even harvesting them (such as rainwater or solar heat). (Mollison 1991, 14) Sectors also refers to man-made flows, such as dust, pollution, noise, and vehicles, in order to comprehend and mitigate their influence on the site.

In a permaculture system, biological resources (plants and animals) are used wherever possible to save energy and to do the work of the farm. Building up biological resources on site is a long-term investment which needs thought and management in the planning stages and is a key strategy for recycling energy. The input at early stages of non-biological resources (such as fossil fuels) is acceptable if they are used to create long-term, sustainable biological systems and an enduring physical infrastructure. (Mollison 1991, 16)

Since the biological model is favored, this means that the designer thinks in terms of complete cycles, utilizing everything. As in nature, there is to be no waste, no pollution. A similar attitude is found in William McDonough's Hannover Principles, which remind us to do as plants do by relying on natural energy flows, such as solar income, and to eliminate the concept of waste by optimizing the full life-cycle of products and processes.(McDonough 1992, 5) Today even the most advanced building or factory in the world is still a kind of steamship, polluting, contaminating, and depleting the surrounding environment with its reliance on fossil fuels and petrochemicals. Imagine, instead, a building as a kind of tree. It would purify air, accrue solar income, produce more energy than it consumes, create shade and habitat, enrich soil, and change with the seasons. (McDonough 1998)

Permaculture systems seek to stop the flow of nutrients and energy off-site and instead turn them into cycles, so that, for instance, kitchen wastes are recycled to compost and household greywater flows to the garden. Good design uses incoming natural energies with those generated on-site to ensure a complete energy cycle.

The Adam J. Lewis Center for Environmental Studies at Oberlin College, designed by William McDonough and Partners, aspires to this ambitious goal of conservation, even if it doesn't yet fully succeed. It contains a "living machine" designed by John Todd, which will purify and recycle wastewater from the building. It also intends to be a net energy exporter, utilizing roof-mounted photovoltaics (PV's) and an aggressive energy-efficiency scheme. Many of the building's systems will be closely monitored, providing valuable feedback for fine-tuning and improvement.

STACKING FUNCTIONS

In every ecosystem different plant species occur at varying heights above the ground, and root structure at different depths. A garden can be planned to emulate a forest by planting an entire system all at once: climax species (long-lived orchard trees such as walnut or pecan); shorter-lived smaller fruit trees; faster-growing pioneers (acacia, autumn olive) for mulch, shade, and nitrogen; short-lived perennials (comfrey, yarrow) to provide weed control and mulch; perennial shrubs (blueberry); and even annuals such as dill, beans, and pumpkin. (Mollison 1991, 20-22) The idea is that each of these plants is doing more than one thing at a time: providing shade, enriching the soil, bearing fruit, giving nectar and pollen to bees.

This key concept – that every element should serve many functions – makes efficient use of space and labor. Another good example is a grape trellis over a path, which provides shade, but also allows maintenance to occur along the way, as a person passes by. (Bates 1998) A pond can be used for irrigation, watering livestock, aquatic crop, and fire control. It is also a habitat for waterfowl, a fish farm, and a light reflector. (Mollison 1991, 6) This versatility is both beautiful and elegant.

An architectural illustration is the BRE Office of the Future in Garston, Hertfordshire, UK, by Feilden Clegg Architects. The sine-curve floor slab is strong, conserves concrete, and performs many complementary functions at once. Its concave surface at the ceiling brings daylighting deep into the space; its efficient shape reduces the overall structural depth, raising the effective ceiling height and enhancing the indirect lighting scheme; its thermal mass stores cool nighttime ventilation air below the raised floor. This demonstrates how the simple choice of a rather unorthodox structural form solves multiple problems and contributes to the overall energy and resource efficiency of the building.

MULTIPLE/ REPEATING FUNCTIONS

Important basic needs such as water, food, energy, and fire protection should be served in two or more ways. A house with a solar hot water system may also contain a back-up woodstove with a water jacket to supply hot water when the sun is not shining. Water itself may be caught in a variety of ways on a site, from dams and tanks to swales and chisel plowing (to replenish groundwater). (Mollison 1991, 8) Another word for this is resilience. If one system fails or falters, others can take over.

This redundancy to meet needs in various ways is illustrated simply by the requirement for multiple means of egress in buildings. If fire blocks one's path, there are alternate choices for escape. A more complex example is the Gštz Headquarters in WŸrzburg, by Webler + Gesler Architects. The exterior is clad in a glazed thermal buffer, or double-curtain wall. With its two layers of glass, this buffer acts like a thermal chimney while simultaneously allowing ample daylight into the offices. As the air between the glass heats up, it is drawn naturally up and out of the top, effectively reducing heat gain within the building. Louvers within this cavity further allow control of direct solar gain and glare. This system is supplemented by fans which drive warm air from the south façade to the colder north façade during the winter. The job of reducing energy use by minimizing heat gain in summer and of making use of it in winter is important enough to be performed by several elements.

APPROPRIATE SCALE

Small-scale, intensive systems means that 1)much of the land can be used efficiently and thoroughly, and 2)the site is under control. If we cannot maintain or improve a system, we should leave it alone, thus minimizing the damage and preserving natural complexity. Mollison proposes that perhaps we should only cultivate or settle those areas which we can establish, maintain and harvest by small technologies as a form of control over our own appetites. (Mollison 1991, 20) The caution here is to be aware of limits at all times. If limits are exceeded, the system will be pushed to collapse.

Another parallel with McDonough's Hannover Principles becomes apparent. Principle #8 says that we should understand the limitations of design. No human creation lasts forever and design does not solve all problems. This humility allows us to treat nature as a model and mentor, not an inconvenience to be evaded or controlled. (McDonough 1992, 5) Our environment bombards us daily with examples of what not to do. Suburban housing developments go onto a site with bulldozers to create a "clean slate" for their executive-mansion monoculture. The resulting "delinquent landscape" (Mollison's term) is highly energy-intensive and not sustainable.

More promising in the U.S. is the popularity of the book, *The Not-So-Big House*. The message is that smaller is better, because homes can be intelligently and creatively planned around a specific family's needs.

DIVERSITY

Diversity is often related to stability. Although the yield of a monoculture system will probably be greater for a particular crop than the yield of any one species in a permaculture system, the sum of yields in a mixed system will be larger. Stability refers not so much to the number of elements in a system, but to the number of *functional connections* between those elements. A system with diverse plant and animal species, habitats, and microclimate reduces the chance of a bad pest situation, thus is more resilient. (Mollison 1991, 24-25) Living systems provide for their own replacements, grow to optimize available space and nutrients, seek companionship, satisfaction, and stability and solve problems. (Bates, 1998)

William McDonough sees respect for diversity as a key ingredient in the "Next Industrial Revolution." Designs will respect the regional, cultural, and material uniqueness of a place. Wastes and emissions will regenerate rather than deplete, and design will be flexible, to allow for changes in the needs of people and communities. For example, office buildings will be convertible into apartments, instead of ending up as rubble in a construction landfill when the market changes. (McDonough 1998)

Older industrial buildings such as the lofts in Soho, New York, have proven to be quite adaptable to new uses. The abandoned American Can Company buildings in Baltimore, Maryland were recently given new life as a mixed-use, office, retail, and restaurant complex. The variety of uses draws all sorts of people to the site and has acted as a catalyst for the revitalization of the entire neighborhood.

RECIPROCITY

This principle deals as much with human attitudes as with design principles. Every resource is either an advantage or a disadvantage, depending on the use made of it. (Mollison 1991, 30) Recalling that in nature, elements have no product unused by other elements in the system, something that seems to be a liability can actually be an asset. At the same time, elements have their own needs supplied by other elements in the system, which completes the cycle.

The Eco-Industrial park at Kalundborg, Denmark, is an excellent example on a large scale of a circular metabolism, or the connecting of the wastes and inputs of different businesses and industries. Truly symbiotic relationships have developed between a power plant, an oil refinery, a pharmaceutical company, a plasterboard maker, and the municipality of Kalundborg. The power plant provides excess heat energy to the municipality for use in its district heating system, provides heat to a fish farm, sells steam to the refinery, and provides gypsum from its stack scrubbers to the plasterboard maker. It also sells flyash to local construction firms. (Beatley 2000, 242-243)

GIVE AWAY

After basic needs are taken care of, we should share any surplus, whether of time, food, labor, energy, money, information, or creativity. A surplus is easily produced, but can be used either well or badly. Choosing wisely will apply surpluses to further the aims of care of the earth and care of the people. (Bates 1998)

One simple way this can apply to architecture is in the production of energy within the building. Grid-connected buildings can utilize a PV system to produce power, and through net-metering, send excess power back to the local utility. The Sacramento, California Municipal Utility District (SMUD) has the "Solar Pioneers" program, which finances the installation of PVs on homes and commercial buildings for decentralized power production. (Strong 1999, 99-100)

CONCLUSIONS

In teaching sustainable design, it is useful to structure the studio around fundamental principles. It is especially valuable when these concepts overlap, reinforcing what can be seen as universal values. For instance, William McDonough's Hannover Principles are remarkably in sync with those of Permaculture. Both remind us to accept responsibility for the consequences of design decisions upon human well-being, the viability of natural systems, and their right to co-exist. They also encourage constant improvement by sharing knowledge between colleagues, patrons, manufacturers and users. (McDonough 1992, 5)

The value of permaculture is that it provides both principles and practical experience. Grounded in many disciplines, these principles are put into practice all over the world in a variety of ways specific to each place. Heathcote Community provides a working model of the ongoing experimentation and struggle to live sustainably and take responsibility at several scales for the consequences of one's actions. As an illustration of this thoughtfulness, member Charles Curtiss bases his purchasing decisions on four questions: Where did this come from? What did it take to get it to me? What does it take to use it? What happens to it when I am through with it? These could be quite a useful guide in the practice of architecture, assuming the availability of hard data to support one's decisions.

During this studio, the students encountered a mind-boggling amount of information, which they had to sift through and evaluate. Happily, they did learn enough about the subject matter to talk intelligently about their decision-making process and, perhaps more importantly, to understand it as a series of well-informed value judgments. As one student said at the final review, "None of us can ever look at design the same way again."

The emphasis on permaculture also helped them to recognize the critical importance of getting to know the site intimately before committing to building anything. Some designs speculated on the potential for an armature or structure to allow adaptation as more is learned about the site. This is a highly advanced notion, suggestive of the Center for Maximum Potential Building Systems near Austin, Texas, a site and structure that has been evolving and changing for many years now.

Students appreciated the encouragement to think about the *quality* of places, to design for the emotions and senses as well as to satisfy abstract criteria. So much of architectural education is necessarily abstract, there is the tendency to lose track of tangible experiences of space. On the other hand, projects suffered from a lack of hard analysis of their technical aspects. Although students learned and used Energy-10 for this project, there was still a demonstrable need for a good, basic understanding of how heat, cold, and moisture move through a building. As a companion to intuition, students need to quantify how much thermal mass or insulation is needed, and whether heating or cooling is the limiting factor. Studio projects could establish acceptable energy budgets and teach students how to analyze and quantify energy use early in their design process.

During a post-semester faculty meeting, one of my colleagues asked these questions: Is this discipline a source of form? Is it a special interest? Or, is it a template to be thrown around all buildings? In a sense, one could answer yes to all. In the same way that permaculture practice varies widely from place to place, the structure and application of design studios would vary, even with commonly-held underlying ecological principles.

After decades of study and observation, ecologists have taught us enough to begin to divine a canon of nature's laws, strategies, and principles that apply to our own endeavors. Nature runs on sunlight; uses only the energy it needs; fits form to function; recycles everything; rewards cooperation; banks on diversity; demands local expertise; curbs excesses from within; and taps the power of limits. (Benyus 1997, 7) Modeling architecture on these laws is not a punishing sacrifice, nor does it lead to aesthetic impoverishment. Indeed, this work will inspire us to redefine our concept of art, to "cultivate a new standard that defines beauty as that which causes no ugliness somewhere else or at some later time." (Orr 1999, 218)

SOURCES

Bates, A. and Marsh, C. (1998) Lecture given at *Natural Building Colloquium*, Davidsonville, Maryland, June 1998.

Beatley, T. (2000) *Green Urbanism*, Island Press, Washington, D.C.

Benyus, J. (1997) *Biomimicry*, William Morrow and Company, New York.

Benyus, J. (1999) Lecture given at *Mainstreaming Green*, conference in Chattanooga, TN, October 1999.

Hawken, P. (1993) *The Ecology of Commerce*, HarperCollins, New York.

McDonough, W. (1992) *The Hannover Principles*, Plowshares Press, Highland Park, New Jersey, p.5.

McDonough, W. and Braungart, M.(1998) "The Next Industrial Revolution," in *The Atlantic Monthly*, October 1998, pp.82 – 92.

Mollison, B. and Slay, R.M. (1991) *Introduction to Permaculture*, Tagari Publications, Tyalgum, Australia.

Orr, D. (1994) *Earth in Mind: On Education. Environment. and the Human Prospect*, Island Press, Washington, D.C.

Orr, D. (1999) "Architecture as Pedagogy," in *Shaping the Built Environment*, Island Press, Washington, D.C.

Strong, S. (1999) "Introduction to Renewable Energy Technologies," in *Shaping the Built Environment*, Island Press, Washington, D.C.

Todd, J. and Todd, N. J. (1984) *Bioshelters. Ocean Arks. City Farming*, Sierra Club Books, San Francisco.

Vitruvius (1960) *The Ten Books on Architecture*, Dover, New York.

Placing Architecture, Presencing Architecture

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Kinya Maruyama, a visiting Japanese architect at the University of Pennsylvania, once sent out his students with their sketchbooks to "draw the wind." The event represents two symptoms about current architecture culture: (1) the limits of the representational project, and (2) a consideration for returning "to the things themselves."

Architecture is more than a discipline; it is above all, a "lived-experience." If architecture is an art, it is an existential art. Architecture and existence are inextricably intertwined, and if any criterion of thinking best addresses this condition, it is the anthropological one.

The discipline of architecture has undergone a major transformation in the last few decades, both in the nature of its production, and in its theoretical dispositions, in short, the way it thinks about itself. One thing that has occurred is a deeper realignment of architecture/architectural theory with other disciplines. This is a new nexus, where the discourse has proceeded beyond the well-known triad of the aesthetical/visual, social/political, and technological/functional. The anthropological dimension is a major part of the new nexus.

I am describing the approach as an anthropological one for lack of a better terminology. It refers to a diverse body of thinking - hermeneutical, existential, and phenomenological. It would be redundant to claim a human dimension for architecture here, and yet the new anthropological project renews or deepens the question of the human situation. It is existential in the sense that it re-addresses architecture as the elemental and foundational way of being. It is phenomenological in the way it re-views architecture as opening up the receptivity "to the full ontological potential of human experience." What is involved here is the direct investigation and description of phenomena as experienced free as possible from unexamined presuppositions, in a heightened reception of all the senses. Mistrusted faculties of human experience - sensorial, kinesthetic, haptic, oneiric - are no longer considered merely irrational, but authentic data for the investigation of the human experience.

The anthropological approach exposes a possible disjunction between architectural practices that rely on a representational and retinal primacy (as the terms image, drawing, analytique, desk crit, etc., convey in academic conversation), and the concrete "lived-experience" of architecture. This rupture, if one were to recognize it as such, has developed out of historical and epistemological conditions, in parallel to or emerging from such overly discussed dichotomies as concepts and perception, and the rational and the sensorial.

This divergence between the norms of a discipline and the actualities of a "lived-world" is exposed in two major conditions: (1) "placing architecture," that shows the fissure between the ideology of architectonic autonomy and the inevitability of situatedness, and (2) "presencing architecture," that reveals the gap between the presence and re-presentation of architecture.

What I am trying to argue and analyze here (as a still work-in-progress) is that architecture is inevitably situated. What does it mean for architecture to be situated? Is not architecture by its very nature situated? What else can we mean by being situated? The topic of situatedness involves a phenomenological understanding of place and placing, and the relationship between body and the environment.

The anthropological project recalls corporeal/embodied "actuality" both in thinking about architecture and in its practice. The work of the French philosopher Maurice Merleau-Ponty on the phenomenology of perception, particularly his notion of the lived-body, has immense implications for architecture and the environment. In the euphoric age of disembodied (virtual) realities and mediated connectivities, the approach returns to and amplifies the fundamental intimacy of the body to architectural conditions. What the enigmatic exercise of Maruyama provokes is the necessity of architectural thinking to confront the fundamental and the phenomenal (Husserl's "back to the things"), and to reconsider the architectural presence prior to and beyond the representational (and perhaps the conceptual) stage.

WHAT IS THIS THING CALLED "PLACE"?

A "place" is something enduring and yet flimsy. Plato, writing in the *Timaeus*, observes that *chora*, what has been translated as "place," is hard to grasp, approachable only by what he called

"bastard reasoning." Aldo Rossi once remarked that as you approach place (conceptually), it recedes.

"Place" is flimsy because it is hard to take its measure. The notion "place," in its English usage, remains particularly suspect. There is the possibility that the notion survives or thrives beyond the English usage, or for that matter, beyond linguistic usage. Yet, how to write place, literally, as Place, *Place*, or "place"? The symbol "place" invites thoughts; the notation ["] is a zone of interweaving not unlike the Greek sense of the word zone. There is a degree of both distinction and continuity. Place, with the capital P, implies a reified object, as something conceptual and abstracted, and *Place* has the implication of being too disjunctive and aberrational.

It should be admitted that re-writing "place" in the twenty-first century does have a retrogressive intonation, especially with the implication of a green ideology, landscape-inspired romanticism, regional chauvinism, or as something stable and perennial. It is also particularly difficult when the opposite of "place" - placelessness - begins to be apotheosized. Many writers think that much of what we understand by place is now outmoded, and one has to recognize placelessness as a new space that is slowly proliferating before us. It is not the placelessness often heralded by modernism, the one that was sort of a utopic and heroic space. One now confronts placelessness as a totally new kind of experience, with hotel and airport spaces being the paradigms.

In the *The Cultural Turn: Selected Writings on the Postmodern*, Fredric Jameson presents and discusses the Westin Bonaventure Hotel in Los Angeles as the epitome of this new space - what he calls a hyperspace - a space that we can now enter and experience. However, the new space, to put it in a nutshell, presents a disorienting experience, an alarming disjunction between the body and the built-environment. It is a space where the individual human body finds itself incapable "to locate itself, to organize its immediate surroundings perceptually, and to map cognitively its position in a mappable external world." A similar characterization may be made about the ever-unfolding nature of airport spaces. Studs Terkel, the celebrated radio personality, gives a humorous account of this condition though: While trying to get to Cleveland from Detroit, Terkel rushed to the counter to board his plane only to receive the answer: "But, sir, you are in Cleveland!" A much more poignant case is that of Mehran Nasseri Kasini, an Iranian "stranded" at Charles de Gaulle airport for more than eleven years while trying to enter France unsuccessfully after fleeing Iran. The newspapers described him being seen inside the terminal "sitting at a table, perhaps smoking a pipe... taking stroll, stopping to pick up his mail at the post office or lunch at the in-house McDonald's... he will be looking very much at home." Kasini is ironically caught between the juridical concepts of two spaces ("countries"). Following Jameson, one can say that this *between* space (hyperspace) can now be experienced, and therefore needs to be taken seriously. Jameson thinks that we still do not possess the "perceptual equipment" to face this new and disorienting hyperspace; in fact, this new conditions require we "grow new organs to expand our sensoria and our bodies to some new, as yet unimaginable, perhaps ultimately impossible, dimensions."

Despite the emerging of new kinds of spaces, a more elemental understanding of "place" has not been exhausted. Such an understanding, I would like to argue, is very much a foundational task for architecture.

I would like to suggest that "place", culture, region, and nation are distinct concepts, even when they often seem interchangeable. The most important distinction is that "place" is the one that is least portable. On the other hand, culture, and even nation, are now perfectly transportable and immensely commodifiable (while region remains very much a metrical concept). Culture can now be mailed, shipped, fedexed, faxed, beamed, and very soon will have nothing to do with any originating location. With MTV, e-commerce and electronic transfer of capital, the geographic rootedness of culture and community is increasingly becoming irrelevant.

"Place", on the other hand, is formed primarily by a locational underpinning - *this place* (there may be no *there* there, but there is surely a *here*). "Place" is now poised against culture, so that one can pose the phrase: "place versus culture." Going back to airports, I would like to point out how the phenomenon of air travel underscores the primacy of placement as experienced in the form of jet lag. Jet lag is but the nagging exposition of a dis-placement, how place-specific physiological and diurnal rhythms are incarnated in us, and before adjustments to a new place can be made show as aberrational traces in the biological system.

In summation, I would like to say that man is a place-conscious being, even if it happens unselfconsciously, despite the evangelical persuasion of "global span" (Saskia Sassen), the often chimerical nature of "there" (Gertrude Stein), and the existential anguish of being thrust into this world without a clue of how we may dwell here (Jean-Paul Sartre). In short, man is inherently an emplaced being.

PLACE AND PLACING

Merleau-Ponty remarks that "our body is not in space like things; it inhabits or haunts space." Or, "the world is wholly inside me and I am wholly outside myself" (this is the core idea of the lived-body). One is inclined to think the same for architecture and the environment. This is one further continuation of the analogy of body and building that recurrently shadows architecture. In this particular case, the correspondence of architecture is to the lived-body.

The lived-body is distinct from the living body, so is the relationship with the environment. The environment is an indefinite extension of the lived-body, and not distinguished as standing over and against the living body. According to Merleau-Ponty, the environment is a "manipulatory area" for the lived-body, something potentially to be taken and incorporated. The lived-body appropriates certain objects in the world to the extent that these objects cease to be objects and become "incorporated," become part of the lived-body. On the other side, the environment directly and indirectly regulates the lived-body. The environment conditions the body in such a way that the body is the expression or reflection of

the environment. In living, the body not only lives itself but also lives the environment. This is what Merleau-Ponty calls a "reciprocal insertion and intertwining" of the lived-body and the environment. "The limits of one are lost in the other," as one writer puts it.

What may be gathered from here is at least a theoretical possibility that architecture and the environment are indissociable concepts; they form a "chiasma." Leatherbarrow and Mostafavi say it aphoristically: "Finishing ends construction, weathering constructs finishes."

The irreversible indictment of the modern age, that societal and cultural norms can no longer be conceived in purely regional or local terms, produces euphoric claims for a global civilization. At the same time, the specificity of particular places continues to resist the homogenizing tendency of globalism. The specificity is derived not so much from cultural criteria (culture being a portable and commodifiable object is no longer the immutable premise), but from more elemental conditions or "realities," conditions that both openly and surreptitiously affect the life and form of architecture, and constitute the nature of its situatedness.

The situatedness of architecture entails, above other things, the following three conditions (1) A telluric "reality" which indicates that the earth is the ultimate ground-basis for architecture, where architecture can be seen as another topographical manipulation of the earth's surface. (2) A climatic "reality" that is the most direct evidence of architecture's chiasmic relation with the elements. And, (3) a geo-logic "reality" that stresses that architecture is a phenomenon of gravity, not so much in a technical sense but in a visceral way. These conditions form a sort of invisible dynamics that work within the making and experience of architecture.

CLIMATE AND GRAVITY

Climate and gravity impinge on us imperceptibly, two things we take for granted as being given, and yet are essential for *where* and *how we are*. What distinguishes lived and actualized architecture from say ideational ones, or from the digitized domain, is that the former is literally and perceptually embedded in climate and gravity in a seamless manner.

Still, the question of climate and gravity remain largely untreated in architectural discourse. It is considered either as a dry prosaic technicality coming under the rubric of climatology, or a sentimental balderdash about nature. Or worse, it could be considered, again not enthusiastically, as a sort of climatic determinism. The issue, I believe, goes beyond these considerations.

The Japanese thinker Tetsuro Watsuji sees space, environment, and climate as synonymous terms. In his book *Climate: A Philosophical Study*, Watsuji places premium on climate, how climate is the basis of how see ourselves and how we see the world. He wishes to rephrase the phenomenological notion of how "we discover ourselves in space" by how "we discover ourselves in climate," that is, how we find ourselves, always, in a concrete climatic and geographic envelope. Notwithstanding allusion to climatic determinism for cultures, Watsuji's arguments have implications for a rephrasing of architecture and environment. First, Watsuji may claim that terms like space and environment are abstract notions, that they make sense only when they have been particularized by specific climates. Second, Watsuji offers the Japanese term "fudo" where culture and climate (or, culture and nature, or by extension, architecture and environment) are seen in a conjoined sense such that it becomes hard to distinguish the two. Watsuji's idea corresponds to Merleau-Ponty's notion of "intertwining."

Architecture, in this sense, may be seen not merely as a shelter from climate, as if climate and architecture are confronting each other, but as the inevitable intertwining of the architectural body and climate; it is where climate is revealed. Architecture is the trace of wind, water, sun, and rain. The parasol and the brise-soleil in some of Le Corbusier's buildings, the marble strips of Louis Kahn's Assembly Building in Dhaka, or more recently, the stained membrane of Peter Zumthor's Chapel in Graubunden, the folding screen of Enriq Miralles' Hostalets Civic Center in Balenya, or the suspended stones in Herzog and de Meuron's Winery in the Napa Valley, all have a weathering narrative.

Gravity is the other bane of architecture. It is after all the metaphor of limitation and death, or as someone said, sleep is the complete surrender of the body to gravity. In the film "The Matrix," the first thing that is attempted is to overcome the reality of gravity. There are comparable anti-gravitational desires all throughout architectural history, particularly in modern architecture.

But gravity persists, and continues to interject an ambivalence in the architectural dream. There is the story of Louis Kahn and Vincent Scully on a visit to Moscow. Scully pointed to the famous church spires there, and exclaimed: "See, Lou, how they touch the sky." Kahn replied, possibly looking at the base: "See how they rise from the ground." Kahn's architecture, more than others in contemporary times, has been an unabashed reflection on gravity, attempting to confirm that architecture on earth is firmly gravity-bound.

Tectonics is actually the *poeisis* of gravity. It is no mere expression of making; it reveals man's dialogue with earth and gravity. Even if tectonic articulation is camouflaged, gravity remains as an abiding ontological condition. Gravity is also an invisible dynamic in corporeal orientation, in understanding the preconceptual modalities of left/right and up/down, horizontality and verticality, heaviness and lightness, ascent and descent, wetness and dryness, and seating and standing. They all have architectural implications, and are in one form or another vectors of gravity.

The task of making, say, a platform - a flat, horizontal surface - may seem rather pedestrian but is actually fraught with a primal urgency (the need for a horizontal datum is quite diminished in zero-gravity). Some current works, as with the return of the ramp as a slanted inhabited plane (as in many Koolhaas's projects), present and problematize the phenomenon of gravity. One such example is Balkrishna Doshi's Gufa in Ahmedabad, a semi-underground art

gallery in a reptilian configuration. At the Gufa, there is an uncompromising absence of the flat plane; all surfaces, including the horizontal or the vertical, slant, curve, and undulate. That includes the floor. Attempts to stand still or stay stationary reminds one how much we take standing or seating for granted, and how precious is the horizontal datum. While I was sitting on that mean floor during an exhibition opening, constantly trying to adjust to an elusive position of comfort, the thought that came to my mind was gravity.

SENSES AND PRESENCES

The situatedness or emplacement of architecture is a tectonic and material act. In other words, it is a phenomenal engagement – an inevitable intertwining - with climate, gravity, and the earth. Steven Holl, echoing an Albertian theme, notes: "An architecture is born when actual phenomena and the idea that drives it intersect." Idea belongs to the domain of thoughts, a matter of the mind, so to speak, while phenomenon involves sensations, perceptions, and feelings. The former implies "design" as modern architecture culture has come to know and practice it, and phenomenon points to the opening up of a work to a full corporeal and environmental engagement. It is siting, tectonics and materiality that give a building a presence. At that point, the building is both part of the social realm and part of the earth's strata: in both cases, demoored from the mind of the creator. It then becomes an engaging phenomenon, and has presence.

An architectural presence is a matter of the senses. There are different degrees of how architecture can be *presenced*, that is, different degrees of visualization, representation, and experience. There is a distinctiveness of each mode, but more importantly, there lies a strain, particularly between the dominantly ocular/retinal/visual mode, and the whole range of spatial, pneumatic, visceral, tactile, aural, and peripatetic/kinesthetic condition. This is a critical disjunction upon which the modern discipline is based, and the transaction of architectural knowledge is substantially anchored. It would be fruitful to investigate how the visual mode informs and forms, describes and inscribes, expands and limits the perimeter of the discipline.

Sound, smell, shadow, tactility, and temperature, along with sight, attune us to place, and to emplaced or sited architecture. One hears a city in the call of the *muezzin*, in the tolling of the church bell (in some places), and perhaps today, in the scream of the police siren. And, again, in distinction to the olfactorily neutral places such as Boston and Minneapolis, one can still smell Istanbul, Venice, Delhi, and perhaps New York. Some of the works of Alvar Aalto remain as classic examples of the tactile. The work of Peter Zumthor (truly the "wizard of senses") is perhaps the most compelling today; his Swiss Pavilion for Expo 2000 in Hanover is an encapsulation of all these topics. The non-visual dimensions of architecture have been addressed lately in some of the writings of Kenneth Frampton, Juhani Palaasma, and David Leatherbarrow.

A last remark on another topic from the dark: While light and lightness have enjoyed an exalted status in much of western modern architecture, as in the crystal metaphor, Mediterranean light, or the "the magnificent play of masses brought together in light," there is still much to say about shades, shadows, and darkness. The construction of shadows, not just as comforting conditions but as compelling even mythopoeic elements, may perhaps be seen in the context of the Arab courtyard, the sanctum of Hindu temples, the stepwells of Gujarat, and the Japanese aesthetics of darkness. One can make a rhetorical claim that "place" is also how shadows are made.

The aesthetical articulation of shadows and darkness may be seen in Japanese teahouses, or as explored in Junichiro Tanizaki's writings. A masterful construction of darkness is Tadao Ando's Japanese Gallery at the Art Institute of Chicago. On entering the gallery, one is immediately confronted with a dusky atmosphere, not an expectation in a museum setting. One sees only a vague apparition of a set of columns (trees in a forest?), beyond which there is a somewhat more lighted area appearing to contain some objects. One navigates through and beyond the dark forest (a grid of nine square wooden posts), and arrives at the semi-lighted area. The area contains glass cases displaying Japanese artifacts; the light seems insufficient to view the pieces. There is a long and heavy wooden bench on one side, where one can sit and let the eyes slowly adjust to the dimness. It is almost epiphanous: The artifacts slowly begin to appear amidst the haze of a visible darkness. The whole experience is one of delayed visibility. For certain things to appear, one has to wait; for certain things to prosper, one has to delay. It is no wonder that the term "dwelling" is cognate with "delaying."

SELECTED BIBLIOGRAPHY

Edward S. Casey. *Getting Back into Place: Toward a Renewed Understanding of the Place-World* (Bloomington: Indiana University Press, 1993)

Fredric Jameson. *The Cultural Turn: Selected Writings on Post-Modernism 1983-1998* (London: Verso, 1998)

David Leatherbarrow, *Uncommon Ground* (Cambridge: MIT Press, 2000)

Henri Lefebvre, *The Production of Space* (Oxford: Blackwell, 1991)

Maurice Merleau-Ponty, *The Phenomenology of Perception* (London: Routledge and Kegan Paul, 1962)

Eugene Minkowski, *Lived Time: Phenomenological and Psychopathological Studies* (Evanston: Northwestern University, 1970)

Robert Mugerauer, *Interpretations on Behalf of Place: Environmental Displacements and Alternative Responses* (Albany: State University of the New York Press, 1994)

Junichiro Tanizaki, *In Praise of Shadows* (New Haven: Leete's Island Books, 1977)

Tetsuro Watsuji, *Climate: A Philosophical Study* (Tokyo: Government of Japan, 1961)

Etruscan Settlement:
Nature, Beliefs and Creation of Space— Comparative Study with Native American Settings and Field Investigations at Vasanello, Italy

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INTRODUCTION

When Ping Xu, an American professor in architecture and Alessandra Veraldi, an Italian architect met in 1996, they found that common interests often allow two strangers to dispense with cultural dissimilarities and become immediate friends. During the fall of 1996, the two investigated several ancient Italian sites and an exchange of thoughts and ideas erupted. Intense discussions followed, that centered upon the ways in which their contrasting ancestry each created their distinct built environment. Throughout the experience they had shared a myriad of similarities and differences. Much of the discovery process was based in Central Italy and specifically Vasanello, Alessandra Veraldi's hometown, located near the town Orte — 80 km north of Rome. Therefore, the discussions spotlighted the ancient Etruscan people (7th century BC) who settled in the Vasanello region for centuries.

To help us understand the characteristics of the ancient settlement, it is important to comprehend the Etruscan cultural composition. Similar to Native American peoples, the Etruscan developed a belief system that closely tied in with nature. Utilizing comparative study, literary research and field observations, we will explore the Etruscan belief system as well as that of the cultural successor, Roman Paganism, and how such belief systems are reflected in the Etruscan settlement in Vasanello.

The Vasanello region is located between Mount Cimino and the Tiber river, and includes two major ancient settlements: the town of Vasanello and the village of Palazzolo (Figure 1). This area is characterized by typically volcanic landscape with predominantly dark brown-reddish soil, created by the erosion of tufa. This volcanic soil has, since the most remote ages, been ideal for agricultural activities. Today the residents cultivate vineyards, olive groves, and hazel-trees; there are also diffused deciduous woods in which oak trees predominate. The territory is rich in water because of the presence of a thick torrential hydrographic net belonging to the Tiber Basin. The streams that flow towards the Tiber, with a continuous erosive action, engraved the tufaceous table-land and so created platforms delimited by vertical faces. On these tufaceous reliefs rose ancient settlements, providing with strong natural defenses and occupying a commanding position. The architectural expressions still today testify to the deep unity that nature, man and art achieved at that time.

Fig. 1. The location of Vasanello.

ETRUSCAN BELIEF SYSTEM

In central Italy, beliefs rooted in the Etruscan religion mixed with Hellenic influence have evolved into the paganism that retarded the entry of Christianity into this area until the third century. These local beliefs formed a cultural background that was integrated within the ancient landscape and architecture.

The original religious literature of the Etruscans unfortunately was lost, therefore our knowledge is founded mainly on the literary works of the Latin and Greek authors, in addition to the rare fragments that have reached us directly. The Roman literature on the documentation of the Etruscan religion has been written since the first century B.C., when the Etruscan religious beliefs greatly influenced the Roman cultural ambiance. The ancient authors gave prominence to the intense religiousness of the Etruscans. The famous Latin writer Livy, describes the Etruscans as "*...people that, more than anyone else, were devoted to the religious observances and excelled in celebrating these events.*" (Livy, the first century B.C.)

The basis of the Etruscan religion was a conception of an intimate connection between the world of the gods and the world of men. Etruscans believed that nature depended strictly on divinity, and that every natural phenomenon was an expression of the divine will; humans had to understand the meaning of the signs sent by the divinity and conform themselves to them. At the beginning the divinity was essentially mysterious, coinciding with forces that presided over nature.

Etruscan Religion in Roman Culture

The Romans, too, as farmers and stockbreeders, had a sacred fear of natural phenomena, as if they were surrounded by mysterious and invisible forces. The Romans were always deeply influenced by the *Etrusca disciplina*, recognizing in the Etruscan religiousness an Italic root that must not be allowed to die. Every time Rome was threatened by dreadful events, until the end of the empire, the Romans always consulted the Sibylline Books, the most famous and important sacred text. According to tradition, these books miraculously appeared in the sixth century B.C. in Rome, when Etruscan cultural and political presence predominated. The ancient legend tells of an old woman, "not Roman," who sold these books of the destiny of Rome to the king Tarquin the Proud. Then the old woman disappeared as mysteriously as she had appeared.

Raymond Bloch wrote that neither Greece, nor Rome founded their beliefs and religions on the books of revelations. Only the Etruscan acted in this way. The Sibylline Books appeared during the reign of the Tarquini and were precisely kept until the end of the pagan period, not being, of course, the foundation of the Roman religion. Nevertheless they contained its *arcana imperii*, the secrets, thanks to which, the Roman power could survive.* (D'Aversa, 1989)

The expansion of Rome also influenced its religion. Trade exchanges, immigration, and wars fostered the introduction of new divinities and the gradual identification of existing divinities with the Greek ones. In 217 B.C. the senate decided that it was possible to receive foreign gods inside the city. Nevertheless in public Romans remained respectful of the cult handed down from their ancestors.

During the Roman empire (the first century - the fourth century A.D.) there developed a spiritual upheaval that would lead to the diffusion of the oriental cults of mystery, to solar syncretism, and to a universal and cosmic vision that would open the way to monotheism and, particularly, to Christian monotheism. The perception of the sacred, however, never failed. Even during the latest empire period, the primitive sense of mystery and horror made the divine presence seem to flutter over every place that remained, especially among the peasant people, so much so that paganism was more difficult to extirpate in the countryside than in the cities. When Christianity did penetrate in the countryside, it could do so only by allowing some ancient rites and pagan festivities of agrarian character to survive and, absorbing them, justified them under a Christian disguise.* (Pastorino, 1973)

Etruscan Setting Method

In particular, Roman people had high respect for the Etruscans' skills of site selection. This respect also was reflected in their ancient literature. Cicero reported that they linked this tradition with the origins of their history. According to tradition, in fact, Romulus founded Rome following the rite used by the Etruscans to found their cities (Cicero, the first century B.C.). Pennik in his book, *Lines on the Landscape*, wrote: <Quote> "*According to Varro's Antiquities, written in 47 BC, Roman town foundation was conducted according to Etruscan ritual. This was the famous Etruscan Discipline, a sophisticated geomantic technique with which all surveys, country planning, and road construction commenced.*" (Pennik, 1989)

The Romans paid great attention to site selection. As Vitruvius in the book "De architectura" wrote during the empire of Augustus:

> *"Our ancestors, when about to build a town or an army post, sacrificed some of the cattle that were wont to feed on the site proposed and examined their livers. If the livers of the first victims were dark-colored or abnormal, they sacrificed others, to see whether the fault was due to disease or their food. They never began to build defensive works in a place until after they had made many such trials and satisfied themselves that good water and food had made the liver sound and firm. If they continued to find it abnormal, they argued from this that the food and water supply found in such a place would be just as unhealthy for man, and so they moved away and changed to another neighborhood, healthfulness being their chief objective." (Vitruvius, the first century: Morgan, 1914).*

The Etruscan priests won great fame in the *haruspicina* (the observation of the animal's liver); they improved this divination technique beyond all other peoples of their time. The Etruscans, following the principle of the correspondence between macrocosm and microcosm, believed that the liver of the sacrificed animals reflected the subdivision of the vault of heaven so that the liver

could be read like the heavens. They had to recognize to which segment of the vault of heaven, corresponded to the anomalies and special peculiarities of the liver, and to interpret these anomalies according to the divinity that occupied the segment concerned. Ancient peoples believed that the liver was the principal seat of human affections and feelings. To examine the liver, the haruspices used models made in bronze or terracotta; it is possible that they also used these as a model for teaching. One such model that has reached us is a bronze liver from Piacenza, from the second century B.C.. On the diaphragmatic face there are two inscriptions: one is dedicated to the sun, *Usils*, and the other to the moon, *Tivr*. In the peripheric band there are the names of the sixteen gods: as the celestial space was divided into sixteen sectors, so the sixteen boxes of the liver reflected the eight seats of the favorable divinities and the eight seats of the unfavorable ones. In the visceral area there were other inscriptions.

The art of the haruspices survived during the time. In the fourth century A.D. the Christian emperor Teodosio decreed that if the imperial palace was struck by lightning, the haruspices must be consulted. All the Etruscans, both men and women, could practice divination, but there were highly specialized priests for the official interpretations. The Etruscan priest was essentially a scholar of human nature and of the nature that surrounded him. He drew his conclusions without regard to personal and factious feeling. The practice of divination was beyond nationality and religion: it was only in the service of man, trying to help him survive the risks of the future. There are numerous cases of divination by Etruscan priests who were at the disposal of Romans and Greeks *(D'Aversa, 1989).

LANDSCAPE SETTING OF THE TOWN OF VASANELLO

The town of Vasanello (whose name was Bassanello up to 1949), is surrounded on the horizon by a frame of mountains arranged in a semicircle: the mountains of Sabina to the east, those of Umbria to the north, and the Cimini mountains to the west. The town rises on a triangular tufaceous plateau, at the confluence of two streams that flow towards the Tiber. Both the east and the west side of the plateau are naturally defended by cliffs that rise from the floor of the valley. General characteristics correspond to the principles of site selection appearing in the "De Architectura":

> *"For fortified towns the following general principles are to be observed. First comes the choice of a very healthy site. Such a site will be high, neither misty nor frosty, and in a climate neither hot nor cold, but temperate: further, without marshes in the neighborhood." (Vitruvius, the first century B.C.: Morgan, 1914)*

The natural defenses of the site limited the built-up area, and a town wall built in the Middle Ages on the south side —that is, the only side unprovided with natural defenses— transformed it into an almost impregnable fortress (Figure 2). The effect was to intensify a normal historical tendency toward urban stratification.

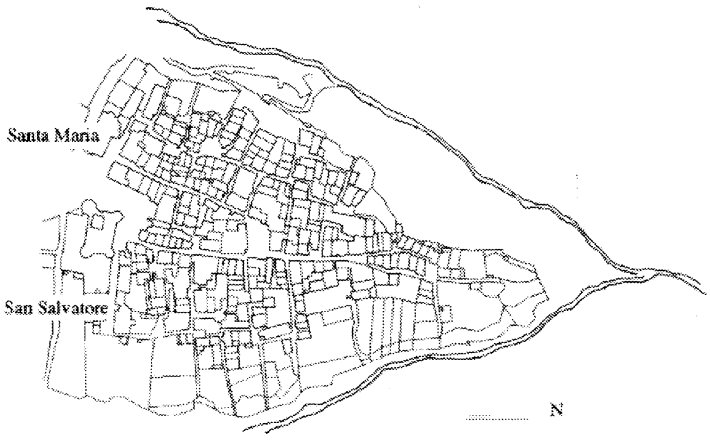

Fig. 2. The plan of the town Vasanello (by Alessandra Veraldi)

CONTINUITY OF SACRED SITES

In many cultures, sacred sites have been used over the years by different creeds, and shrines of one religion have frequently been converted into the service of another (Pennick, 1987). In the United States, an Anasazi (ancient Native American) ruin site, Site 16 on the top of mesa at Mesa Verde, was reused and rebuilt over three different periods (Figure 3). According to archaeological excavation, when Anasazi residents of the second house in 1000's A.D. dug the pit for their kiva, they deposited their dirt back into the older kiva built in Early 900's A.D. In the Southwest there are numerous Anasazi sites that had been reused and re-constructed over time. This phenomenon also occurred in the ancient town of Vasanello. In addition to converting the worship of pagan gods to the service of the True God, and the reuse of building material, one significant motive may have been respect to the original selection of a sacred site.

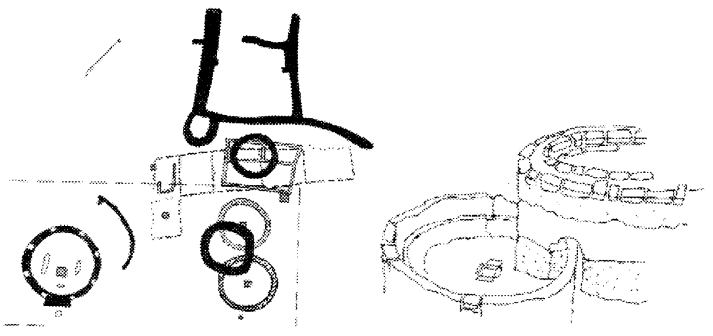

Fig. 3. Site 16. an Anasazi ruin site on the top of the mesa at Mesa Verde. was reused and rebuilt over three different periods. (Original source: Ferguson. 1987)

In 1925, during the restoration of Santa Maria's church, a big travertine fragment of a pagan altar was found under the pavement of the crypt; on the fragment is sculptured the head of a ram from whose horns start two festoons of flowers on which some birds perch.

Also, found in the crypt was a travertine pagan stele. These discoveries strengthen the hypothesis that the central cell of Santa Maria's apse was a pagan temple. Also, the south facade of the Santa Maria's church, even today, shows its foundation is based on a pagan temple (Figure 4).

Another pagan stele was found in a wall of Santa Maria della Stella, a church situated just out of the historical center of Vasanello. Today this stele is preserved inside the church of Madonna delle Grazie. According to the description of the scholar S.Mariani, it was possible to read on the stele these words:

M L FELICIS

DEO SILVANO

SACRUM VOTUM

The words DEO SILVANO referred to the god Silvan, who protected agriculture. Probably Vasanello had a cult of this divinity from the most remote times.

A tower could function as an omphalos. Pennick indicates that omphalos were a link between the earth and the heavens. Its precincts afforded protection, literally a sanctuary (Pennick, 1989). In the eleventh century, on the ancient Christian basilica of Santa Maria, rose the Romanesque church, which we can still see today. The bell-tower that rises in front of the facade was built on a Roman tower that was part of the defensive system. Moreover, in the thirteenth century, another bell-tower rose in front of the facade of San Salvatore - the other Romanesque church of Vasanello. This bell-tower was built of the stones that had paved the Amerina road running through this territory, a Roman road of the third century B.C.. According to a local tradition, the bell-tower was built on a pre-existent sepulchral monument erected for the last Etruscan king Elio, who was killed nearby the Vadimon lake, only a few kilometers from Vasanello, at the final battle between the Etruscans and the Romans in the 3rd century BC. When exploring the bell-tower's foundations, a basalt sarcophagus was found, but it was not ever possible to ascertain if it was the tomb of Elio*(Mariani, 1957).

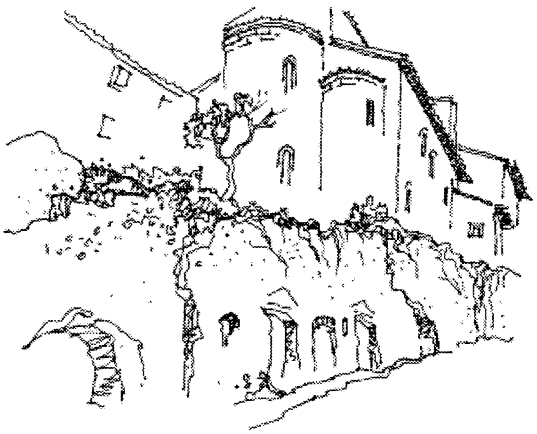

Fig. 4. Santa Maria's church was built on a pagan temple. (by Ping Xu)

NORTH-SOUTH AXIS

According to Etruscan legends, after the primordial chaos, Tinia, the most important celestial god who inhabited the north part of Heaven, determined the cosmic order. The sky and the earth were divided into four sectors by an invisible cross. The half on his left, from which the sun and the stars rose, was considered as a messenger of happiness; the other on his right, as ruinous. The first axis is the north-south axis. Perpendicular to the north-south axis, the east-west axis was determined by the positions of the sunrise and the sunset. The north-south axis was invariable, while the axis pointing to the sunrise and the sunset varied with the seasons * (D'Aversa, 1989).

Corresponding to this legend, in the Roman tradition, the alignment of the first straight line for a main road of a town was north-south, which was achieved by observation of the sunrise (Pennik, 1989). In the town of Vasanello there is a main street running from north to south, crossing through the irregular matrix of its urban fabric. This road starts from the castle, crosses the town, and ends at the extreme point of the plateau, where some kitchen gardens are today cultivated. This north-south axis seems to reflect the hypothetical layout of the *cardo* during the Roman age (*cardo* is the Latin name of the main north-south road).

The importance of the north-south axis is commonly found in other cultures. In Chaco Canyon, New Mexico, USA, Pueblo Bonito is the largest single Anazazi building. It could have housed perhaps 1000 people in some 600 rooms in A.D. 1050 - 1100. Pueblo Bonito is a spectacular architectural achievement for Anasazi, who had no metal tools, no wheel, and no beast of burden (Ferguson, 1987). In the center of Pueblo Bonito there is a wall running north-south, which serves as the main axis in the random composition of rooms and kivas (Figure 5).

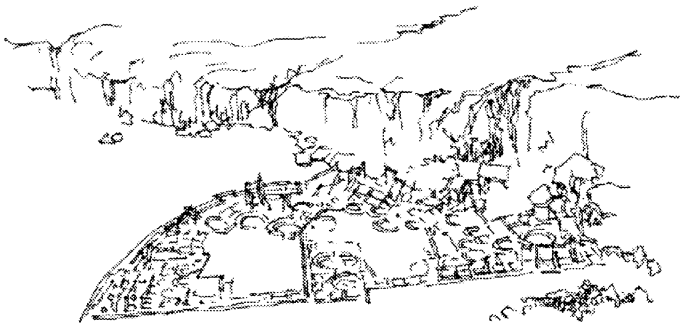

Fig. 5. In the center of Pueblo Bonito, an Anazazi ruin in Chaco Canyon, New Mexico, USA, there is a wall running north-south, which serves as the main axis in the random composition of rooms and kivas. (by Ping Xu)

SUNRISES AND STRAIGHT TRACK ALIGNMENT

As in other ancient cultures, sun worship and significance of sunrise were strongly reflected in ancient Italian life. The east and southeast were especially favorable orientations, symbolizing the power of luck. Morini wrote that according to the Etruscan rite, the foundation of a town was decided in the morning, and the main roads were oriented with the point where the sun rose*(Morini, 1963).

Facing East at the Various Scales

The urban plan of Vasanello is structured along a main road axis, on which the secondary roads are grafted, that crosses the whole center lengthwise to the extreme point of the plateau. This north-south axis created great opportunities for public ritual buildings to face east. A peculiarity of the churches of Vasanello is that their facades are oriented to the east; this is the case both in Santa Maria and in San Salvatore. On a small scale, the sun worship was especially reflected in the east orientation of the altar. As Vitruvius mentioned:

> *"Altars should face the east, and should always be placed on a lower level than are the statues in the temples, so that those who are praying and sacrificing may look upwards towards the divinity. They are of different heights, being each regulated so as to be appropriate to its own god. ...In accordance with these rules will altars be adjusted when one is preparing his plans." (Vitruvius, the first century; Morgan, 1914)*

Straight Track Alignment

Straight lines in landscape are a common phenomenon throughout the world. Research on a variety of landscape lines is all related to the thread of thinking on 'ley' that was effectively commenced when Alfred Watkins coined the term in the 1920s, after discovering a linear pattern in his native Herefordshire landscape (Pennik, 1989).

The Romans not only used the alignment for setting a main road of a town, but also for orienting their sacred places. They celebrated the cult in the open air, where they felt the gods would present themselves: in the woods, near springs, and on the shores of watercourses. The sacred place was delimited, and there an altar was erected to receive offerings brought to the divinity. This sacred enclosure was oriented to the east, by following a line that the priest drew on the ground.* (Pastorino, 1973).

We also discovered a straight-track alignment at Palazzolo, a subdivision of Vasanello. The archaeological area of Palazzolo is situated northwest about 2 km from the town of Vasanello. The ancient route that linked up the two centers was excavated in the tufaceous rock and wound on the tableland at the edge of the present-day road. In ancient times the Palazzolo village of Etruscan-Roman origin seemed to occupy an important territorial junction.

On October 18, 1996, we visited Palazzolo. Along an ancient road running west of the Palazzolo ruins, in front of a necropolis, is a hill at whose foot there is a cave. The tracks on the wall of the cave imply that people may have once collected water that seeped from the hill. On the top of the hill there is a shelter created by a huge rock overhanging. This shelter looks very similar to rock shelters with petroglyphs in New Mexico, USA (Figure 6). Also, the top of the rock (at the hill west of Palazzolo) bears traces implying that there was once a structure. This hill may once have been used as a place to watch the sunrise, since the sunrise has ritual importance as well as technical use in determining the axis for ancient settlements. It would not be surprising to find that this hill was a sacred place for the ancient people. As Pennik indicated, ancient literature provides us with numerous instances of heroes or religious figures ascending holy hills in order to communicate with the gods (Pennik, 1989).

Fig. 6. On the top of a hill west of Palazzolo there is a huge rock shelter (left) which looks very similar to a rock shelter (right) of petroglyph site in Albuquerque, New Mexico, USA. (by Ping Xu)

Standing atop the hill, Ping Xu noticed an alignment from the top of the hill, passing through the ruin of the ancient church located at the west end of the Palazzolo hill, and pointing directly at the peak of the San Pancrazio mountain to the east (Figure 7). Alessandra Veraldi watched the sunrise at the winter solstice (12/21/96) and the equinox (3/21/1997). During the equinox of 1997, Alessandra Veraldi proved Ping Xu's hypothesis that the sunrise position on the profile of the San Pancrazio Mountain aligns with the church ruin and the top of this hill. Later, Alessandra Veraldi went to the top of San Pancrazio Mountain, from which there is a view to Vasanello. On the top of San Pancrazio mountain is a Roman pagan temple ruin near a little church.

Fig. 7. A straight line passing through the top of a hill, the church ruin, and the peak of the San Pancrazio Mountain, where the sun rises during the equinox and where a Roman pagan temple ruin remains. (by the authors)

The thought of finding the straight tract alignment to the sunrise in Vasanello also came from Ping Xu's experience in watching the sunrises at Anasazi settlement, the Far View ruins at Mesa Verde during the autumnal equinox of 1995 (Xu, 1998). She discovered that as the first rays shone directly on the ruin, the north wall of the ruin pointed straight at the sun, appearing on the mountain profile of the eastern horizon (Figure 8).

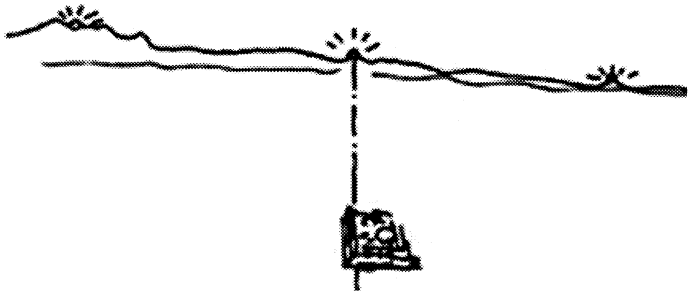

Fig. 8. The north wall of the Far View ruin pointed straight at the sun appearing on the mountain profile of the eastern horizon. (by Ping Xu)

CONCLUSIONS

The study of the deep cultural roots of Etruscan and Roman paganism in central Italy may help us to better understand the ancient creativity, the results of which still somehow remain as a ghostly landscape overlapping the contemporary land. Nature was a resource for the ancient people, and it is also a resource for us to understand our ancestors' creation on the land. When we research the settlement of an ancient people whose culture and techniques have been mostly lost, field investigations of phenomena on the landscape are appropriate. Also, cross-cultural and comparative studies may provide clues to stimulate our thinking. Moreover, identifying both similarities and differences between cultures could help us understand some essential issues of ancient built environments. This research at Vasanello provides a case study of the Etruscan settlements that was the creation integrating a functional space with nature and beliefs. Integrating spiritual aspects with physical concerns, the ancient approach provided models for integrative design in the built environment.

The significance of the sunrise was strongly reflected in the Etruscan built environment. The sunrise position also often related to a straight track alignment on land. At Palazzolo we discovered a straight line passing through the top of a hill, the church ruin, and the peak of the San Pancrazio Mountain, where the sun rises during the equinox and where a Roman pagan temple ruin remains. Orienting their built structures to sunrises, Etruscan settings stressed the horizontally spatial relationship between site and landscape, from large scale to small scale, from town selection to the arrangement of an altar. Their sacred sites have been used over the years by different creeds.

Ancient Italian landscape and architecture reflected a belief system and activities that have many similarities to other ancient cultures, such as Native American cultural heritages. The ancient holistic thinking patterns have been reflected in their designs, some of which still remain as readable phenomena in the world, in

the West as well as the East. However, there are different levels of continuity with those heritages. Some cultures have kept their ancient system, thinking patterns, and practice until the last century. And the cultural continuity has never completely stopped even in the present time. But most of the West has largely lost its ancient track through religious persecutions, through modern, mechanist, scientific thinking, and through the use of advanced techniques over a much longer time period. Moreover, there are differences in attitudes toward the ancient ways of shaping a built environment, and toward the way in which we rethink and re-find these ancient disciplines and their resultant settlements. To understand how ancient people designed we must try to understand what they were thinking and why they were doing what they did.

Respect for the awareness of early peoples, their different perceptions of the environment, and their consciousness and spirituality will lead more and more people into the integrative investigations of ancient settlements throughout the world, in the West as well as the East. Such research certainly will enhance our insight into the essential contents of landscape, architecture and beliefs, and their significant roles in creating the built environment. Eventually, we believe, a new approach— integrative, systematic, rooted in the ancient tradition and utilizing modern techniques— will appear and grow in this century.

NOTE

*translation from Italian by Alessandra Veraldi.

REFERENCES

Brown, Hanbury. *Man and the Stars.* Oxford: Oxford University Press, 1978.

Livy (the first century). *Ab urbe condita - Book IX* with an English translation by B.O. Foster

(1926). New York: G. P. Putnam's Sons.

Ferguson, William M. and Arthur H Rohn. *Anasazi Ruins of the Southwest in Color.*

Albuquerque: University of New Mexico Press, 1987.

Pennick, Nigel. *The Ancient Science of Geomancy. Living in Harmony with the Earth.*

London: Thames & Husdson, 1979.

Pennick, Nigel and Paul Devreux. *Lines on the landscape: Leys and other linear Enigmas.* London: R. Hale, 1989.

Marcus, Clare. "Alternative Landscape: Ley-lines, Feng-shui and Gaia Hypothesis," *Landscape.*

29 (1987): 1-10.

Seneca (the first century). *Naturales Quaestiones* with an English translation by Thomas H.

Corcoran, Cambridge, Massachusetts: Harvard University Press, 1971.

Vitruvius (the first century). *De Architectura -The Ten Books on Architecture* translated by Morris

Hicky Morgan, London: Humphrey Milford, Oxford University Press, 1914.

Xu, Ping. "*Feng-shui* as Clue: Identifying Prehistoric Landscape Setting Patterns in the Southwest." *Landscape Journal,* Volume 16 (1998):2, pp. 174-190.

in Italian:

D'Aversa, Arnaldo. *La divinazione nella cultura etrusca e romana.* Brescia: Paideia Editrice

Gamurrini, G.F. - Cozza A. - Pasqui A. - Mengarelli R. (1972). *Carta archeologica d'Italia. Materiali per l'Etruria e per la Sabina.* Firenze, 1989.

Mariani, Salvatore. *Il Cavaliere di Cristo S.Lando M. Protettore di Bassanello.* Civita

Castellana: Ed. Pian Paradisi,1957.

Morini, Mario. *Atlante di storia dell'urbanistica.* Milano, 1963.

Nardi, Giuliana. *Le antichita' di Orte.* Roma: Consiglio Nazionale delle Ricerche, 1980.

Pallottino, Massimo. *Etruscologia.* Milano: Hoepli, 1984.

Pastorino, Agostino. *La religione romana.* Milano: U. Mursia & C.,1973.

Raspi Serra, Joselita (1980). *Vasanello-Palazzolo:* un territorio, ambito di lotta fra Romani e

Barbari. Roma: Herder Libreria Editrice

Staccioli, Romolo A. (1981). *Storia e civilta' degli Etruschi.* Roma: Newton Compton.

The Paradox of Eco-Tech

Moderator: Robert Fleming, Philadelphia University

Mumbling and Stumbling:
Paradoxes of Green Design Practice

JACK ELLIOTT
Cornell University

Unhealthy Energy Conservation Practices

PHILLIP G. MEAD
Texas Tech University

Eco-Technologies:
A Collaboration with Nature

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University of Colorado at Denver

Mumbling and Stumbling:
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INTRODUCTION

Thirty years ago Ian McHarg wrote "Design with Nature", calling for architecture and planning to change the way human interventions are imposed on the natural world.[1] Today, others are making the same admonitions, only the environmental stakes are much higher. However, unlike other "world crises" such as the nuclear holocaust or overpopulation, where design interventions could only be minor and responsive, the environmental crisis is one where design responses can be major and generative. Almost 40% of the world's energy and resources are spent on creating, operating, or dismantling the built environment. This has a considerable impact on the biophysical world. Designers can be part of the solution but this is not happening.[2]

Despite the quantity of "environmental knowledge" developed over the last few decades, it has done little to change our daily lives, let alone reverse environmental degradation. Our society is equipped with more information about our biophysical world than it has ever had and yet our responses seem ineffective. This paradox is evident in the design community as well, whose lack of effective action in the face of such great environmental threats is startling. We are not changing the way we practice in order to lessen the harmful effects on the environment, let alone make things better. Most of us are stumbling along in the same direction, contributing to many of the environmental problems we now face.

Even more paradoxically, those of us who have decided to take up the environmental cause are often ineffective at expressing our "greenness" through our interventions. Our work mumbles, barely speaking of its underlying environmental agenda. This paper examines these paradoxes of "stumbling" and "mumbling" as they are manifested in works of design and how these paradoxes are symptomatic of some larger serious problems faced by humankind on this planet. Finally, this paper investigates what the implications are for educating environmentally responsible designers capable of dealing with the daunting biophysical challenges as they enter into a critical new century.

STUMBLING: PARADOX OF INEFFECTIVE DESIGN ACTIVITY

A paradox of ineffective activity is gripping the design professions. Despite growing evidence about global environmental degradation and the related roles that the design and construction of the built environment play, design practice is proceeding as usual.[3] Yet few among us would declare a deliberate effort aimed at degrading our environment. Most of us want the best for our children. So why the business-as-usual attitude, despite the knowledge, despite the care for our future generations? If these environmentally deleterious acts are not deliberate, why are they happening?

One of the possible reasons for this paradox is lack of knowledge, not of the environmental difficulties that face our biophysical world, but of the appropriate local design responses to those difficulties. The responsibility for acquiring this information lies largely with the institutions of design education. However, despite the importance of this facet of design education, environmental responsibility is a low priority in most of America's design programs. In 1999, I conducted a web-based survey, examining the required curriculum of the top thirty graduate schools of architecture in the U.S as ranked in 1997 by the U.S. News and World Report. Only two of these schools had any required courseware regarding sustainable issues in design.[4] These were the University of Minnesota-Twin Cities and Rice University. The University of Virginia with William McDonough as its former dean only strongly recommended their course on sustainable issues. It was not required. Most of the environmental courseware in the schools were related to HVAC, energy, and building systems.

The results of these surveys provide one explanation of why this paradox of ineffective activity persists so vigorously. Students are not being equipped with the information about how they can reduce the "ecological footprint" of their interventions. The bad news is that even if this scenario were to change today, it would be another five to ten years before the impacts would be felt in the built environment. This is how long it would take for a student to become a policy-making member of a professional practice.

Why is this deficiency of environmental design education happening in American universities? To attempt to answer this, one has to

investigate the forces that shape curriculum in design programs. Since design education is largely profession-driven, the concerns of practice are quickly impressed on academia through advisory boards and professional accreditation organizations. While advisory councils vary from program to program, accreditation groups are national in scope and reveal base-line standards for professional education. However, both the Foundation of Interior Design Education Research (FIDER) and National Architectural Accreditation Board Inc. (NAAB) have language relating to environmental education objectives. For example, the NAAB lists "environmental conservation" as one of 37 student performance criteria where students must show an understanding of "the basic principles of ecology and architect's responsibilities with respect to environmental and resource conservation in architecture and urban design."[5]

If it is not the external factors such as advisory groups and accreditation boards, the responsibilities for the existing state of design curriculum must lay with us, the educators and our institutions. In Sarah Hammond Creighton's book, Greening the Ivory Tower, she discusses how to "improve the environmental track record of universities, colleges, and other institutions."[6] Although she devotes only a few pages to the issues of curriculum, none of which related to design education, Creighton does make some good points.

She suggests that universities often "green" the curriculum on a single department basis or in a few academic specialties, most often in the environmental sciences. What about the remainder of the student population who graduate from these institutions? Anthony Cortese, the renowned environmental educator, provides an answer:

> *"Because all members of society consume resources and produce pollution and waste, it is essential that all of us understand the importance of the environment to our existence and quality of life and that we have the knowledge, tools, and sense of responsibility to carry out our daily lives and professions in ways that minimize our impact on the environment. That is, we need an environmentally literate and responsible citizenry."*[7]

Cortese argues that environmental issues should be introduced to all students, regardless of discipline, just as writing skills, numerical fluency or physical education are listed as requisite courseware at most of today's institutions of higher learning. Ultimately, this approach could cause the category of "green design" to disappear. It would become an expectation to be taken for granted. Just as today we expect buildings to stand up and appliances to work, we would expect all design to be ecologically benign, if not restorative.

Another reason for the persistence of this paradox has to do with values. It is not that designers do not care about the biophysical world, but they care about other issues more, especially those which appear more immediate. Profits, litigation, client satisfaction all provide justifications for this disparity between knowledge of the environmental problems and professional responses. For many practitioners, environmental issues rank low on their list of considerations. In the recent book "Architectural Knowledge: The Idea of a Profession", most of the writings were centered on issues of scope of practice, information technology, and the role of professional associations.[8] Of the eighteen chapters, not one specifically dealt with the environmental issues that face the profession. Nowhere was there any discussion about new forms of professional engagement that would make an environmental difference. This apathy is not limited to this particular book. It is widespread in the design professions.

Compounding the problem of the devaluation of green design is the perspective that ecological issues are viewed as technical issues and therefore less important than formal design. Mainstream practice views sustainable design as marginal to the true task of form giving. Recent history may have had something to do with this devaluation of green design in architecture. The awkward built responses to the energy crisis of the 1970's produced works where the technologies overpowered the program and form. This "solar stigmata" is still with us today.[9] Green designers are seen as "techies", not as designers. Few design magazine "stars" refer to the biophysical considerations of their work.

This is not to say that the design professions are not making any efforts to respond to this challenge. Five years ago, Susan Maxman, then president of the AIA, declared 1995 the "Year of Sustainability". Sustainable design became a specific Professional Interest Major (PIM) of the AIA, ASID, and IDSA. New books, periodicals, and trade journals have appeared in response to the growing demand for information on sustainable design of the built environment. However, this knowledge has not exactly revolutionized the profession. Rarely has this expertise been demonstrated as central to a new or provocative design expression, a seemingly necessary condition for redirecting visually oriented professions.[10] Designs are still being created that manifestly express their environmentally insensitive values, often unbeknown to the designer. David Orr describes how conventional school architecture communicates its damaging moral convictions:

> *"First, it tells its users that locality, knowing where they are is unimportant...Second, because it uses energy wastefully, the building tells its users that energy is cheap and abundant and can be squandered with no thought for the morrow. Third, nowhere in the building do students learn about the materials used in its construction or who was downwind or downstream from the wells, mines, forests, and manufacturing facilities where these materials originated or where they eventually will be discarded. And the lesson learned is mindlessness, which is to say that disconnection is normal."*[11]

It is the normality of this disconnection that green design seeks to correct. An awareness of environmental responsibilities is what fundamentally differentiates green design from others. However, upon closer examination, many examples of green design also suffer from this malady, ineffectively expressing the deeply held environmental values of their creators. This expressive failure reveals a second paradox.

MUMBLING: PARADOX OF INEFFECTIVE AESTHETIC COMMUNICATION

This paradox of ineffective communication can be seen as "mumbling", where messages are being sent but they are unclear or confusing. Within the green design movement as a whole, there is a widespread ineffectiveness in visually communicating a sense of "greenness", despite the deep ethical fervor. The rhetorical potential of design is being ignored. For me, the irony of the mumbling paradox is more troubling of the two.

This paradox is especially evident in publications dedicated to promoting green design. In a recent review of "architecture of the environment", forty-four buildings were selected from around the world "which address environmental issues and nature in a cogent and intelligent manner."[12] Upon reviewing the case studies, the reader is struck by the stark, machine-like quality of the majority of these buildings' facades. Their visual messages are diametrically opposed to their conceptual environmental agenda (see Figure 1).

Upon closer examination, the greatest ironies of expression are found in the materials chosen for building facades. Choices made here are extremely important, as these are the locations where most of the building's meanings are visually communicated into the public realm. Of these forty-four examples, only sixteen projects utilized renewable materials in their facades. Only five projects used recycled materials in their cladding. Most of the projects use aluminum or glass. Both of these materials are derived from open-pit mining, are high in embodied energy, and are non-local and non-renewable. This is more of a display of wealth than of restraint, where the ends (performance) justify the means (production). Short-term goals outweigh the long-term environmental effects. Most of the facade configurations are simple, regular and orthogonal, not only reflecting the technology of their assembly but the technophilic orientations of their creators.

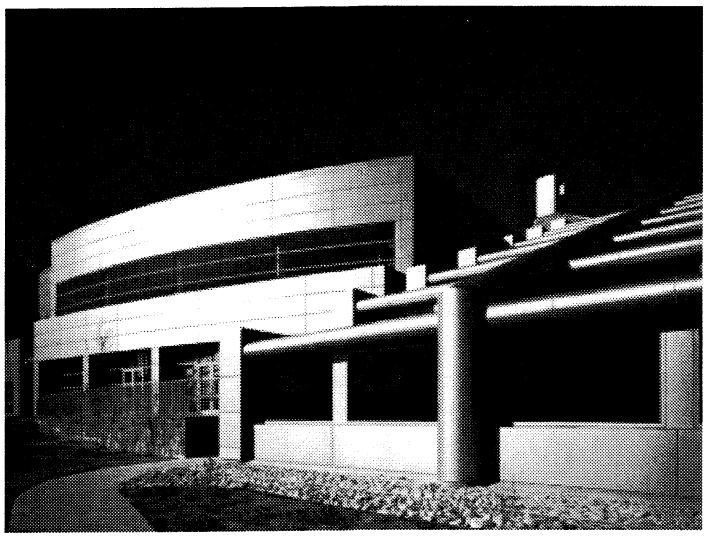

Figure 1: Anderson Bartolo Pan. Inc., NREL Solar Energy Research Facility. Golden. Colorado. USA. 1993.

Figure 2: Viaduct des Arts. Patrick Berger and Jean-Michel Wilmotte. Paris. 1995.

Another way a building communicates visual messages is in relation to its age. Of the forty-four projects highlighted, only two projects in this survey are renovation projects, a minimal impact intervention. All the rest of the buildings were new. One of the exceptions was the refurbishment of the Viaduct des Arts along the Avenue de Daumesnil in Paris. In a world of diminishing resources, this is the kind of architectural intervention that needs promotion, not the creation of new monuments to designers or their clients. Not only does rehabilitation use less material and energy; it maintains a connection to the history and culture of the place (see Figure 2).

The Viaduct des Arts also demonstrates how a building can provide meaning through its relationships with its urban context. Almost all of the other projects are stand-alone works, situated in suburban office parks or industrial zones. As such, these projects discourage pedestrian activity, support car-based access, strain urban infrastructures, and contribute to urban sprawl and the disappearance of green space. Any amenities they provide are available only within the private realm. On the other hand, the Viaduct des Arts enhances the pedestrian experience, allows car-based access, strengthens existing urban infrastructures, densifies the city, and provides new green space within the public realm.

The way a design functions also communicates values. Only three projects utilize in-situ sewage treatment. Only one project integrates other living systems into its operations. None of these projects generate more usable energy than they consume. None are explicitly designed for re-use or disassembly. None are designed to improve local ecologies through their interactions with their sites.

Most of these buildings singled out for publication do nothing but reinforce our detachment from Nature through their aesthetic expression and functional performance. These selections may be more a case of the author's bias than an accurate representation of the state of environmentally responsible design. However, published as exemplars, they exert considerable influence on practice

reinforcing an ironic disconnection with Nature already widespread in the design world.

If "green" designers cannot communicate a project's eco-ethical program through the form of the design, who can? Sadly, the answer is not many. The presence of gaps between designers' professed values and their formal expressions are nothing new. In fact, this gap is intentional, freeing designers from passing judgement on their clients or their activities. This "veil of innocence"[13] which the early modernists tried to lift with their social housing programs, has been firmly put back into place. Ethics is limited to practice and contractual obligations. Social and environmental ethics rarely enter into the picture.

Perhaps this paradox is linked to a deeper flaw in our collective worldview, not just as designers, but as global citizens of the "developed world." Roger Scruton, a philosopher of aesthetics, points out how we describe the world in two different ways, as the spontaneous, self-organized world of nature - as the world which *contains* us, and as the deliberate, intentionally organized world on which we act. He points out that "we are part of nature, obedient to natural laws. But we also stand back from nature, and make choices we believe to be free,"[14] independent from the natural laws we actually depend on. It is this "illusion of free choice" that sustains the belief that design practice can be reduced to a system of rational, prescriptive rules, independent of the natural world that contains it. This uniquely modern relation should not be taken for granted; it epitomizes the crisis of contemporary design, if not society at large.

Scruton's concept of the "illusion of free choice" is extended even further to the idea of "entrapment" in the writings of the French Marxist philosopher, Herbert Marcuse.

> *"Science by virtue of its own method and concepts, has projected and promoted a universe in which the domination of nature has remained linked to the domination of man - a link which tends to be fatal to this universe as a whole. Nature, scientifically comprehended and mastered, reappears in the technical apparatus of production and destruction which sustains and improves the life of individuals while subordinating them to the masters of the apparatus."*[15]

We have become victims of our own technical success. In order to reap the rewards of an instrumental approach to the natural world, we have become instruments ourselves by the system we have created. What are some of the ways our society in general and design in particular can escape this rationalist, technological entrapment? Marcuse offers some answers. He sees contemporary technology in terms that underscore its intrinsic instrumentalism. The procedures of abstraction, calculation, and rationalization allow technology to become a form of social control and domination.[16] Marcuse suggests that if instrumental rationalism is behind the domination of Nature and humanity, then new practices, linked not to a metaphysics of domination but rather to a metaphysics of liberation, might alter everything. He describes this metaphysics as founded on, "a new sensibility - aesthetic, life affirming, and liberatory in character -". It would be based on aesthetic dimensions and a regard for beauty as a check against aggression and destruction."[17] This is a call for social and political criticality in art and design. Rather than being the handmaiden of the established apparatus, beautifying its business and its misery, design could become an instrument for its transformation. Design could become part of the solution, instead part of the problem. In order to do this design must revise its values.

THE ROLE OF ETHICS IN GREEN DESIGN EDUCATION

How can we as design educators help bring about this change in values to enable greater social and political criticality in art and design? One way is to change the focus of our worldview, especially as it pertains to ethical matters. The prevailing anthropocentric worldview is not working. However, a truly non-anthropocentric or biocentric worldview is not possible either since "nature" is a human construct in both theory and practice. This paper argues for something in between, a movement towards a fuller sense of anthropocentrism, one where humankind is still at the center of the worldview but where sympathies many people already feel and experience towards things natural are revitalized and expanded without sacrificing their concerns for each other. People must be aware of the global impacts of their local acts. This modified worldview could enable designers to fulfill their goals while respecting the lives of all things they impact. By caring about natural systems in general, they are caring for themselves in particular.

As a design educator, I am faced with the challenge of changing the focus of the worldviews of the students I encounter by expanding their scope of environmental awareness. These students are eager and earnest to find ways to make the world a better place. However, many of them lack an intrinsic appreciation of what it is that is in need of protection or regeneration. Most of them come from urban/suburban environments where nature is glimpsed on the Discovery Channel or through a car window. Compounding the issue are the conventional models of design education where students only consider the appearance of inanimate things when constituting a built environment for people. Before I can help them design in an environmentally responsible manner, I must help them revise their conceptual frameworks about their world and their place in it. The design professionals of tomorrow must be aware of the ecological challenges we face as a biotic community and care enough to do something about it. Resource depletion, global warming, habitat loss, toxification of indoor and outdoor environments are real issues that require real action. They must be made aware of more than the visible matters of meaning. They must probe into the hidden realms of ethics to reorder their own personal worldview.

This is not a simple educational task. Providing information is easy. Changing values is hard. These are matters of moral education where the objective is to reduce unethical behavior. A number of techniques have been developed by educators to increase moral competency such as fostering the development of moral reasoning and encouraging sensitivities to moral issues.[18] This can be accomplished in the classroom through the study of moral dilemmas, presenting all sides of the arguments. However, other social obliga-

tions and personal desires often present themselves in opposition to ethical responsibilities, thereby weakening the link between moral judgement and behavior. Consequently, some researchers suggest that educators should do more to incorporate ethics into people' s self-concepts[19] and on building moral character.[20] This can be achieved by putting students into active, real world situations involved with ethical issues. Nature walks, site visits, and community service projects with environmental agenda are effective techniques for bring green design issues home to the students.[21]

Other research in ethical education has shown that greater moral competence does not necessarily lead to greater moral behavior as this paper has already documented with regard to "mumbling". Unethical behavior is often not the result of a disconnection between moral judgement and behavior but rather a corruption of the ethical resolution process where immoral behavior is rationalized in order to justify a desired outcome.[22] This corruption results in the erroneous conclusion that an unethical action is actually morally acceptable. This behavior is not a result of a moral judgement failing to determine action but rather of a corrupted judgement driving action. In this case, it is vital to augment ethical discussions with students by demonstrating how and why moral reasoning can fail, despite good intentions and the absence of guilt. Students need to be trained to recognize fallacious arguments and other forms of flawed moral reasoning in order to inoculate themselves against the type of motivated arguments they might be tempted to use later in life, both personally and professionally.

CONCLUSIONS

This paper set out to investigate why the design community has been ineffective in changing the way it does business in the face of today's great environmental degradations. The investigation was structured through the exploration of two major paradoxes labeled "stumbling" and "mumbling". Despite a concern for the environment, most design practitioners continue to stumble along in the same professional direction, contributing to many of the environmental problems we now face. This is a matter of ineffective action. Many of those who have decided to take up the environmental cause mumble as they express their "greenness" through their interventions. This is a matter of ineffective expression. These paradoxes of "stumbling and mumbling" are symptomatic of some larger serious problems faced by humankind, namely a loss of sensitivities and consequent values for things natural, non-rational, and non-human. These devaluations for the natural world has major implications for educating environmentally responsible designers. A focus on knowledge is not enough. The focus has to be on values. Education can bring about positive change. That is why many of us are in this profession. Minds are young enough to incorporate new ideas. They are free enough to explore new views and values. It is vital that these minds experience the powerful effect of an active, critical design process "doing good" in a real world context. It is my profound hope that once experienced, most of the students will be forever changed. They will enter the world as critical individuals, as design activists, not satisfied to "sustain" the way things are, but to work towards making things better.

Design can bring about positive change. Design does not need to be a passive mirror of the way things are. It can present a new optimistic worldview, about how things can be. It can influence people through the values it expresses. Therefore, it seems reasonable that as a public art, design should affect the minds of the audience for the sake of the public good. As described by Tzonis and Lefaivre, "It should edify wisely, consult and comment judiciously, defend and praise, rouse consciousness, and criticize."[23] Given that design can provide leadership through its aesthetic expression, it would seem to be a missed opportunity if it fails to express publicly the environmental ethics affecting its realization.

NOTES

[1]Ian McHarg, *Design with Nature* (Garden City, NY: Doubleday, Natural History Press, 1969).

[2]Gary Pask, "Introduction", *Canadian Eco-Architecture* 5 (2000): 3. Pask's fist line reads,"Sustainable design isn't taking hold."

[3]Thomas A. Dutton and Lian Hurst Mann, "Modernism, Postmodernism, and Architecture's Social Project", in Thomas A. Dutton and Lian Hurst Mann, eds., *Reconstructing Architecture: Critical Discourse and Social Practices* (Minneapolis: University of Minnesota, 1996), 3.

[4]These results came from a web survey of the top thirty graduate schools of architecture as ranked in 1997 by the US News and world Report survey.

[5]Taken from the NAAB website at http://www.naab.org/information1726/information_show.htm

[6]Sarah Hammond Creighton, *Greening the Ivory Tower: Improving the Environmental Track Record of Universities, Colleges, and Other Institutions* (Cambridge, MA: MIT Press, 1998).

[7]Anthony Cortese, "Education for an Environmentally Sustainable Future," *Environment Science and Technology* 26: 6 (1992): 1108-1114.

[8]Francis Duffy with Les Hutton, *Architectural Knowledge: The Idea of a Profession* (London: E & FN Spon, 1998).

[9]Richard Ingersoll, "Second Nature: On the Social Bond of Ecology and Architecture", in Thomas A. Dutton and Lian Hurst Mann, eds., *Reconstructing Architecture: Critical Discourse and Social Practices* (Minneapolis: University of Minnesota, 1996), 137-138.

[10]Exceptions may be the recent work of Starck, Piano, Rogers, Foster, and Yeang.

[11]David Orr, "Architecture as Pedagogy" in Charles J. Kibert, ed., *Reshaping the Built Environment: Ecology, Ethics, and Economics* (Washington, D.C.: Island Press, 1999), 213.

[12]David Lloyd Jones, *Architecture and the Environment: Bioclimatic Building Design* (Woodstock, NY: Overlook Press, 1998), 9.

[13]Phrase "veil of innocence" provided by Pauline Morin in discussions about Alberti and architectural practice.

[14]Roger Scruton, *An Intelligent Person's guide to Philosophy* (London: Penguin Press, 1996), 22.

[15]Herbert Marcuse, *One Dimensional Man: Studies in the Ideology of Advanced Industrial Society*. (Boston: Beacon Press, 1964), 166.

[16]Ibid., 157-158.

[17]Ibid., 146.

[18]J.R. Rest, "The Major Components of Morality" in: W. Kurtines and J. Gewirtz, eds., *Mortality, Moral Behaviour, and Moral Development*, (New York, Wiley), 24-38.

[19]A. Colby,and W. Damon, *Some Do Care: Contemporary Lives of Moral Commitment* (New York, The Free Press, (1992).

[20]J.R. Rest, 38.

[21]One well documented example of this approach is outlined by Leslie Kanes Weisman, "Re-designing Architectural Education: New Models for a New Century", in Joan Rothschild, ed., *Design and Feminism: Re-Visioning Spaces, places, and Everyday Things*, (New Brunswick, NJ: Rutgers University Press), 159-173.

[22]David M. Bersoff, "Explaining Unethical Behaviour Among People Motivated to Act Prosocially", Journal of Moral Education, Vol. 28, No. 4, 1999, 413.

[23]Alexander Tzonis and Liane Lefaivre, *Classical Architecture: The Poetics of Order* (Cambridge, MA: MIT Press, 1986), 5.

Unhealthy Energy Conservation Practices

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INTRODUCTION

"Today's problems come from yesterday's solutions." Systems thinker Peter Senge wrote this introductory passage in his best seller *The Fifth Discipline* to illustrate the futility of simplistic solutions. Systems dynamics predict that the most obvious solutions are too narrowly focused; they may improve matters in the short term, but only make things worse for the future.[1] Environmental design has demonstrated this maxim several times from the Department of Transportation's freeway campaign in the 50's to Corbu inspired high-rise slums. In examining energy practices over the last 25 years it is clear that the building industry and the academy too narrowly defined and attacked the energy crisis at the expense of broader health and welfare issues. ASHRAE guidelines, passive energy recommendations and typical planning and building efficiencies have significantly deteriorated indoor light, air and views.

ASHRAE'S CONTRIBUTION TO THE PROBLEM

In the late 70's and 80's, ASHRAE responded to the crisis by taking the most direct route by lowering ventilation standards. Since ventilation represents 20 to 40 percent of a building's thermal load, ASHRAE looked at the most obvious solution and cut ventilation in office buildings from 15cfm in 1977 to 5cfm in 1982.[2, 3] Seven years later, after a number of press releases and articles on sick building syndrome, the *ASHRAE, 1989 Fundamentals Handbook* still wrote the following on ventilation, "Outdoor air introduced into a building constitutes part of the space-conditioning load which is one reason to *limit air exchange* rates in buildings to the minimum required."[4] The *1997 ASHRAE Handbook Fundamentals* contains this same sentence which demonstrates that efficiency is of central importance while human health is on the periphery.

But air quality appears to be a fraction of the problem. In addition to respiratory illness, simplistic efficiency strategies have lowered the quality and quantity of indoor light. Within the last 20 years, medical studies have found that today's low levels of light may significantly contribute to depression[5] inattentiveness,[6] stress[7] and compromised immunity.[8] Additionally, restricted access to outdoor spaces that provide a plenitude of full-spectrum light may significantly increase rates of osteoporosis[9] and cancers of the breast and prostate.[10] For hospital patients, poor views due to smaller energy saving windows may slow recovery time and increase pain.[11]

MODERN ARCHITECTURE'S TIE TO HEALTHY DESIGN

Recent environmental medical findings have roots back to ancient times and more recently to the mid 19th century. Florence Nightingale was one amongst many who strongly recommended light — in particular sunlight—and fresh air in hospital and house designs in her influential 1860 book *Notes on Nursing*. In 1903, the therapeutic use of light gained considerable validity when the Nobel Prize was given to Niels Finson for discovering the curative effects of light on tuberculosis.[12] These findings inspired building and city designs to access more light and air. According to Ph.D. candidate James Ross of Brown University, modern architecture and its health conscious use of light and air was deeply influenced by late 19th century medical findings and theories.[13] From this era emerged the health inspired work of Frank Lloyd Wright, Irving Gill, Rudolph Schindler, Richard Neutra and Alvar Aalto.[14] All promoted their designs as healthy. Most used glass liberally and blurred the distinction between inside and outside for natural views, fresh air and light. Today however, to designers who still see windows as an energy drain and outdoor spaces as superfluous, modern architecture's use of glass and outdoor rooms could be seen as wasteful.

PROBLEMS WITH VERNACULAR PRECEDENTS

By breaking cultural traditions, modern architecture's use of glass appeared culturally blind. A void of traditional forms and practices resulted which vernacular architecture may have filled. In addition to the comfort of tradition, the vernacular is often touted as both energy efficient and healthy. However, this is not always the case with cold weather examples like the igloo, wigwam and the early New England home. Although thermally responsive due to limited windows and low exterior wall to space ratios, rooms are typically oriented inward which may compromise basic health needs for light, air and view. For example, the early colonial Capen house

in Massachusetts is considered a climate responsive design because it's rooms gather around a dark centralized mass of fireplaces to conserve heat.[15] Colonialists could take comfort in this type of heat, but in latitudes that rank the highest percentages of clinical winter depression (from 10 to 29 percent of the population depending on latitude) orienting spaces away from natural light in the winter most likely exacerbated depression.

THE SEDUCTIVE EFFICIENCY OF MINIMIZED EXTERIOR WALLS AND WINDOWS

Taking a clue from cold weather vernaculars, Victor Olgyay recommends in *Design With Climate* that designs in northern latitudes should be nearly square because of the high space to low exterior wall ratio.[16] Using graphic tables he demonstrates how BTU efficiency slumps when building shapes become more thin. However, this strategy not only limits natural light, but the design can have a multitude of interior rooms which rely solely on the air conditioning system for fresh air. If the system is contaminated or broken, windows cannot be opened to temporarily relieve the problem. Additionally, rooms near the core have views of walls instead of stress reducing views of nature.

Gideon in his book *Mechanization Takes Command* noted the machinelike efficiency of this compaction strategy in Belfast's 1900 Royal Victorian Hospital. In contrast to the Royal Victorian, most contemporary hospital designs sported winged pavilions with natural light and patient access to garden courtyards. Air quality was assured through cross ventilation. However, the Royal Victorian eliminated inefficient patient centered courtyards and pavilion wings by compressing the scheme into a single rectangular block minimizing energy wasting exterior walls and windows. Gideon showcased this more efficient arrangement because it greatly minimized heat distribution ducts which the engineers utilized to reduce heat loss.[17]

While the Royal Victorian reduced duct runs, it also reduced circulation space saving nurses and doctors steps. This circulation efficiency was later used frequently in hospital designs due in part to administrative efficiency and the demise of environmental therapies which were replaced by more controllable biochemical drugs.[18]

In 1978, the ASHRAE Applications Handbook also endorsed a similar compaction strategy while discouraging the use of windows. In '78 it recommended that "since the exterior load varies from 30 –60% of the total air-conditioned load when fenestration ranges from 25 – 75 percent, it is desirable to keep the perimeter area to a minimum."[19] Energy tables graphically reinforced the idea.

But beyond the seduction of thermal and administrative efficiency, minimizing exterior walls and windows is profitable for all climates because of its ease of planning and assembly. Compared to interior walls, exteriors require more detailing, building time, and energy intensive materials due to the extra effort needed to waterproof, insulate and integrate windows and doors. In short, it takes more human and material energy to build exterior walls.

MEDICAL EVIDENCE AGAINST BUILDINGS THAT MINIMIZE EXTERIOR WALLS AND WINDOWS

However, the health risks of limiting exterior walls and windows could be substantial. In 1984 Roger Ulrich's landmark study demonstrated that window views to nature may accelerate healing and decrease pain medication in hospital patients.[20] These views appear to relax patients. Research has found that a relaxed body increases the amount of white blood cells in the bloodstream helping to strengthen the immune system.[21] Ulrich's studies are significant because the benefits of stress-reducing views can crossover to other stressful settings like schools and offices.

The importance of windows and light is demonstrated in Lisa Heschong's 1999 study of classrooms where she found a link with higher test performance levels in rooms with windows and skylights. In this study, she evaluated 21,000 children from 2nd to 5th grade from three different climates in Seattle, Ft. Collins, and San Juan Capistrano.. All three showed similar results, but the most promising study found that students whose classrooms were exposed to the largest window areas progressed 15% faster in math and 23% faster in reading than those with the least amount of window area. [22]

Heschong's studies could tie into recent sleep disorder and depression research.[23] Inadequate indoor light as it relates to sleep disorders and anxiety could lead to higher levels of stress which raises the body's hormonal levels of cortisone and epinephrine. Both hormones compromise the immune system's white blood cell counts.[24] Inadequate levels of light as it relates to depression[25] can conceivably contribute to other types of immune problems. Studies conducted on depressed patients have shown that certain immune system regulators like immunoglobulins and lymphocytes can be compromised making the depressed more vulnerable to illness[26] and conceivably to building related illness.

While our eyes and bodies have evolved with very high levels of outdoor light, ranging between 5,000 to 10,000-lux, it isn't until recently where we began to spend the majority of our time in darker inside spaces of 100 to 500-lux. According to sleep researcher Dr. Daniel Kripke of the University of California in San Diego, humans function normally in the wake/sleep cycle, when exposed regularly to light conditions of 1500 to 2,500-lux. Today's typical indoor light measurements are 3 to 25 times lower. According to Kripke, these low levels do not fully activate the production of serotonin.[27]

Serotonin is a crucial neurotransmitter which gives the brain a sense of well being. Without it, depression can result. This could also explain why Heschong's school children received higher scores in the daylit schools. Studies also show that alcoholics, violent offenders, sex offenders and suicide victims demonstrate marked deficiencies of serotonin. With this evidence, the psychiatric community spawned a new breed of serotonin activators like Prozac, Paxil, Zoloft and light boxes....all significantly more effective than its predecessors Valium and Xanax.[28] When light turns to dark, the pineal gland converts serotonin to its chief metabolite, melatonin which is crucial for inducing sleep. Both neurotransmitters are essential for accommodating stress.

For those who suffer from Seasonal Affective Disorder (SAD), high intensity lamps of 10,000-lux adequately relieve winter depression. However, these lamps along with typical interior lights lack the full spectrum of daylight. Incandescent light lacks outside levels of blue while cool white fluorescent lack red and less than optimal amounts of blue. Both light sources are foreign to what our brain evolved with which is high levels of outdoor full-spectrum light. Some researchers have deemed this imbalance as "mal-illumination" referring to the different color spectrums as essential nutriants.[29] Blue light, which is lacking in both incandescent and many fluorescent lights is known to activate the para-sympathetic nervous system which helps the body to relax.[30] This is congruent with further studies that shows that the color blue lowers blood pressure and heart rates[31] . Additionally, blue light is also linked with the suppression of melatonin which makes us drowsy.[32] From this evidence, it appears that the higher levels of blue light found in the sky not only relaxes the body, but also keeps the mind alert. This evidence could also explain why Heschong's schoolchildren performed better with larger windows.

Task lighting standards may also contribute to anxiety and depression. Task lighting currently focuses on minimum light levels for *visual comfort* and task efficiency. These numbers range from 300-lux for classrooms and computer stations to 500-lux for offices,[33] which is not the vastly higher levels of 1500 –2500-lux that are recommended for normal bodily function and serotonin production.

THE HEALTH BENEFITS OF OUTDOOR LIGHT

In addition to the high levels of outdoor light, medical research is now claiming that the *lack* of outdoor full-spectrum light could be responsible for a number of maladies that go far beyond sleep disorders and depression. Because lifestyles today are typically spent indoors, studies are showing a relationship between a lack of outdoor light and higher incidences of osteoporosis, jaundice, breast cancer, ovarian cancer, colin cancer, large bowel cancer and prostate cancer. Most of this research is sponsored by science based foundation grants and is reported in hard scientific medical journals.[34,35] Sunlight induced ultraviolet B light and its production of vitamin D3, a sunshine not dietary induced vitamin, helps bones and the immune system absorb calcium. Although dietary vitamin D can be metabolized into vitamin D3, the process is only 60% as effective as outdoor light exposure.[36] The combination of calcium and vitamin D 3 not only helps form strong bones and teeth, but also may help to regulate the body's immune system for which bones play an integral part.[37] This contribution to the immune system has resulted in a multitude of promising studies since the '80's that show strong links to ultraviolet light and its role in combating heart disease and cancer (breast, prostate and bowel).[35,36] Reinforcing this research is a number of surprising studies that show lower incidences of both cancer and heart disease in global areas and times of the year where the sun shines strongest. (higher altitudes, lower latitudes and summer time)[38,39,40] Although windows block out most ultraviolet light, thus eliminating Vitamin D3 production, this prompts the need for more accessible and comfortable outside areas.

Not only is the outdoors a source of high amounts of full-spectrum light, but in many cases, fresh air. Compared to outside air, recycled indoor air in most sick buildings has higher concentrations of fungus. According to asthma researcher Dr. Cynthia Jumper of Texas Tech's Health Science Center, sick indoor air conditions have been linked to upper and lower respiratory illnesses. Asthma in children has risen dramatically since the 70's energy crisis where today 1 in 20 children are afflicted. Dr. Jumper speculates that tightly sealed buildings and lower ventilation standards are a major contributor, if not the main cause.[41] As pointed out by Dr. Jumper's colleagues, Dr. Danny Cooley and Dr. David Strauss in their research of 94 buildings in 48 states, the fungi which is responsible for building related illnesses, and sick building syndrome has significantly higher concentrations inside. As a result, these researchers use outdoor air as a baseline for measuring normal fungus levels.[42] Because outside air is continuously moving, it can in most cases easily disperse harmful fungus and gasses to near harmless concentration levels.

The relative freshness of outdoor air, the opportunity to view natural scenes and the anticancer properties of sunshine vitamin D-3 overshadow the danger of outdoor light's link with melanoma. Although abusive exposure to ultraviolet light (as demonstrated in the 1970's suntan fad) has been linked with melanoma, there is contrary evidence that significant *lack* of sunlight may also contribute to skin cancer.[43] Additionally, the hands and face which are regularly exposed to the sun, seldom develop melanoma; it is the torso and legs which are not normally exposed, that develop melanoma.[44] Melanoma researcher Dupont Guerrt, MD admits in his book *Melanoma Prevention , Detection and Treatment* that: "mild exposure to the sun is not harmful to most people. Indeed, it may have beneficial effects... it has been reported that the sort of mild continual sun exposure that produces a bit of a tan, but no burn may even protect you from melanoma."

CONCLUSION

It is often written in sustainability literature that energy efficiency *is* healthy. Sometimes the writing appears as if the two are interchangeable. This is not the case for health needs and energy efficiency is frequently at odds. Although sustainability intends to be health conscious, the first priority still appears to be energy efficiency. Although sustainable practices aim to incorporate natural light, the formulas dwell more on energy efficiency and minimum task levels. Higher circadian light levels do not enter the formula because task levels are assumed to be enough. Although it is considered sustainable to reuse existing buildings, how healthy is it to re-occupy deep space buildings that are designed with a multitude of interior rooms with no access to views, light and air? Because a home is made of straw bale in a humid climate does not guarantee that a person with allergies or asthma can live in it. This is *not* to say sustainable practices and ASHRAE guidelines have

ignored health concerns, but it appears that basic human biological needs are secondary to efficient energy usage.

If a new energy crisis emerges, new regulations are inevitable. If again, energy standards are too narrowly focused, then history may repeat itself in the form of unhealthy building design. From a biological point of view, recent light, air and view research suggests that the rules of thumb and tools of sustainable design be re-examined to include more basic human needs. Through this re-assessment, perhaps a more balanced vision of sustainability can emerge.

NOTES

[1]Peter Senge, *The Fifth Discipline.* (New York, Doubleday 1990)

[2]*ASHRAE Hand book. 1977 Fundamentals.* (Atlanta, ASHRAE 1977)

[3]*ASHRAE Handbook. 1982 Fundamentals.* (Atlanta, ASHRAE 1982)

[4]*ASHRAE Handbook. 1989 Fundamentals.* (Atlanta, ASHRAE 1989)

[5]Norman Rosenthal, *Seasons of the Mind.* (New York, Bantam, 1989)

[6]Lisa Heschong, "Daylighting In Schools: An Investigation into the Relationship between Daylighting and Human Performance. (Condensed Report submitted to the Pacific Gas and Electric Company, 1999)

[7]R. Kuller and C. Lindstern, "Health and Behavior of Children in Classrooms with and without Windows," *Journal of Environmental Psychology* 12, (1992) pp 305-317

[8]F. Holwich and B. Dieckhues, "The Effect of Natural and Artificial Light via the Eye on the Hormonal Metabolic Balance of Animal and Man," *Ophthalmologica* 180, No. 4 pp188-197

[9]Michael Holick, "The Role of Sunlight in Providing Vitamin D for Bone Health," in M. Holick and E. Jung's *Biologic Effects of Light 96.* (New York, Walter D. Gruyter and Co, 1997)

[10]Michael Holick, "Historical and New Perspectives in M. Holick and E. Jung (eds) *The Biologic Effects of Light 98.* (Norwell Mass, Kluwer Academic Publishers, 1999)

[11]Roger Ulrich, "View Through a Window May Influence Recovery from Surgery, *Science* 224 (1984) pp 420-21

[12]Michael Holick, "The Biological Effects of Light, Historical and New Perspectives" in M. Holick and E. Jung (eds) *The Biologic Effects of Light 98.* (Norwell Mass, Kluwer Academic Publishers, 1999)

[13]James Ross, "The Impact of the 19th Century Public Health Movement on American Architecture." (Unpublished paper delivered at the 1995 Annual Meeting of the S Society of Architectural Historians, Seattle)

[14]F.L. Wright, *The Natural House.* (New York, Horizon Press, 1954) Wright scorned the unhealthful qualities of basements due to lack of fresh air and light. Irving Gill,

"New Ideas About Concrete Floors" *Sunset Magazine* December (1915) Gill wrote about the sanitizing qualities of his concrete floors. R. M. Schindler, "Care of the Body" *Los Angeles Times* March 14 and April 11, (1926) Schindler wrote in place of Dr. Lovell on air quality issues. Richard Neutra, *Survival Through Design.* (New York, Oxford Press, 1954). Neutra wrote on various health related design issues. Alvar Aalto's Pamio Sanitarium included design features that allowed beds and easy therapeutic access to outdoor sun, air and views of nature. Aalto also designed splash minimizing sinks and chairs that allowed for patients to sit at such an angle as to make breathing easier.

[15]C. Moore, G. Allen and D. Lyndon. *The Place of Houses.* (New York, Holt, Rinehart and Winston, 1974) p. 71

[16]Victor Olgyay, *Design With Climate* (Princeton, NJ. Princeton Univ. Press, 1973) pp. 88-89

[17]S. Giedion, *Mechanization Takes Command.* (New York, Norton 1948)

[18]Marni Barnes and Clare Cooper-Markus, "Research Report Applying the Therapeutic Benefits of Gardens" *Journal of Healthcare Design.* (Vol. VIII, 1996)

[19]*ASHRAE Handbook 1982 Applications,* (Atlanta, ASHRAE) p. 6.3

[20]Roger Ulrich, "View Through a Window May Influence Recovery From Surgery"

[21]Hans Selye, *The Stress of Life.* (New York, McGraw Hill. 1956)

[22]Lisa Heschong, "Daylighting in Schools: An Investigation into the Relationship Between Daylighting and Human Performance," (Report submitted to: The Pacific Gas and Electric Company, August 20 1999) p. 2

[23]Daniel Kripke, "The Uses of Bright Light in an Office Practice" in S. Poceta and M. Mitler (eds) *Sleep Disorders: Diagnosis and Treatment.* (Totowa, NJ, Humana Press. 1998)

[24]R. Parsons, "The Potential Influences of Environmental Perception on Human Health

Journal of Environmental Psychology. 11 (1991) pp 1-23

[25]N. Rosenthal, D. Sack, J Gillin, et al: "Seasonal Affective Disorder: A Description of the Syndrome and Preliminary Findings with Light Treatment," *Arch Gen Psychiatry 41* (1984) pp 72-80

[26]Fredric Goodwin and Kay Redfield Jamison, *Manic Depressive Illness* (New York, Oxford Univ. Press, 1990) Reports that depression studies have shown that one of the immune systems regulation devices, Prostaglandin, is shown to be elevated in depressed patients. T. Kronfolz and W. Nascallah, "Leukocyte Regulation in Depression and Schizophrenia." *Psychiatry Res 13:* (1984), pp. 13-18 Research finds that depressed patients have less circulating lymphocytes. Delist e al., A. King and S. Targum, "Serum Immunoglobulin Concentration in Patients Admitted to an Acute Psychiatric In-Patient Service." *British Journal of Psych. 145* 1984) pp 661-665 Research finds that the level of immunoglobulins are lower in those suffering from depression than in normal people.

[27]N. Okudaira and D. Kripke. "Naturalistic Studies of Human Light Exposure" *American Journal of Physiology 245:* R613-R615

[28]Michael Norden, *Beyond Prozac. Brain-Toxic Lifestyles. Natural Antidotes and New Generation Antidepressants.* (New York, Regan Books,1996)

[29]John Ott, *Light and Health.* (Old Greenwich, Conn. Devin-Adir Co. 1973)

[30]S. Krakov, "Color Vision and the Automatic Nervous System." *Journal of the Optical Society of America.* June (1942)

[31]H. Woolfarth, "Psychological Evaluation of Experiment to Assert the Effects of Color Stimuli Upon the Automatic Nervous System," *Exerpta Medica Neurology and Psychiatry 2* no. 4 (1958)

[32]R. Reiter. "Action Spectra Dose Response Relationships and Temporal Aspects of Light's Effects on The Pineal Gland." *Annals of the New York Academy of Science 453.* (1985) pp. 215-230

[33]Benjamin Stein and John Reynolds, *Mechanical and Electrical Equipment for Buildings* (New York, John Wiley and Sons, 2000)

[34]Full-spectrum light deprivation (in particular UVB light deprivation) and its detrimental effects on breast, ovarian, prostate and colon cancer can be found in medical journals as early as 1980 in the *International Journal of Epidemiology.* Similar studies have appeared consistently through the 90's in journals such as *Cancer Research. Lancet* and *Cancer Causes and Control.*

[35]Michael Holick, *The Biologic Effects of Light 98*

[36]Michael Holick, *The Biologic Effects of Light 95*

[37]F. Holwich and B. Dieckhues, "The Effect of Natural and Artificial Light via the Eye on the Hormonal Metabolic Balance of Animal and Man." *Ophthalmologica 180* No. 4, (1980) pp. 188 – 197

[38]R. Scragg, *Int. Journal of Epidemiology 10* pp. 337-341

[39]C. Garland, G. Comstock, F. Garland, K. Helsing, E. Shaw and E. Gorham. "Serum 25-Dihydroxyvitamin D and Colin Cancer: Eight Year Prospective Study." *Lancet* (1989) pp. 1176-1178

[40]J. Waterhouse, C. Muir and P. Shanmugarantnam: "Cancer Incidence in Five Continents" Vol. IV IARC Sci Publ. Lyon (1982) Follow-up studies tracked immigrants who moved from lower to higher latitudes and visa versa and found the subjects appeared to take-on the risks associated with the new location.

[41]Dr. Cynthia Jumper and the author have taken part in three, day long indoor air quality roundtable discussions between 1997 and 1999 at the Texas Tech Health Science Center where Dr. Jumper has given the results of her asthma research and her views on Building Related Illnesses.

[42]David Strauss, J. Danny Cooley, Wing C. Wong and Cynthia A Jumper "Correlation Between the Prevalence of Certain Fungi and Sick Building Syndrome" *Occupational Environmental Medicine 55* (1998) pp. 579-584

[43]F. Garland, M. White and E. D. Gorman. *Arch Environmental Health 45.* (1990), pp 261- 267 Melanoma and other skin cancers have been linked with UV B light, but this research has shown that those whose jobs that take place mostly inside can have a higher risk of skin cancers than those whose jobs that are outside.

[44]M. Braun and M. Tucker, "Do Photoproducts of Vitamin D Play a Role in the Etiology of Cutaneious Melanoma," In M. Holick and E. Jung (eds) *Biologic Effects of Light 95*

Eco-Technologies:
A Collaboration with Nature

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Ironically, the creative act of designing and constructing a building is often preceded by a violent act of destruction: the scraping of the earth, the displacement of wildlife, the use of non-renewable resources and the manipulation of the natural landscape. In contrast, Ian McHarg writes in his book *Design with Nature* that humanity's "life, in sickness and in health, is bound up with the forces of nature, and that nature, far from being opposed and conquered, must rather be treated as an ally and friend, whose ways must be understood, and whose counsel must be respected...."

The largest impact on the natural environment and landscape comes from the built environment. Buildings consume the greatest amount of resources and materials, create the greatest amount of waste, and claim the greatest amount of natural landscape. If we can design our buildings as environments that harmonize with the natural surroundings and land, we can derive principles from such designs that simultaneously increase our understanding of our relationship with nature and our dependency on the natural environment for our own well-being. As McHarg and the first law of ecology suggest, everything is related to everything else. The study of ecology is the study of connectedness. As Theodore Roszak points out in the edited book *Ecopsychology*:

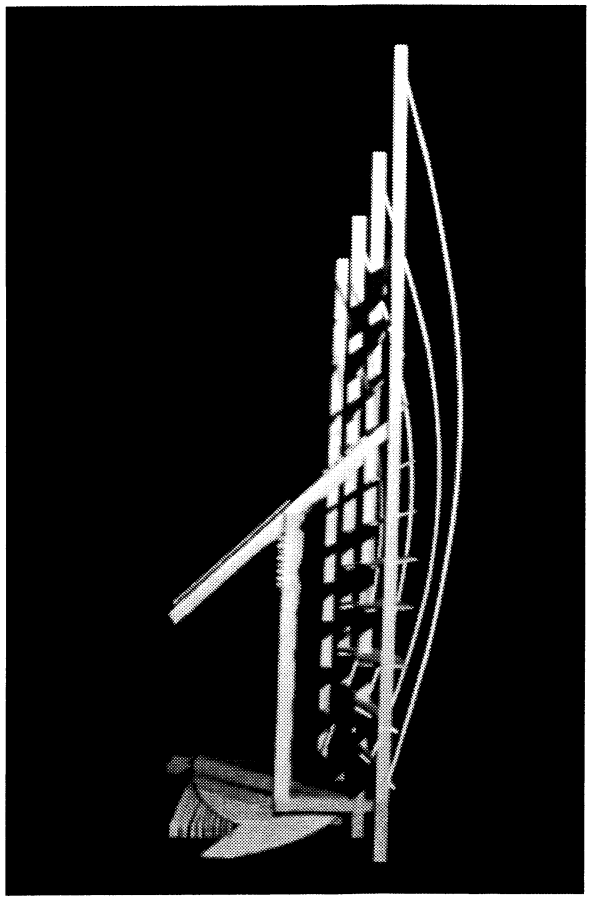
> *It began its intellectual history as the holistic study of the myriad niches and crannies in which life has taken hold on this planet, but its destiny was to be much greater. It has eventually come to see the entire Earth as a remarkable cosmic "niche intricately connected with the grand hierarchy of systems we call the universe." As nature around us unfolds to reveal level upon level of structured complexity, we are coming to see that we inhabit a densely connected ecological universe where nothing is "nothing but" a simple, disconnected, or isolated thing. Nor is anything accidental.*

This theory was the starting point in developing my seminar course called *Building in the Land.*

The inspiration for the course came from the need to develop in students an understanding of the interrelationship and impact of their actions as designers. Using as a basis ancient traditions of contemplative practice, the course was developed to foster contemplation of the relation between the built and natural environment in a way that may, in turn, enable us to reconsider and change how we design and construct our built environment. The primary questions raised to begin the discussion in the course were:

- What is our relationship to the natural environment?
- What is the impact of the built environment on the natural environment and landscape?
- How can the forces of nature be used to shape and inform the design of the built environment?

To explore the answers to these questions the following three perspectives were developed throughout the course:



Figs A (previous page) + B (above): Terra Archetype—The concept proposes using the Earth that has been removed from the site to create panels in the facade that combine passive solar gain and shading. The panels have been placed at different angles according to the angle of the sun year round allowing sunlight to penetrate the space in the winter and developing shading from summer sun.

- *Within the structure*—an internal, personal contemplative awareness that focuses on balancing the mental, spiritual, social and physical elements of the being through spatial experiences that connect to the built and natural environments.
- *Outside the structure*—an external holistic experience that reconnects the aesthetics and impact of the structure to the context, land, nature and the environment.
- *The interface*—creating transitional spaces between the two—inside and outside— separating, blurring and reconnecting the inside to the outside environment.

The course was both experimental in nature as well as numerical. It was about a way of contemplating, thinking and weaving ecological ideas with other influences that can be developed into future design projects. The key to the explorations was to balance the poetic and technical aspects of each project. The course was developed as a technology credit with the focus on ultimately designing buildings as low impact physical interventions.

The primary objectives of the course included:

- Developing ideas pertaining to the symbiotic relationship between humanity, nature and technology
- Introducing and develop design principles that incorporate the basic elements of sun, wind, earth and water using both passive and active technologies
- Analyzing projects that exhibit constructive partnerships between ecology and building
- Raising questions about building technology, ecological thinking and aesthetic implications

Criteria that needed to be understood at the completion of the course included:

- Environmental conservation
- Understanding the architects' responsibilities with respect to environmental and resource conservation in design
- Understanding the basic principles that inform the design of building envelope systems
- Ability to assess, select and integrate systems in building designs
- Ability to employ basic methods of data collection and analysis to inform all aspects of the design process

Projects and exercises were developed that explored technology, architecture and nature. The projects included:

Precedent Studies

The concept portion focused on precedent studies and research of other places and cultures that used as resources the sun, wind, earth and water. Researching both historic and contemporary examples students used the elements as resources to develop an understanding of how concepts and forms were developed in the built environment. Each precedent defined a design problem and analyzed the building forms as solutions.

Archetypes

As a means of synthesizing the knowledge, students were asked to develop a physical model of the skin (wall, roof, foundation) as an interface between the private interior experience and transitions to the external social and natural environment.

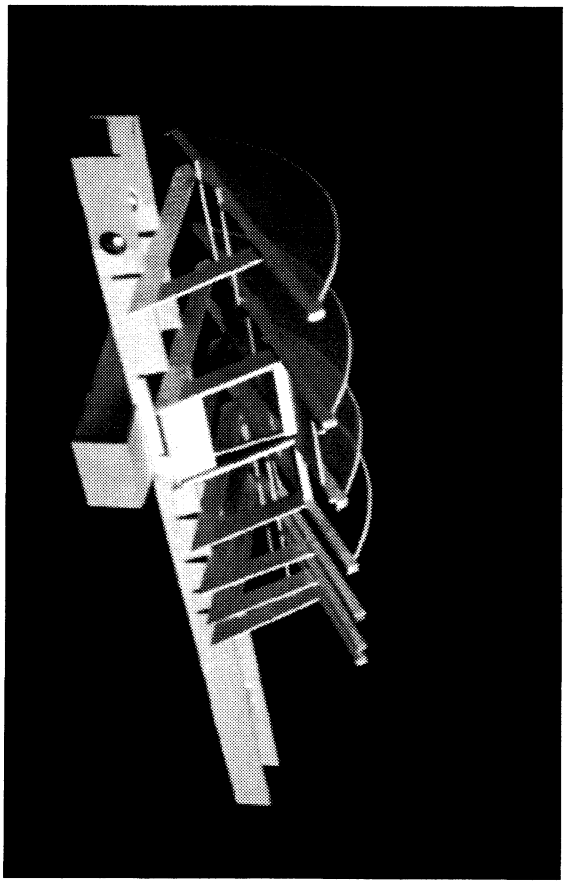
Based on the analysis of the precedent studies, one archetype was developed for each element: sun, wind, water and earth. Each archetype consisted of a written problem statement, a discussion of the problem and a proposal of a future design solution.

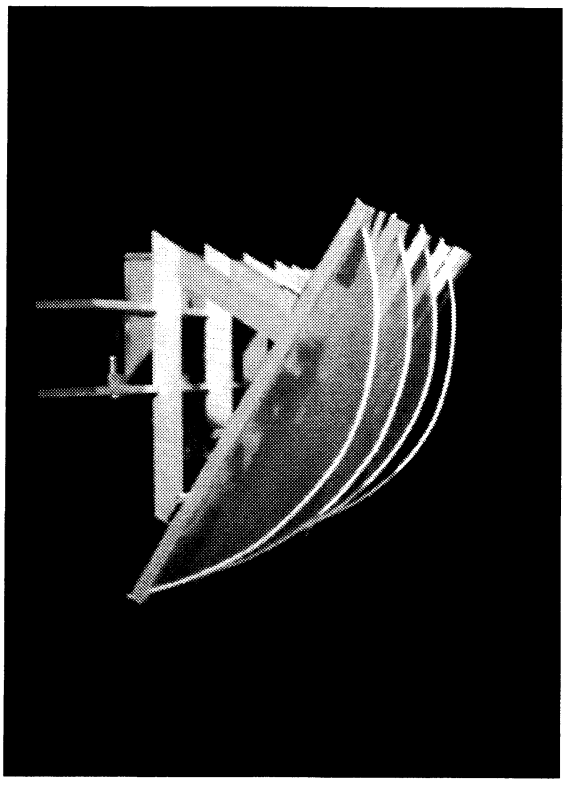
Readings

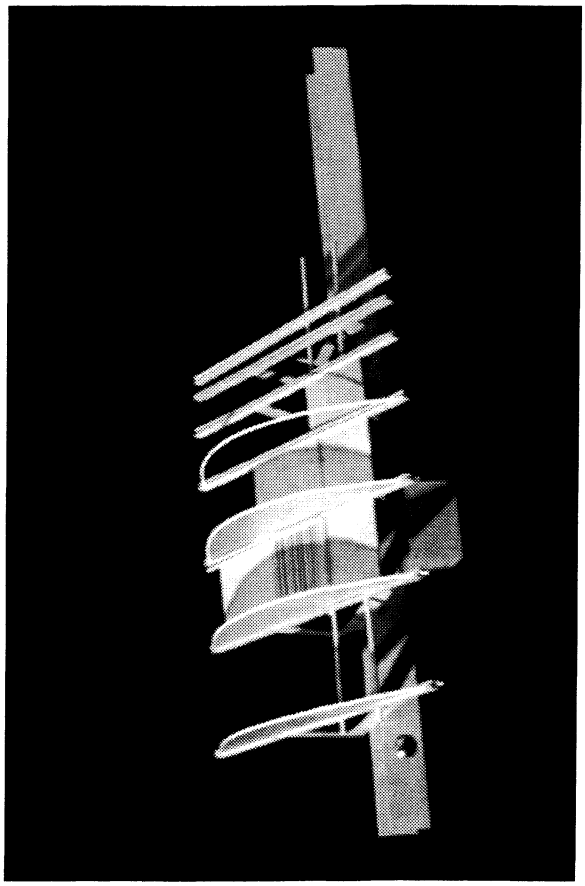
Selected readings in literature that capture the relationship between humanity and nature found in culture, environment, ecology, history, landscape and architecture were used to present various perspectives. The discussions took place on-line rather than in the classroom. Given the flexibility of on-line discussions the responses were thought provoking, thoughtful and thorough in development. Students who normally would be too intimidated to speak in class found a voice in writing.

Technology Presentations

Presentations were developed as group projects focusing on using the four elements, sun, wind, water and earth, as qualitative and quantitative resources. Questions that were addressed included: What can history teach us? What is the current technology? How is it being applied to building design? What are the implications in regard to low impact design? What are the aesthetic implications? Through research and project development each group became resident experts.







Figs C. D. + E: Wind Archetype—The concept proposes using hinged panels to control ventilation through the building. The panels allow for the release of warm air and the shading of the summer sun.

PROCESS

The goal of the course was to create a paradigm shift in how students develop their designs. A portion of each class focused on experiencing and connecting with the resource that was being studied. For example, when we focused on the sun we spent time outside sitting quietly and observing. We felt the warmth of the sun and its energy as we sat in direct light. We noticed the difference when we moved to the shade. We observed the light patterns that were created and how they changed over the course of the three-hour period of the class. We looked for examples that portrayed the effects of the sun-dried and cracked earth, fading color on a building, the direction a tree grew when it was partially shaded by a structure. These exercises were used for wind, water and earth as well. The exercise gave us the foundation for developing the poetics of designing the archetypes.

The experiences were then coupled with studying the technical aspects of the sun, wind, earth and water. The class researched current technologies and applications available. Through an understanding of the technical applications, coupled with the poetic details, students better understood the implications of their design decisions.

OUTCOME

Based on class discussions at the end of the semester, the course offered students a new perspective on the use of natural forces as guides to designing buildings. I believe the greatest outcome was in raising the students' awareness about the impact that their actions as designers may have on the future and making them mindful of their actions.

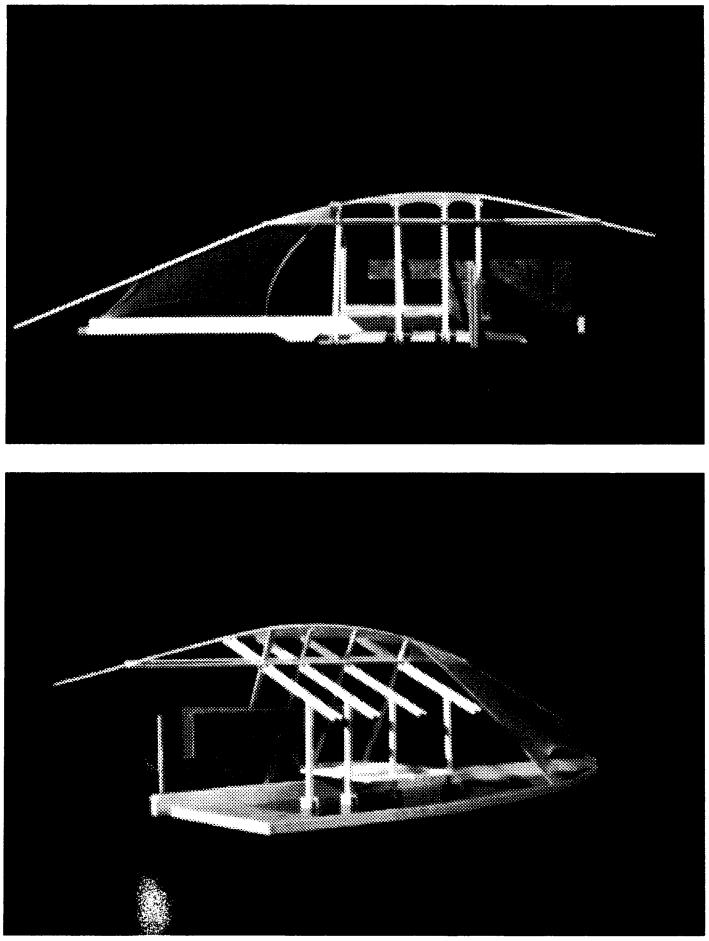
The precedent studies served as a great resource for studying historic and contemporary examples of how the earth, wind, sun and water were used in design. Since the research was documented in digital format as well as hard copy, the students developed their own resource catalog and will use the information in design studios.

The archetypes worked well as an exploration of design possibilities and solutions. Each student defined a specific problem and proposed a solution through his/her conceptual models. These conceptual ideas will be incorporated into future studio projects.

The group projects offered an opportunity for collaboration. The technical aspect of each resource proved to be valuable in assessing the impact of students' designs.

Upon the completion of the precedent studies, archetypes and research projects, each student was asked to develop a proposal for a final project as a means to apply the information gained in the semester. The criteria used for the final project included use of the sun, wind, earth or water, and a final assessment of the impact of the design on the landscape and natural environment. The project could be developed in model and drawing forms, a research paper could be written, or a combination of the two could be used.

Final projects ranged from redesigning rowhomes in Indonesia that use the sun passively, the wind to develop better ventilation, the roof as a poetic detail for capturing the water and the earth to build high upon, to a paper written on Sick Building Syndrome and its effects on us and our health by being disconnected from natural ventilation.

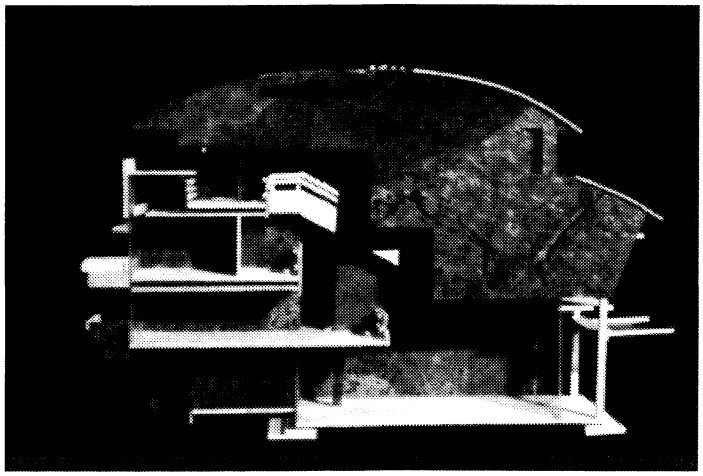


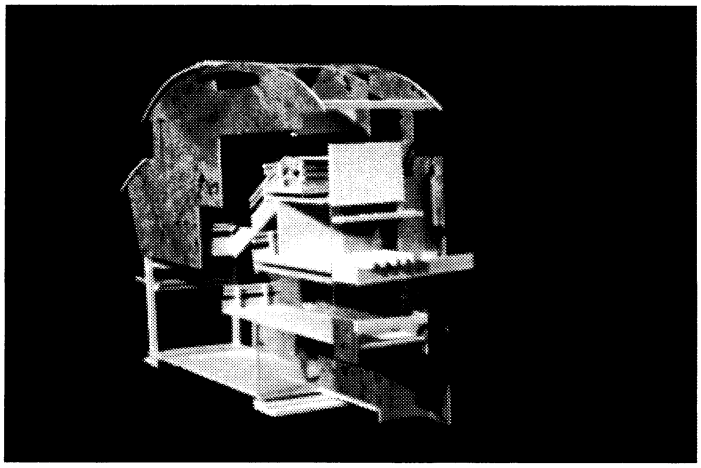
Figs F+G: Water Archtetype—This concept reflected the use of water in the home. By studying cultures that use water as a form of protection the proposal considers the structure surrounded by water and the use of evaporative cooling.

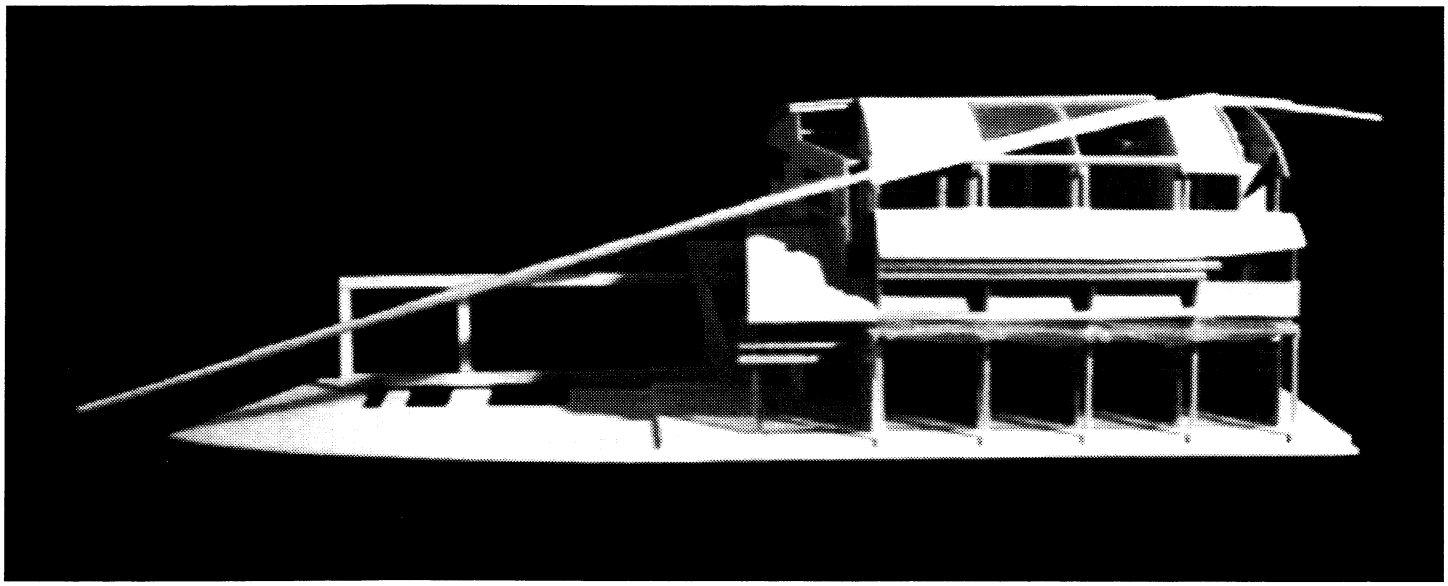
CONCLUSION

The purpose of the seminar course was to present to students an alternative way of thinking and contemplating design within the relationship of nature as a guiding force. My goal was to collaborate with students in research, readings and exercises to begin to understand the overall impact that our built environment has on the natural environment. The information explored in the seminar is being applied to the development of projects in the sustainable design studio.

This course was developed with a grant from the American Council for the Learned Society and The Center for Contemplative Mind in Society.







Figs H. I. + J: Final Project—Two final projects were developed using the archetypes as a foundation. Project H and J propose the use of wind. sun. and water as elements to bring comfort to a standard Thai rowhouse by opening the volume of the space and allowing for solar gain. ventilation and cooling. Project J uses the same principals for a corner lot condition.

REFERENCES

McHarg, Ian L. *Design with Nature*. New York: John Wiley and Sons, Inc.,1992.

Roszak, Theodore. *Ecopsychology*. San Fransisco: Sierra Club Books, 1995.

FACULTY DESIGN

Built Work/Design Build

Unbuilt/Theorietical/Competition Entries

Urban Design

Interiors/Interventions

Built Work/Design Build

Moderator: Melissa Weese Goodill,
University of Maryland

A House for Uninhabitable Memory:

The Center for Holocaust Studies, Clark University, Worchester, MA

2000-2001 ACSA Faculty Design Award

JULIAN BONDER
Roger Williams University

Wang Addition

THOMAS STAUFFER
Kent State University

A School Bus Stop

MICHAEL CULPEPPER
University of Washington
GREG TEW
Montana State University

A House For Uninhabitable Memory

The Center for Holocaust Studies, Clark University, Worcester, MA

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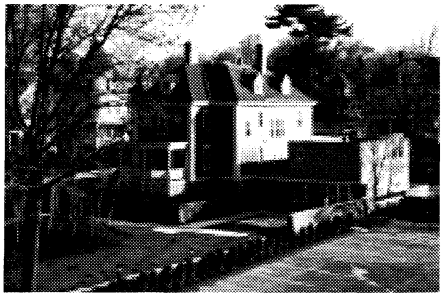
JULIAN BONDER
Roger Williams University



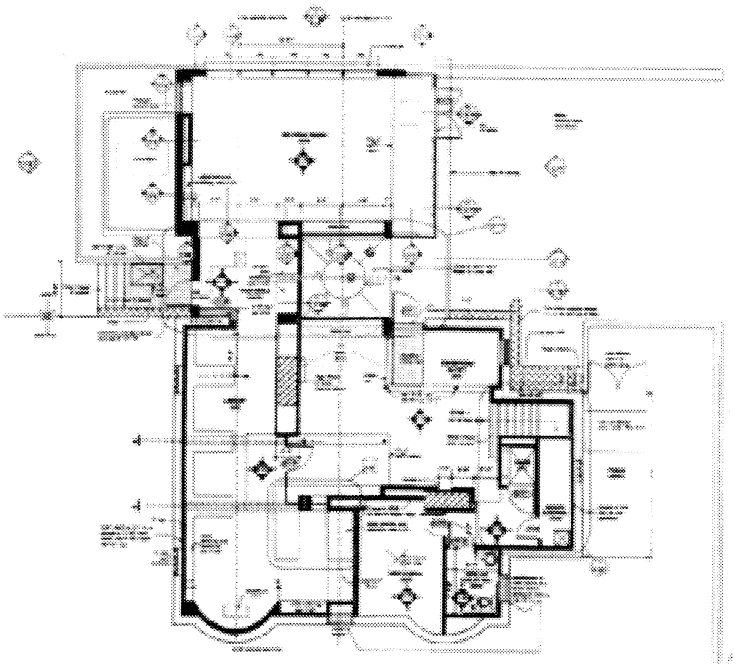
The Holocaust changed the basis for the continuity of life within history. The so-called 'Final Solution', exceptionally resistant to any redemptive perspective of humanity or life, threatens to remain an open wound, a breach in modern thinking. In its vastness, and horror, it appears to be ungraspable, an irreversible rupture, an absent meaning, and it presents only questions. Therefore, the task of designing and building the Center for Holocaust Studies, raised issues and questions which were not merely architectural, but indeed moral, ethical and philosophical.

This project involved working in a particular site that plays a pivotal role between Clark University's Main Campus and the Woodland Street Neighborhood -listed in the National Register of Historic Places. The site included an existing Colonial Revival structure, to be adapted, built in 1899 by the firm Frost, Briggs & Chamberlain. The unprecedented program in Holocaust Studies required offices for faculty, graduate students, and staff; meeting and seminar rooms; exhibition area; a Holocaust library-reading room, and a small memorial garden. The project comprised an extensive renovation of the preexisting structure -including its dark basement in derelict condition.

The scheme proposes the integration of the old and the new beyond appearances, establishing a connection between the historical and the aesthethical filtered through multiple levels of intense ethical-architectural dialogue. The different components of Lasry house - the preexisting structure, the Library addition and the Forested Mound in the garden- are to be seen as composing a new integral whole, while at the same time exposing an horizon of disconnections and absences.

Thoughts about the study of the Holocaust and concepts such as, difference, hierarchy reversal, iteration, displacement and dialogism were utilized as design techniques in order to:

- expose both historic continuities as well as ruptures;
- transform the derelict basement, the ground plane and the movement through the site;
- construct a precise relation between the addition -Memory Box- and the house through the use materials, contrasts, textures, composition, proportions and details;
- introduce 'memory catalysts', such as the Forested Mound, the courtyard tree, the Skylight cuts, the wall of books, the book sculpture and other elements.



The project's ultimate task is to make room for echoes of an uncanny past to be heard in a humane environment created for reflection, study and dialogue, presenting a strong, yet quiet estrangement expressive of a daunting historical uniqueness. It proposes ethical questions and a mode of being in space in sharp contrast with the story to be studied, while deferring, silencing any kind of attempt to represent -through intense spatial dramatization and gestures - the Holocaust experience, for no matter how dark, vast or complex spaces may be, the Holocaust doesn't fit in any space.

CREDITS

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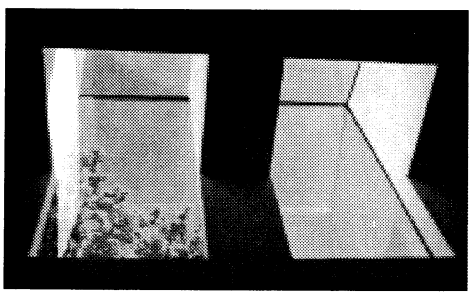
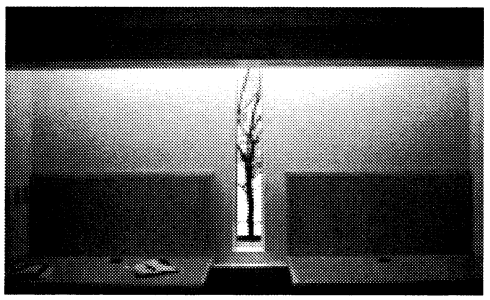
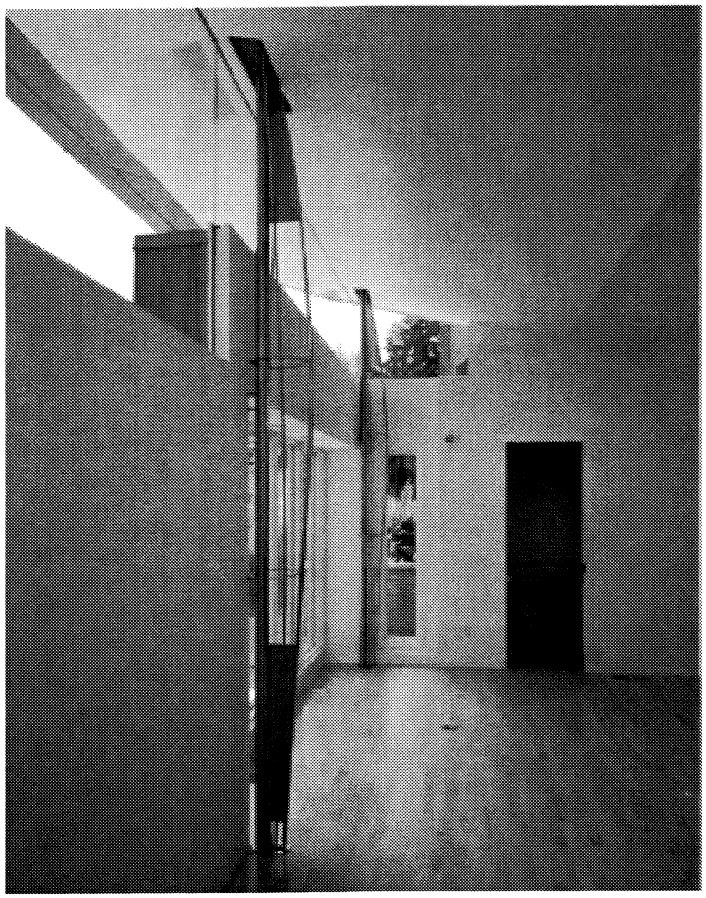
Photos: Julian Bonder, Tom Lingner (as noted).

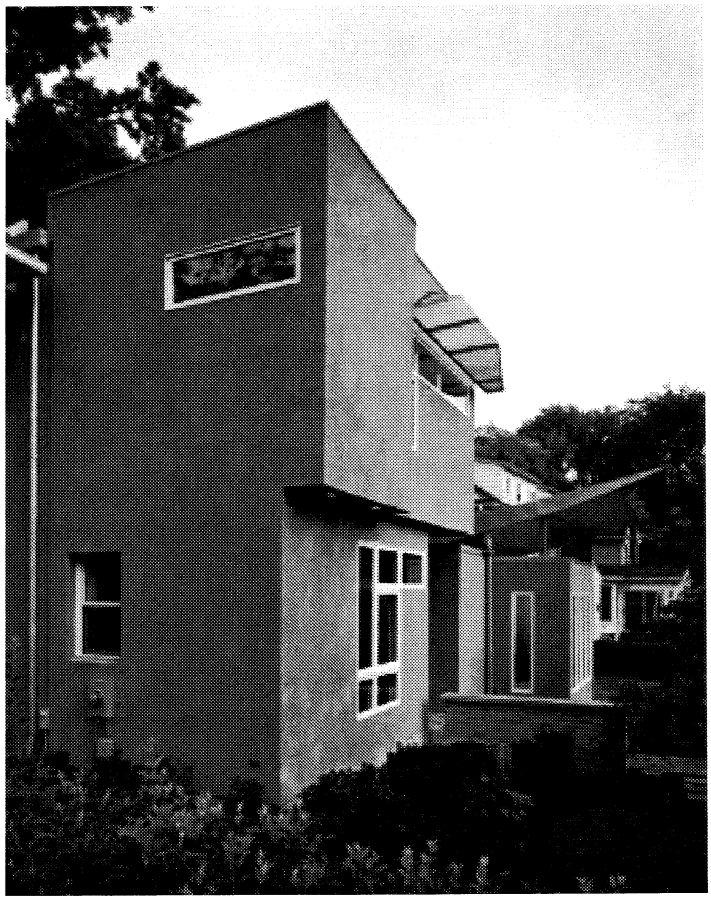


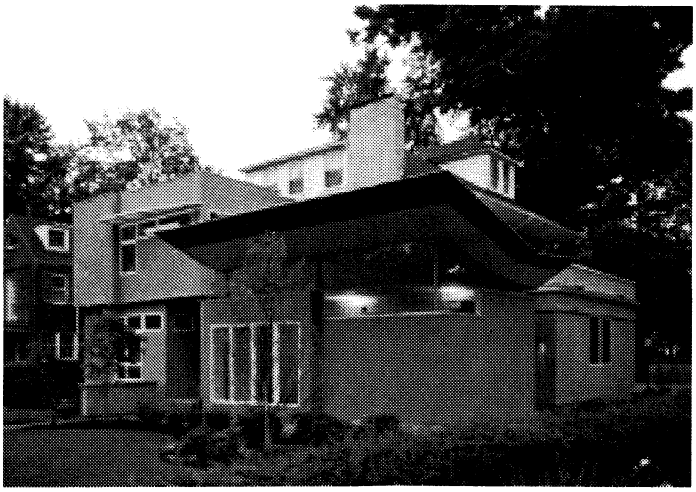


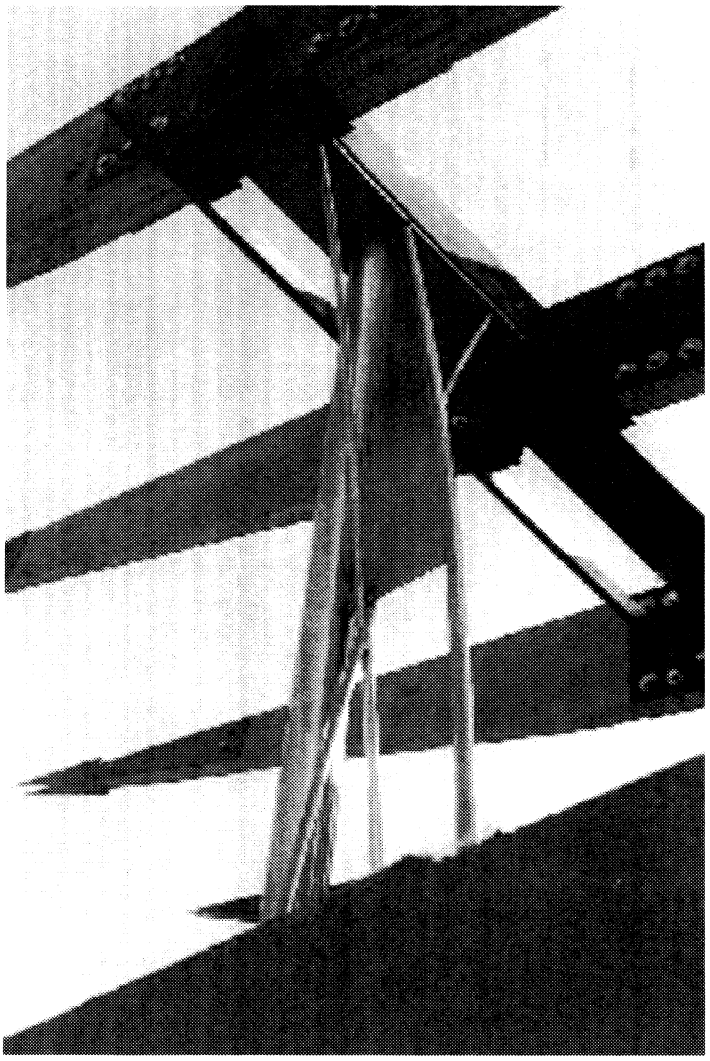
Wang Addition

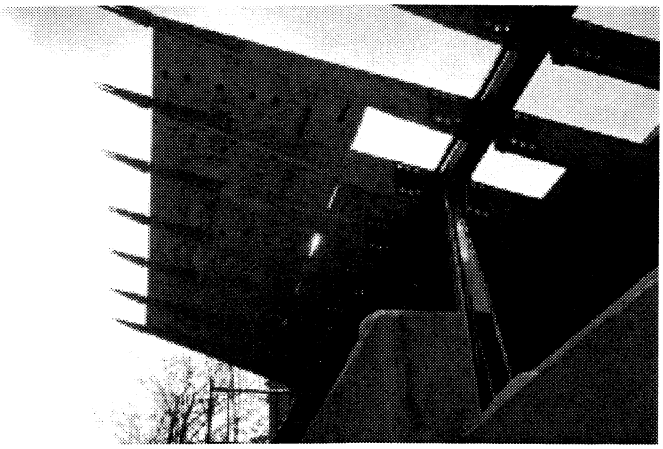
THOMAS STAUFFER
Kent State University

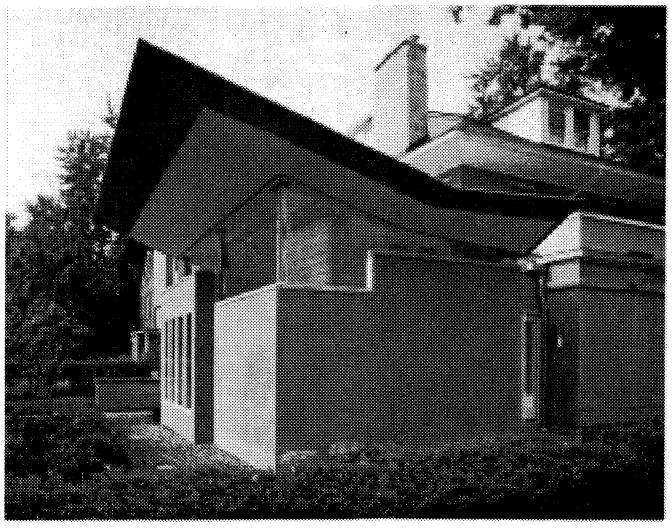












A School Bus Stop

MICHAEL CULPEPPER
University of Washington

GREG TEW
Montana State University

BUILDING TYPE

Throughout the Palouse of north Idaho and eastern Washington, small school bus stop shelters dot the landscape. These small structures are much needed during the hash Winters. We chose this unique building type as a vehicle to study form in the landscape. Ultimately, the desired form and difficult site inspired unusual construction methods.

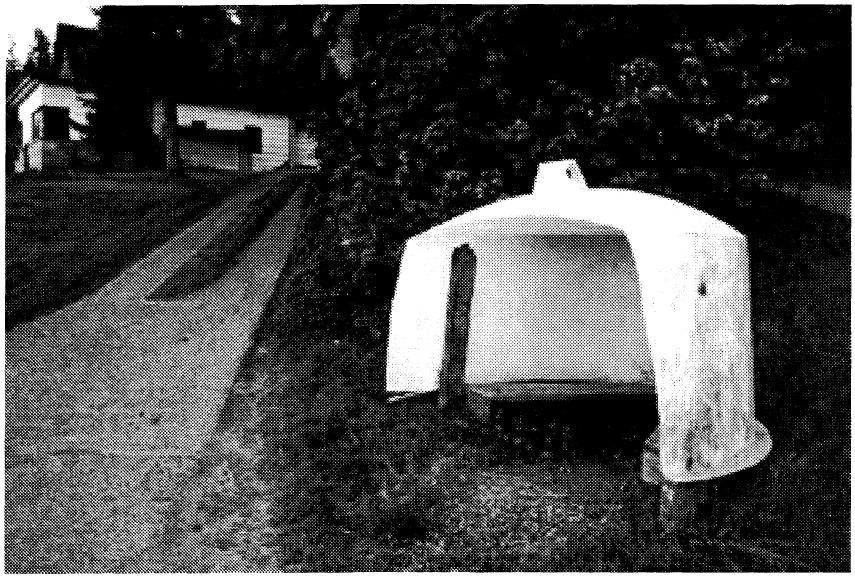
SITE

The selected site - offering tremendous views south across the Palouse and to mountains beyond - is on the foot of Moscow Mountain north of Moscow, Idaho. The most appropriate site, to take advantage of the view and to ensure safe use, was a steeply sloped bank - 30 inches of slope over six feet of building depth.

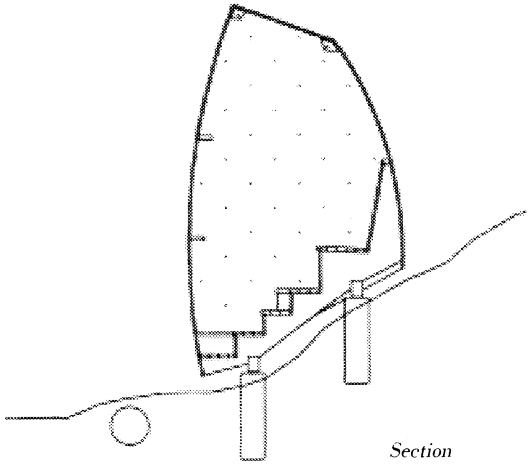
FORM

The building is a bulging form that expresses its function as a shelter for children. Built using a ¾ inch thick structural skin, the need for interior bracing is removed revealing the exterior in the interior and vise versa. This stressed skin allowed the exterior to be only 1½ inches larger than the interior.

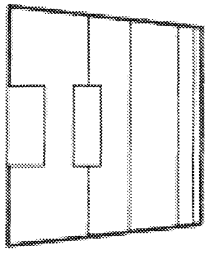
The site informs the building with its steep slope and spectacular views to and away from the site. The gaze across the Palouse is captured and the vista of the road toward the site is terminated.



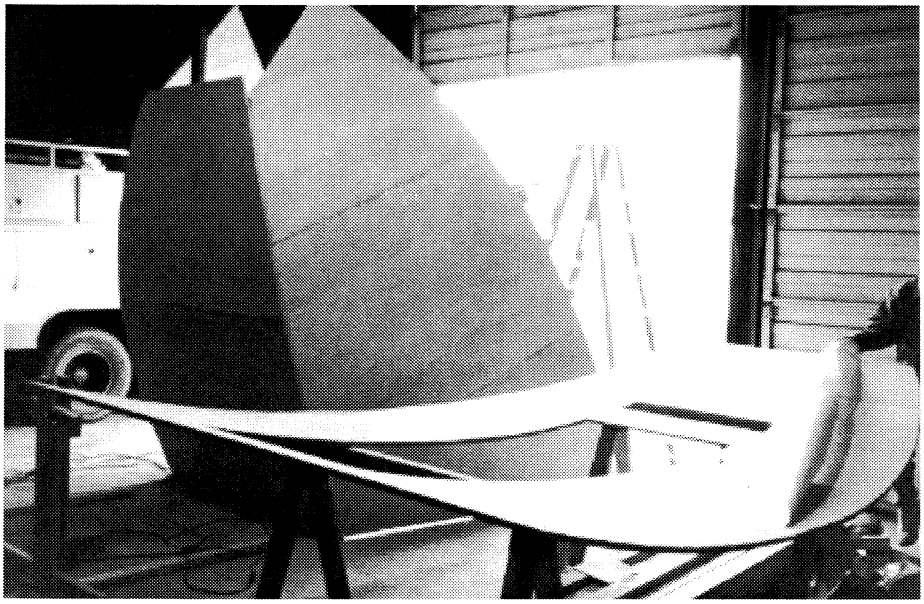
Precedent



Section



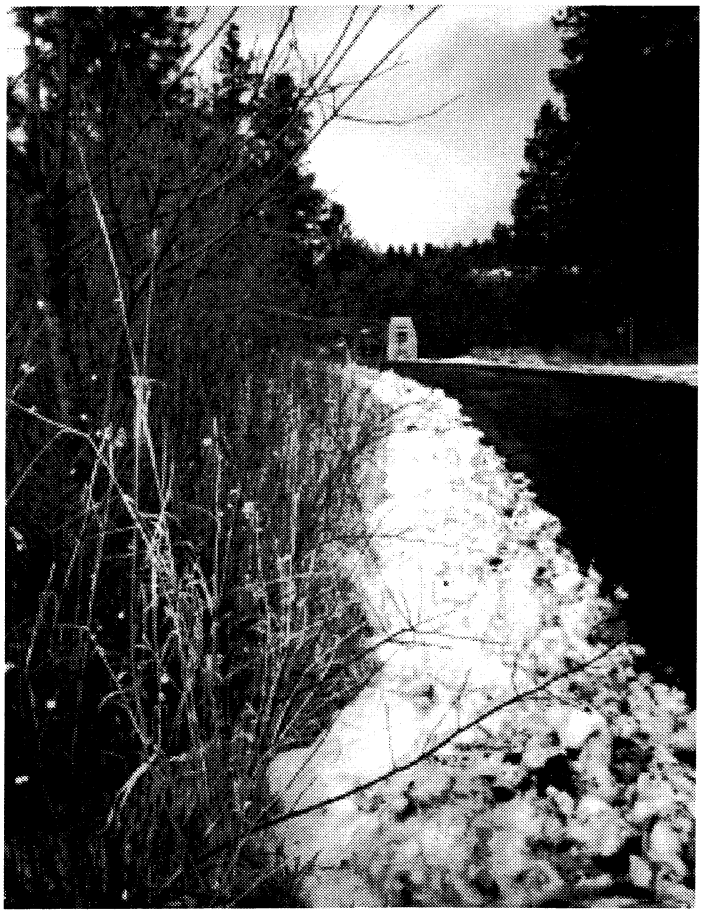
Plan

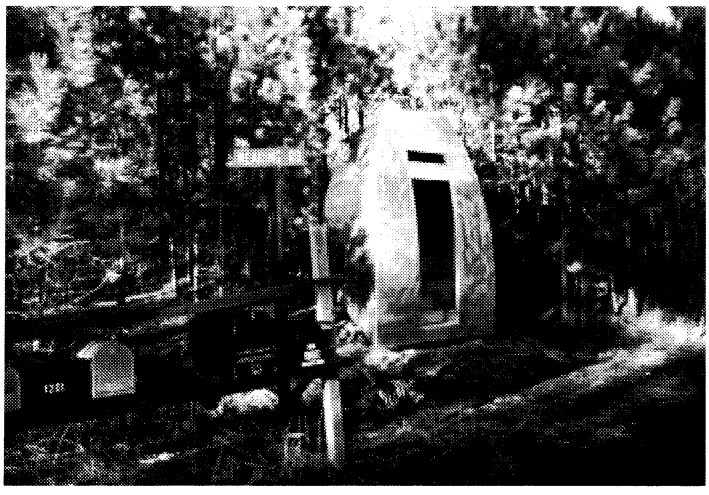


The slope inspired a seating arrangement similar to gymnasium bleachers. The open door - required to maintain view and safety - allows some snow and rain to enter the shelter. The stepped seating provides the dual benefit of lifting the users up the slope of the site and keeps a row of seats clear of snow and mud.

CONSTRUCTION

The idea of a pregnant shape was realized by fabricating bent plywood. Each side of the structure is cut from a single sheet of 8 x 12 foot curved plywood. The plywood was formed by gluing, screwing, and clamping three layers of ¼ inch plywood together in a radius mold. Each side was cut to the correct shape after tracing full scale patterns - enlarged from a small cardboard model - onto the preformed plywood. Eight steel brackets located in the far corners of the building were used to assemble and bend the walls to the finished shape. The top brackets hold the roof/ceiling in place. Seating was built with stringers spanning from front to back. The stringers rest on two beams attached to concrete pilings - leaving the enclosed skin to float above the ground.





UNBUILT/THEORETICAL/COMPETITION ENTRIES

Moderator: Susan Piedmont-Palladino,
Virginia Polytechnic Institute and State University,
Washington/Alexandria Architecture Consortium

Pine Chapel

2000-2001 ACSA Faculty Design Award
RANDALL OTT
University of Colorado at Denver

Sacred Ground

CRAIG BORUM
KARL DAUBMANN
University of Michigan
Ply (+)

Fields, Walls, Paths, Grove, Water, Dream:

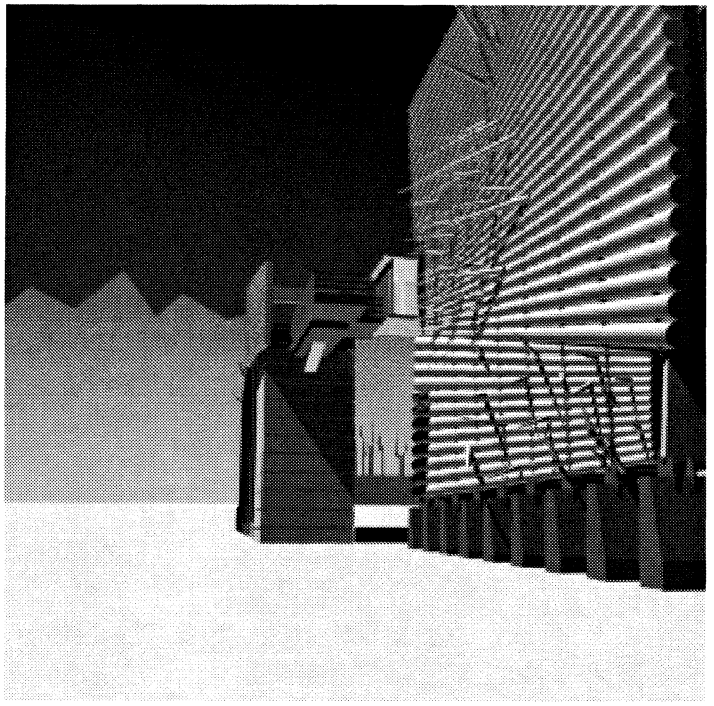
The Martin Luther King, Jr. Memorial Competition
SHERYL TUCKER DE VAZQUEZ
SCOTT W. WALL
Tulane University

Pine Chapel

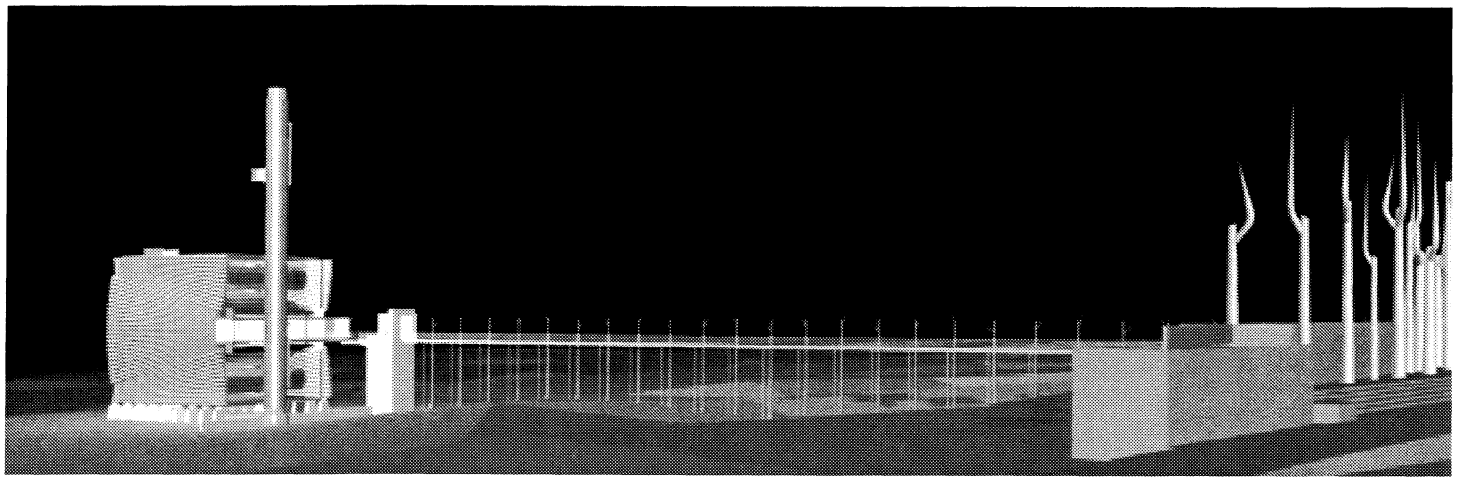
2000-2001 ACSA Faculty Design Award

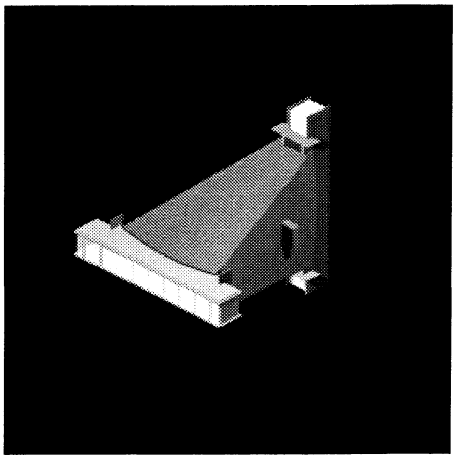
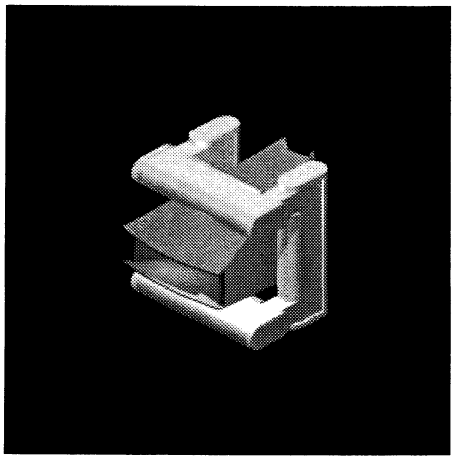
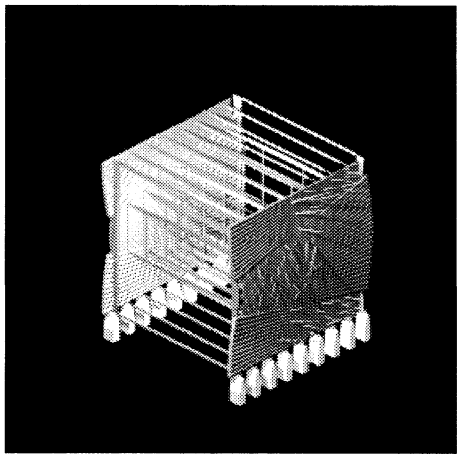
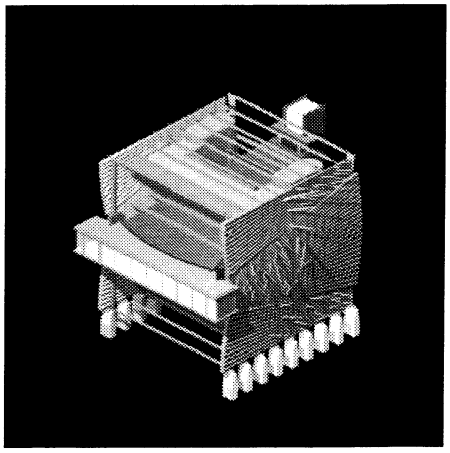
RANDALL OTT
University of Colorado at Denver

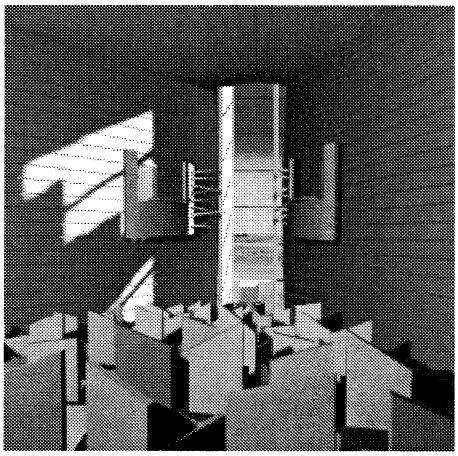
Located in Boulder County along the Rockies' leading "Front Range," the Pine Chapel preserves and 're-presents' three components of Colorado's regional past. First is a *perspectival* 're-presentation,' describing how Coloradoans see space either vertically or horizontally given Colorado's dramatically contrasting natural topography; second, a *natural* 're-presentation,' focusing upon the pine tree, whose conical forms profusely coat the mountains but never visit the plains; and third, a *conventional* 're-presentation,' using the flatlands farmstead typology – a composition of morphologically distinct shapes: boxy barn, tall silo, and horizontal fence. These three 're-presentations' respectively touch on the Front Range's cultural, landscape, and building traditions.

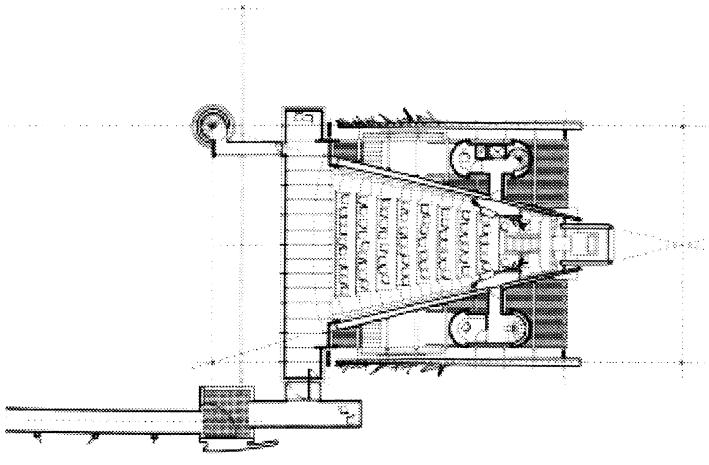
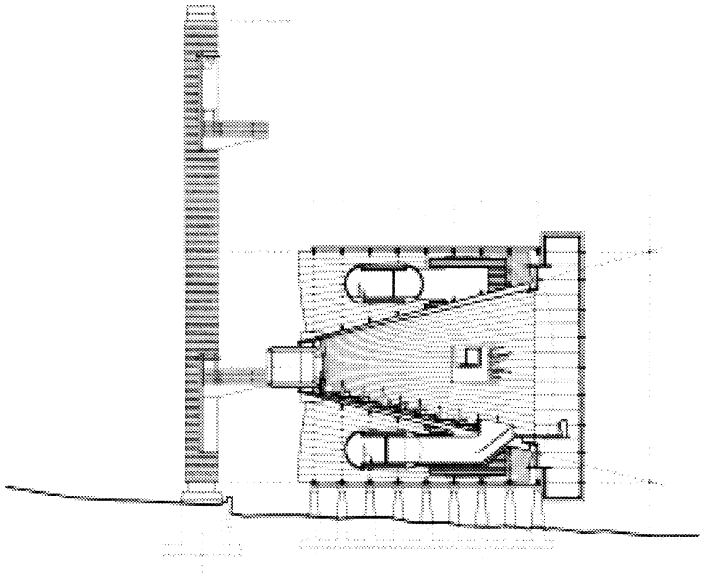


The Pine Chapel's nave spans between two slot-like blades of glass — one horizontal and one vertical. Placed in tandem at the juncture of Colorado's counter topographies, these two blades are oriented paradoxically. The upright blade faces the plains, allowing only a narrowly vertical view of the endless horizon stretching east. The prone blade faces the mountains, allowing only a broadly horizontal view of the precipitous peaks rising west. These two slender portals portray the antithetical ways that Coloradoans view space. Pine logs are stacked "short-end-upon-short-end" and "long-end-upon-long-end" to achieve the angularities necessary to support this "bellows-like" volume. Circulation tubes give access to the pulpit, lectern, offices, and building services.



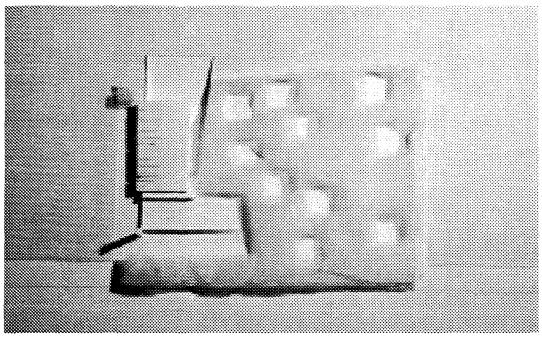


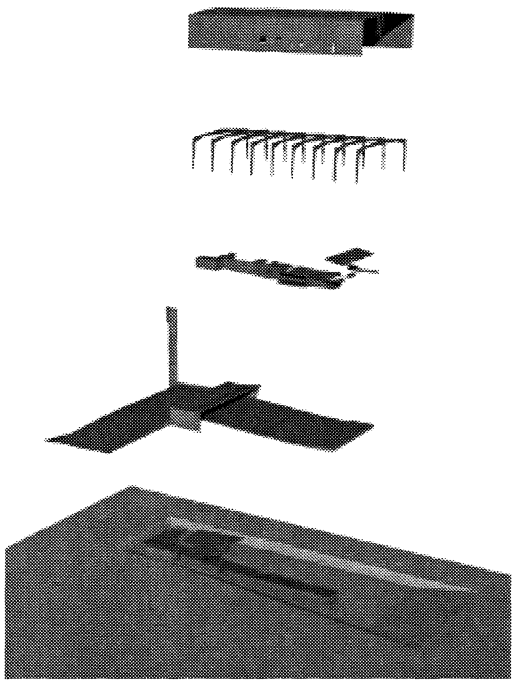
Sacred Ground

CRAIG BORUM
KARL DAUBMANN
University of Michigan
Ply (+)

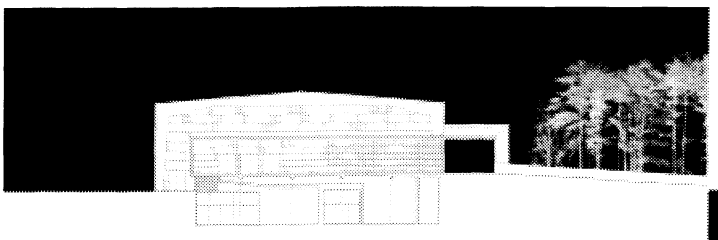
The project for the pilgrimage Church of Our Lady of Gaudalupe, a competition sponsored by the church community, attempts to transform the rural, agrarian, Indiana landscape of the site into a sanctuary by fully engaging the terrain in the rituals of a pilgrimage church. One of the key issues, as defined by the competition brief, was that a large portion of the building be constructed by volunteer labor from the pilgrimage community to minimize the construction costs. The knitting of the church and the surrounding terrain was seen as the means to spatially fix a mark upon the land which could provide an orientation and sense of place in the otherwise undistinguished expanse of flat farmland. The site of the proposal was a wooded parcel in a seemingly endless sea of furrowed fields of corn.

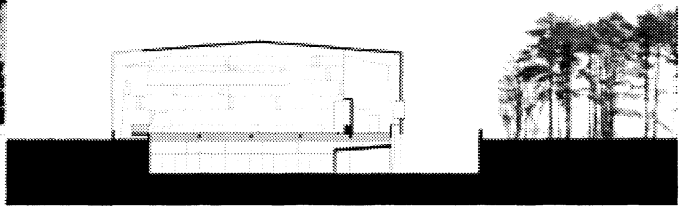


The design of the church was approached through the exploration of the relationships and integration among three key elements: landscape, church exterior, and church interior. To create a connection between the building and the site, the landscape was manipulated in three simple operations. The first strategy was to preserve as much of the existing forest as possible and to clear all of the undergrowth from the site. This resulted in the carving of parking rooms from the tree canopy which would be wrapped by hedges and serviced by utility masts, providing water and fire for the campers that arrive during the pilgrimage celebrations of Our Lady of Guadalupe.



The site of the building was then excavated to create for a tornado shelter in the lower level. A mis-registration of the excavation and church created two exterior zones, one for access and entry (to the side) and one for larger exterior gatherings (to the end). The larger exterior gathering zone could be occupied as an inclined seating area oriented toward an exterior pulpit. A prefabricated "butler building" was employed to enclose the most space for the least price. The church exterior could be constructed quickly using

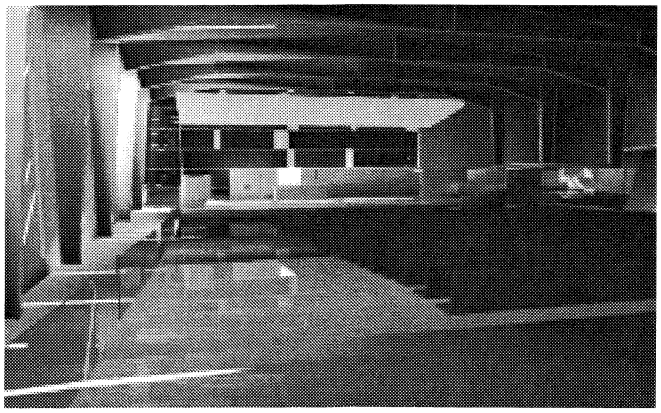


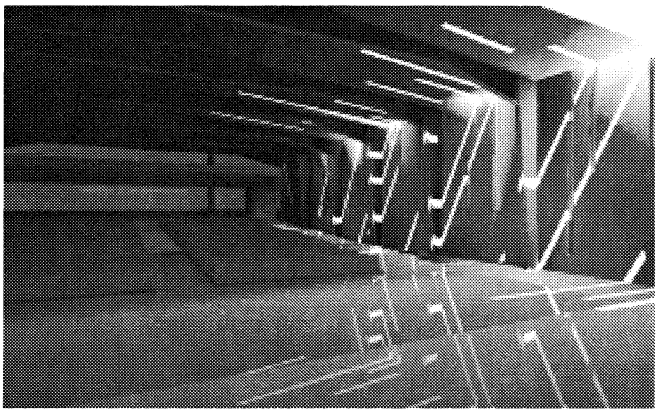


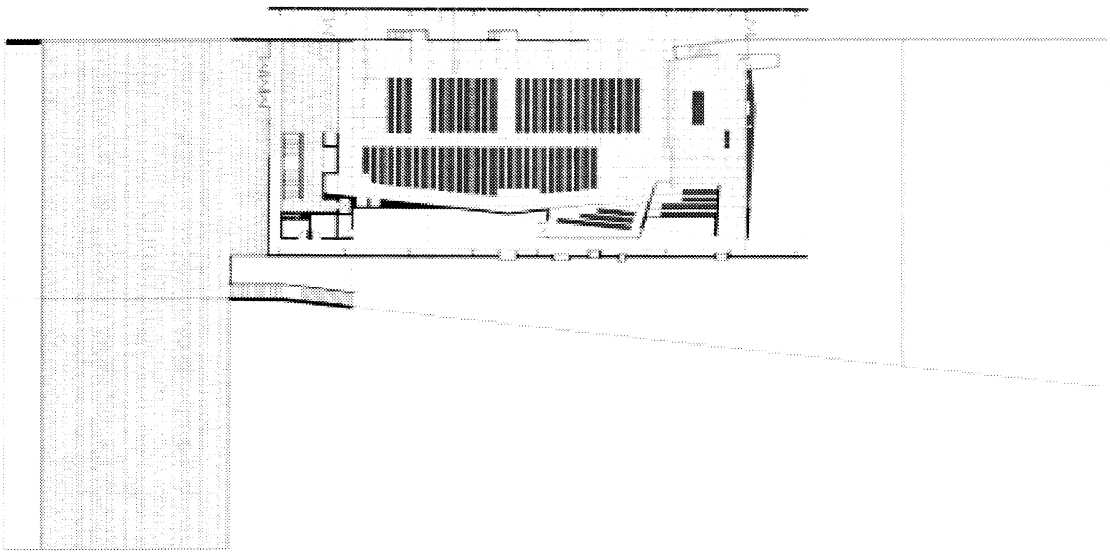
standard parts by skilled labor. This allows the unskilled labor to finish the interior without having to worry about water tightness. The ends of the building would be enclosed with glass curtain walls, expanding the interior space of the Church into the landscape.

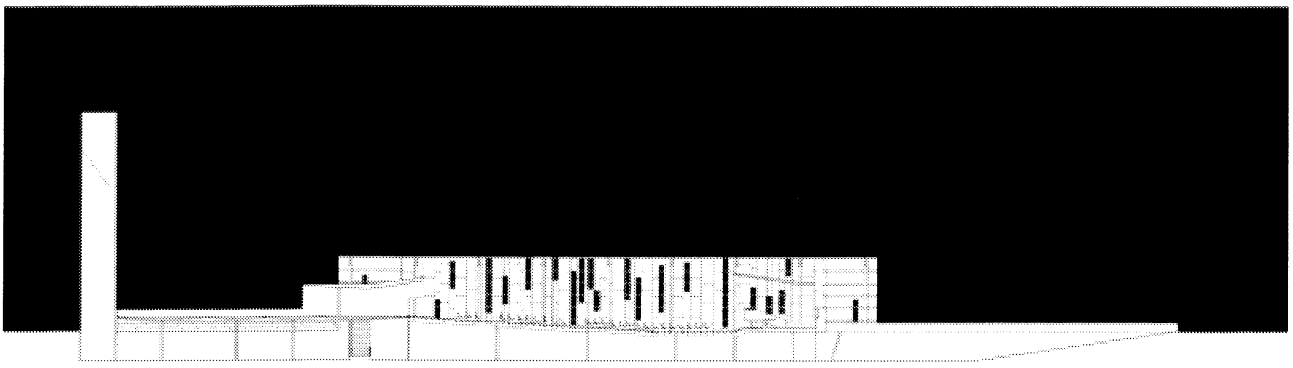
The strategy at work in the separation of the two scales of building provides the scenario for the rescue of ritual from the everyday economic and utilitarian constraints that the "butler building" represents. Its singular figure becomes the baggy enclosure for a liner of highly articulated figural forms built though the community effort of the parishioners.

Project Team: Craig Borum, Karl Daubmann, Gregory Hanson, Anca Trandafirescu









Fields, Walls, Paths, Grove, Water, Dream:
The Martin Luther King Jr. Memorial Competition

SHERYL TUCKER DE VAZQUEZ
SCOTT W. WALL
Tulane University

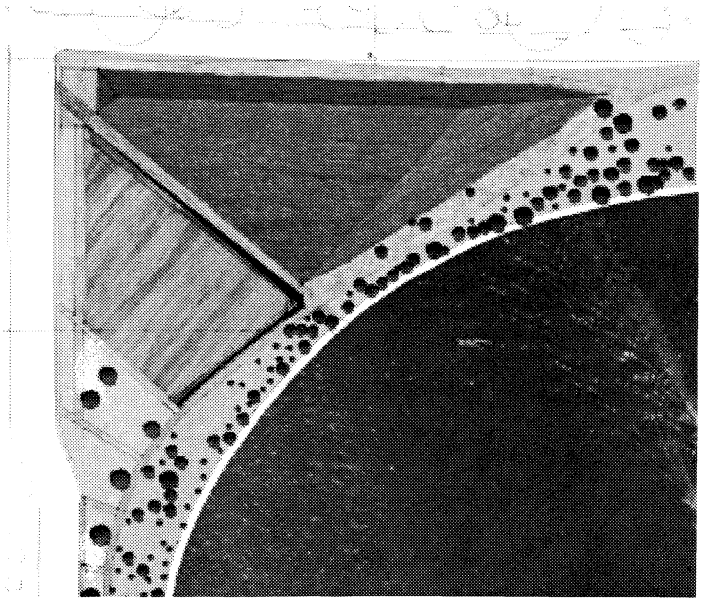
At every point of contact with the ground, the Memorial — its collaboration of multiple surfaces — merge with, and emerge from the ground, growing out of, and into, the tender, fertile soil of the earth. Consistent with Dr. King's strong advocacy of non-violent action and intervention, the project respects the lines of that which existed before the project design, while simultaneously changing that landscape to accommodate the specific requirements of both collective and individual commemoration this singular figure in American history.

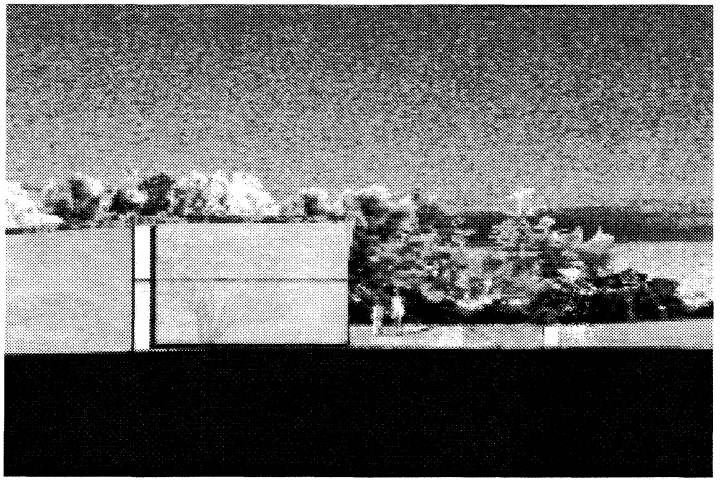
The green field of gathering, the continually changing plain of wildflowers, the edges of the cherry grove are all considered as equal, inseparable parts of a living project. The Walk falls and the Wall rises from the fields of past conflict and resolution, and into the present and possible future hope of a national creed of equality embodied in the words of the Constitution, the words of the Emancipation Proclamation, the actions of Civil Rights Movement, and the words, work and life of Dr. Martin Luther King Jr.

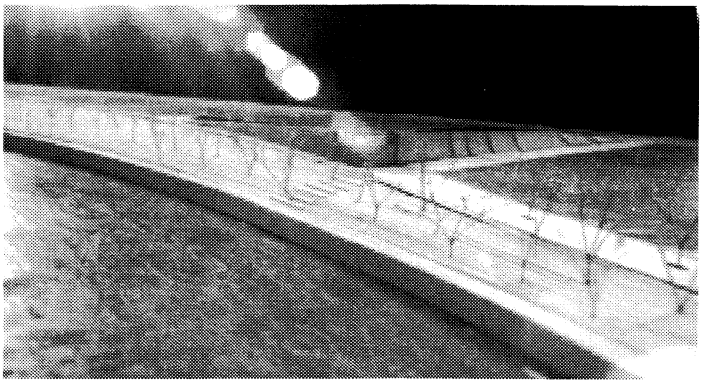
All materials are derived from the earth: the solidity of Georgian stone, the eternal force of gravity in the slow liquid of 3" x 8" x 24" solid glass blocks, the magic alchemical alloy of weathered bronze rubbed to a golden finish in places, and the improbable weeds that are the grasses and wildflowers grown, cut and harvested as part of this living memorial to Dr. King.

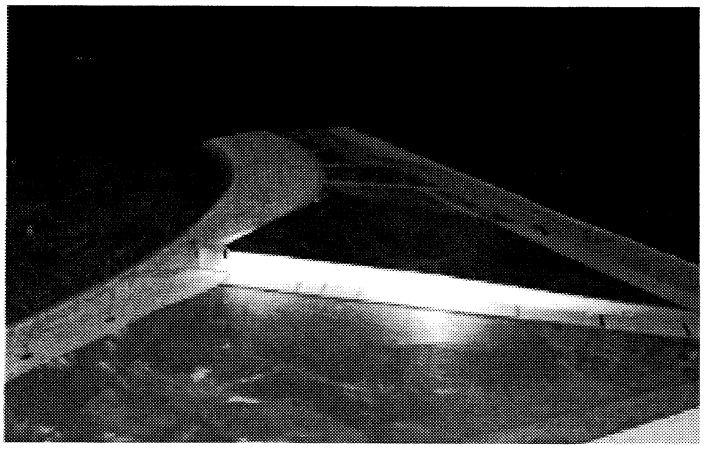
The project physically records the cycle of events of the Civil Rights Movement and their intersection with the life of Dr. King. These intersections are marked across both Walk and Wall in honed stone and bronze, beginning with the words of Lincoln's Emancipation Proclamation of 1863 and ending with the bronze scar marking the death of Martin Luther King (1968). But it is the memory of the "dream" speech of Dr. King at the Lincoln Memorial in 1963 which runs like a mantra across the topographic roll of the Wall. Moving from the horizontal at the Memorial entrance, it emerges from the earth and climbs, arcing up as the Walk moves down toward the contemplative space of the Cherry Grove and the reflective surface of the Tidal Basin.

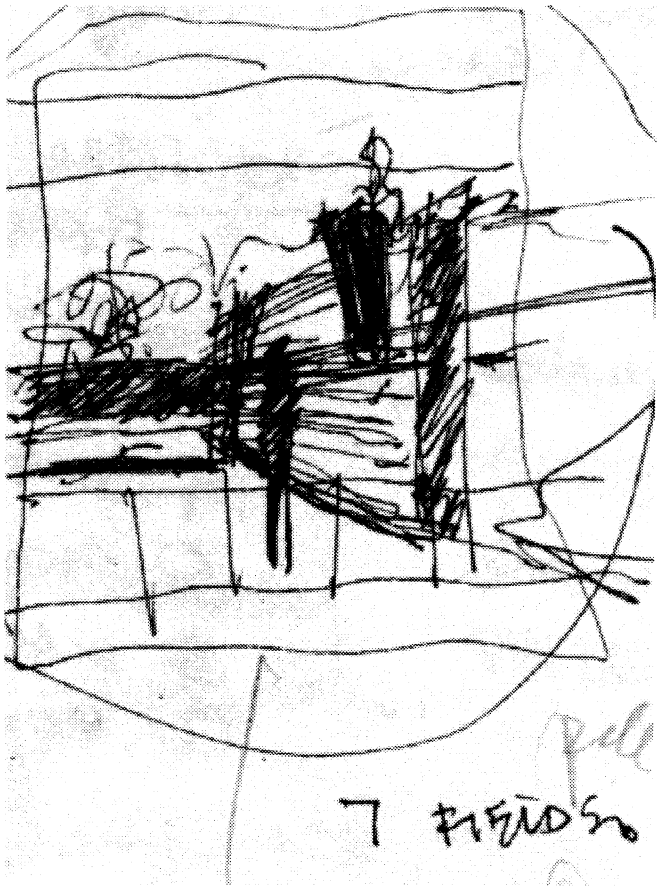
Running the length of Walk and Wall is a continuous thin bronze incision in both glass and stone. Its only break occurs at the 24" bronze "volume" which marks the space of Dr. King's death. This tiny cut in the Wall provides the long line for action and remembrance. Notes, cherry blossoms and flowers, artifacts of commemoration can be left attached to this thin bronze line. Each person who comes into contact with this piece of bronze is reminded of the moment of Dr. King's death, while simultaneously being able to give thanks for his life.











Harvesting Flowers:

In the spring, school children, parents, teachers, the old who still remember before, the white man, the black woman, the others who need to know and to remember, and who need to dream the dream of one man, one movement, one nation, come to the field of wildflowers. It is the time when the cherry tree blossoms, the time when the dogwoods begin to bloom. It is the month of April, the month of his death. In this month, and in others, they come to pick the flowers, to take hold of them. To take them home to put them in a vase on the dining table. To take them 'round to the wall, to leave them at its foot, or dangling gracefully from the pitons, to leave them in remembrance of someone, or some moment along the line of time which moves inexorably forward. It is a line which is always marked by the visible and invisible striations of change, and the recurrent, but temporary colors of the season's flowers. These are the ones of April.

URBAN DESIGN

Moderator: Maurice Cox, University of Virginia

Detroit:

Cass Corridor Housing Prototypes

2000-2001 ACSA Faculty Design Award

ROBERT LEVIT
University of Michigan

Two Projects:

Another Atlantic Steel and The (con)Temporary Film Institute

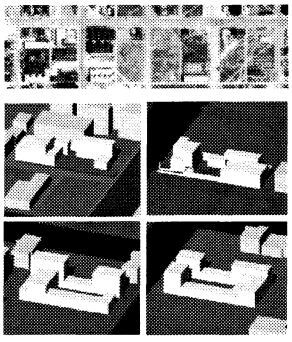
MICHAEL E. GAMBLE
Georgia Institute of Technology

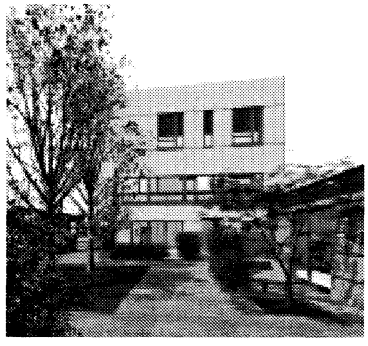
Detroit:
Cass Corridor Housing Prototypes
2000-2001 ACSA Faculty Design Award

ROBERT LEVIT
University of Michigan

PROJECT

This is a proposal for multi-family housing prototypes for the city of Detroit and for its Cass Corridor neighborhood. The work suggests four prototypes or two pairs, i.e. two prototypes of eight units and two of ten. One of these eight unit buildings is developed in depth here.



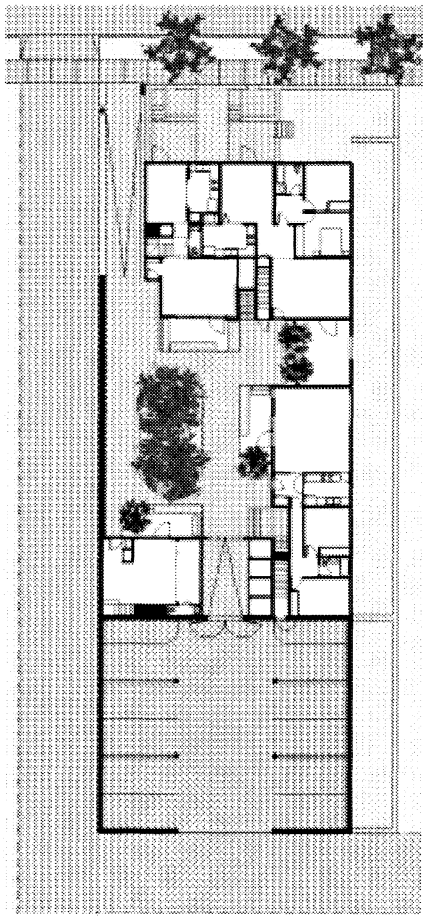


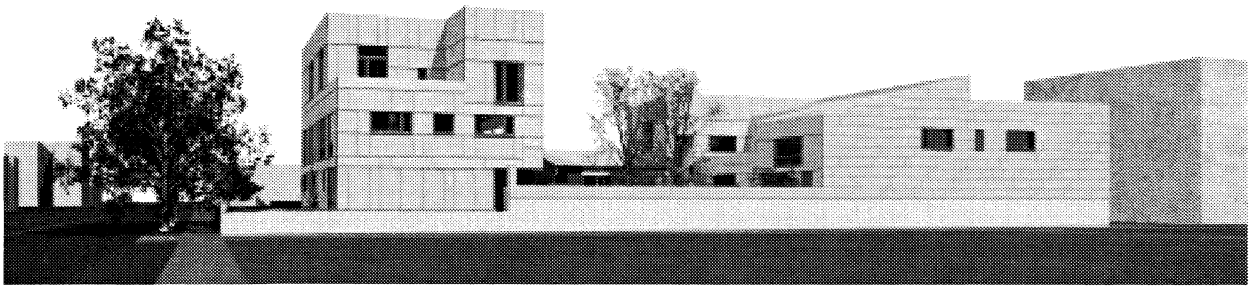
Four Prototypes

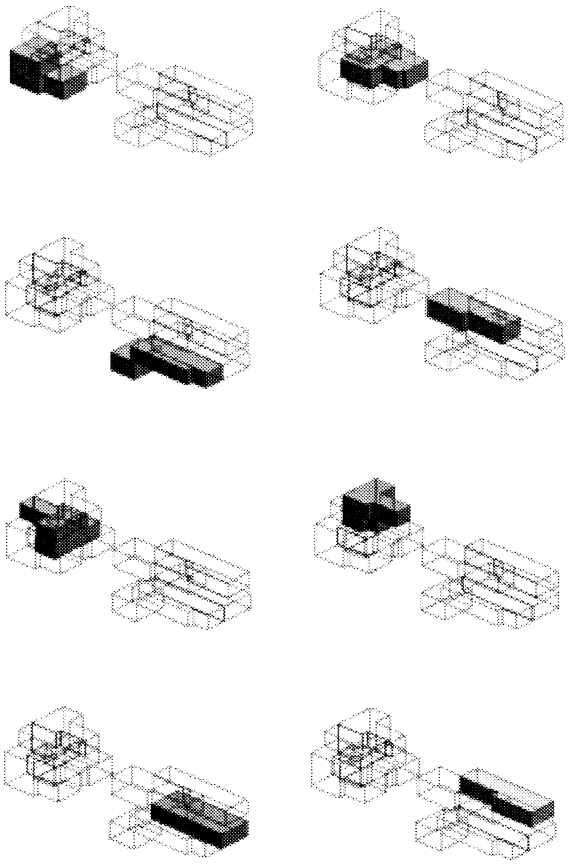
ISSUES

At stake is the suburbanization of Detroit and similar American cities. This proposal's goal is to redirect these suburbanizing efforts of housing development in Detroit. However, though the sense that suburban form's intrusion into the city has deleterious effects on the qualities of the city that make urban life desirable—notably proximity and variety—many of the ambitions and accommodations that suburbia satisfy are accepted here as relevant (and presently unavoidable) protagonists for an urban synthesis.

In Detroit the vast amounts of vacant and abandoned lots have made it possible for large consolidations of land. In residential development this has meant the appearance of large PUD-like subdivisions, consolidating many blocks at a time in order to create suburban styled subdivisions. These developments erase the former map of the city and replace the city's fine-grained street pattern with a balkanized configuration of discrete developments. A profound, if less easily grasped, consequence of such 'de-mappings' is the erasure of the physical vessel of memory that finds itself in the durability of urban pattern. More immediately apparent is the dissolution of the compact between public and private space within the city. Single-family houses are withdrawn from the street into bermed landscape settings. Excessively large minimum lot sizes and single family house zoning contribute to undesirably low building densities substituting present suburban-based standards for city metrics that once accommodated even the single family houses on narrow urban lots. The re-emergence of seemingly 'urban' housing types in the form of lofts and townhouses brings with it its own anti-urban tendencies. These new townhouses follow the infamous example of lining streets with garage frontage while in the case of lofts surface parking is placed on lots equal in size to the residential building proper and immediately adjacent to first floor unit







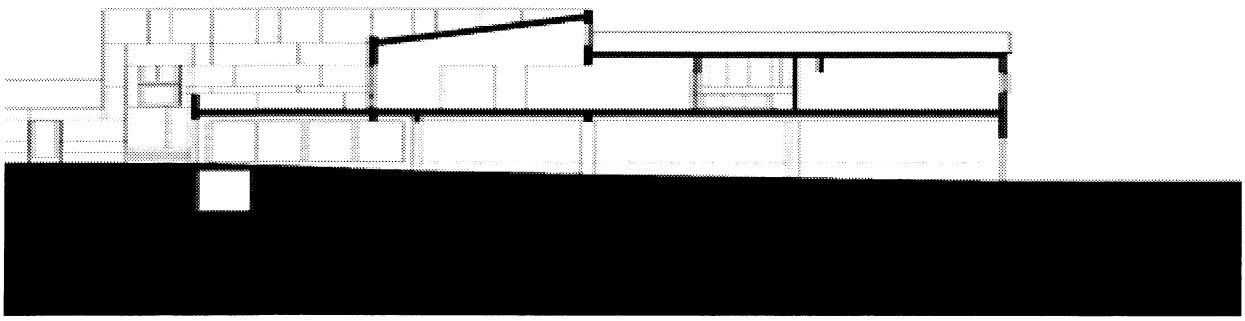
Unit Distributions

exposures. In neither case do these housing types make use of the available network of alleys as a cue to parking solutions. In both cases the accommodation of the car leads to the disruption of urban continuity and the spatial/social exchange between public and private realms.

The development of consolidated subdivisions within the city also favors large-scale capital ventures, neglecting the prospect for economic developments rooted in community-based settings. Non-profit neighborhood and small private developers working within economically 'marginal' neighborhoods need to accommodate themselves to more incrementally acquired properties that will inevitably follow, in some fashion, existing parcel patterns. In such circumstances the advantage to maintaining continuity with the historical pattern of the city is built into the limitations of these developers' financial capacities, however finding ways to accommodate the very issues addressed in the suburban styled development nevertheless remains.

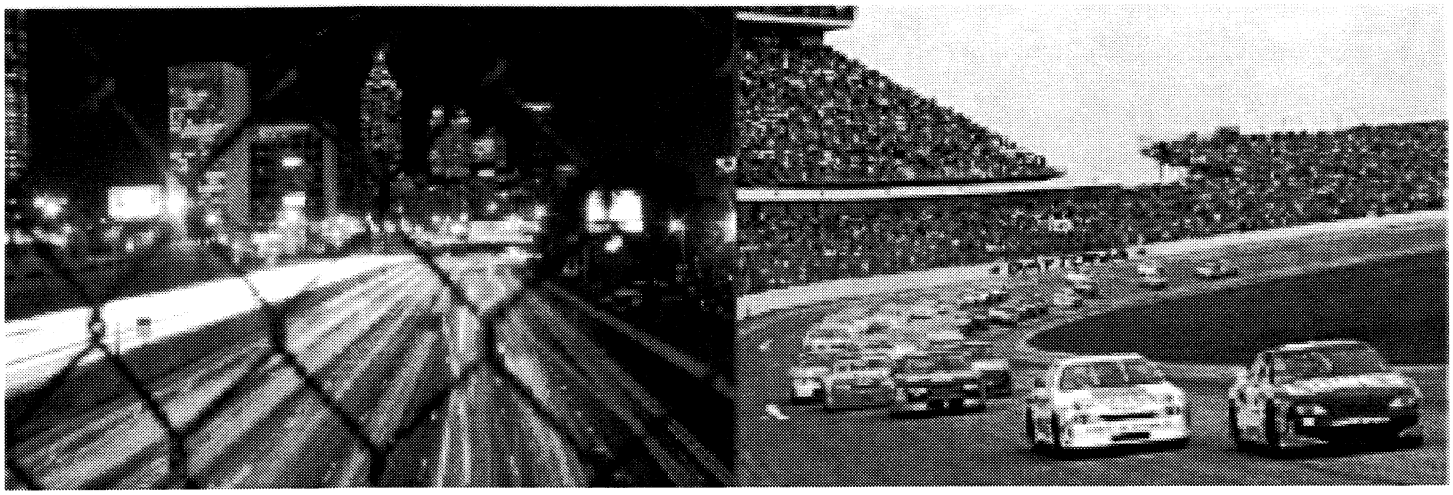
RESPONSE

The tactics adopted to deal with the above issues involve the reconfiguration of lot sizes, reconsideration of unit configuration and arrangement, patterns of unit aggregation, open space or landscape patterns, private-public sequences and thresholds, constructional economy versus unit variety and solar ecology.



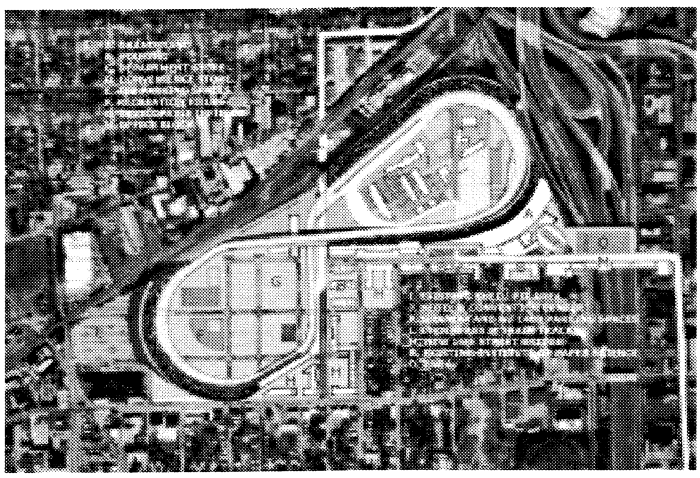
Two Projects:
Another Atlantic Steel and The (con)Temporary Film Institute

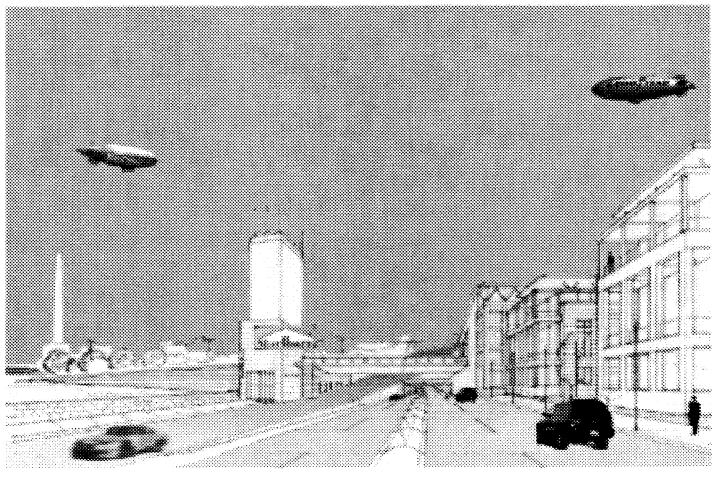
MICHAEL E. GAMBLE
Georgia Institute of Technology

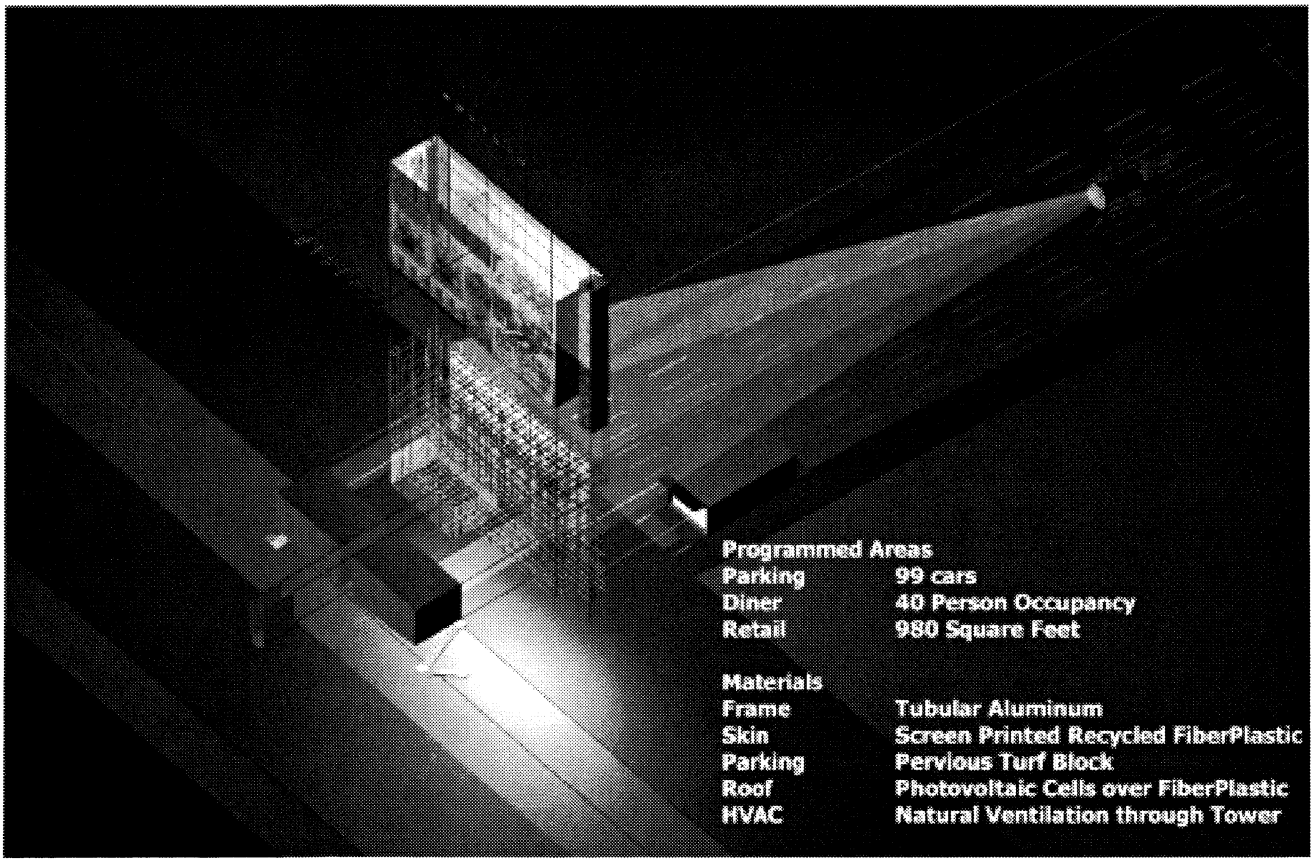


ANOTHER ATLANTIC STEEL

The now defunct Atlantic Steel, America's largest brownfield reclamation project, is situated to become a model for urban redevelopment. Atlanta, haven to numerous large scale sporting facilities and the consummate auto congested contemporary city, provides the social, economic and political narrative for this proposal. From defensive driving classes, weekend NASCAR and Grand Prix Events, large scale auto, etc. conventions, to sound affordable housing, workspace and shopping spaces, our proposal embraces the existing street and circulation patterns of the contemporary city. These new amenities are woven into a 1.9-mile racing loop. Multiple speeds and layers of movement overlap at numerous instances in the revitalized neighborhood. The infield of the development is open to vehicular, recreational and pedestrian circulation 24/7, while the track, the greatest 20th century sporting venue in the city, supports a variety of functions ingrained in the daily lives of Atlanta's 3 million inhabitants.



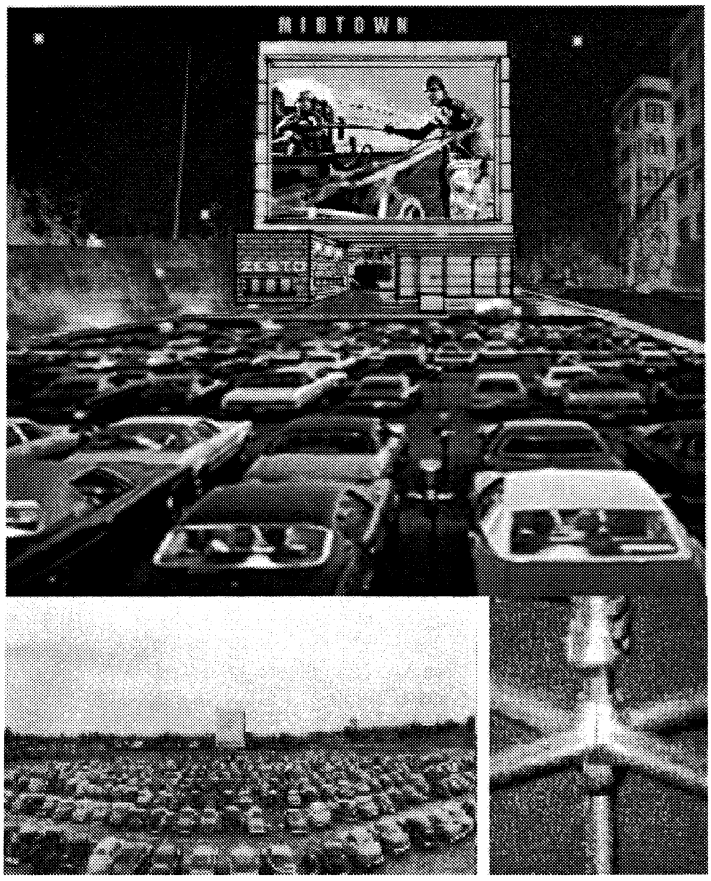




THE (CON)TEMPORARY FILM INSTITUTE

Public space is where the meaning and the unity of the social is negotiated. As public spaces are slowly absorbed by privatization and the definition of the social evolves, one must take stock of those spaces, public and private, which constitute a primary place of interaction. The parking lot, as many of us know, is the most frequently experienced urban space in Atlanta. As a component of a viable urban fabric, Richard Dagenhart states, "Atlanta's parking lots lead to nowhere."

During the day, the (Con)Temporary Film Institute operates as most parking lots in the vicinity, accommodating the flow of traffic. In the evening, when many of the adjacent lots have little to no occupancy, the Institute is busy, showing a double feature 7 nights a week outside and inside. The aluminum frame, photovoltaic cells, and lightweight skin contribute to the ephemeral nature of the project. On short notice, as new clients come forward with plans for permanent structures, the (Con)Temporary Film Institute can be disassembled and reconstructed elsewhere, at minimum cost and maximum reusability.



INTERIORS/INTERVENTIONS

Moderator: Susan Piedmont-Palladino,
Virginia Polytechnic Institute and State University,
Washington/Alexandria Architecture Consortium

not furniture-not architecture

2000-2001 ACSA Faculty Design Award

TIMOTHY STENSON
University of Virginia

Surface | Thickness

LISA IWAMOTO
CRAIG SCOTT
University of Michigan

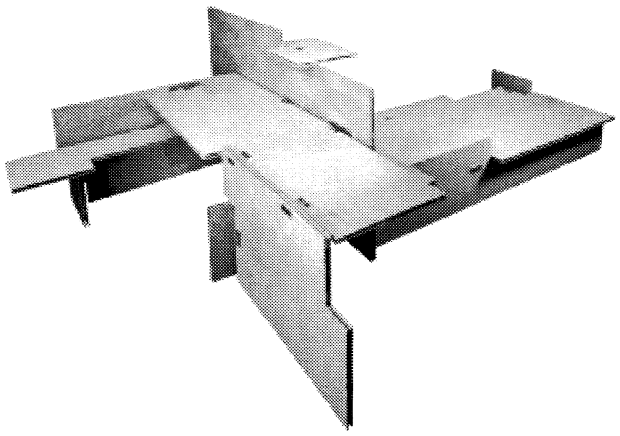
Museum Bookshop

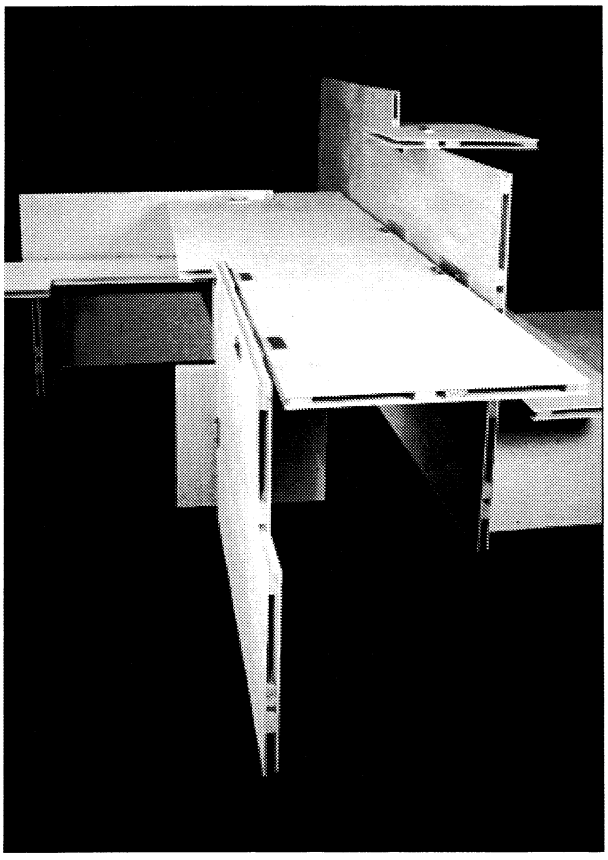
JASON YOUNG
University of Michigan

not furniture-not architecture

2000-2001 ACSA Faculty Design Award

TIMOTHY STENSON
University of Virginia

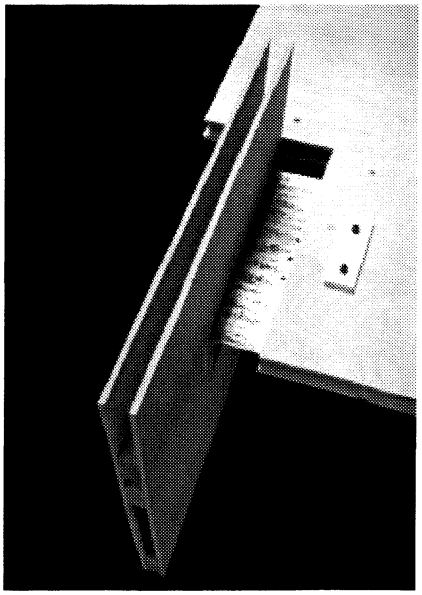


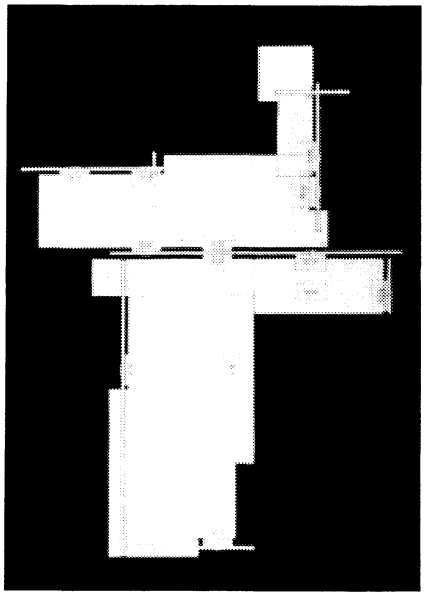


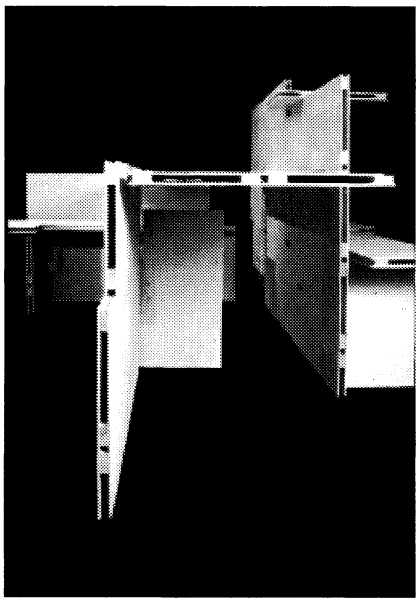
The project depicted here attempts to align field concept with field production. ("Field" is understood specifically as "spatial field" - a space or range of activity or opportunity, a nonhierarchical distribution with an emphasis on the system of production versus a fixed composition, and further understood, therefore, in opposition to the deterministic qualities of figure.) It consists of a system of variously shaped plywood panels and aluminum connectors - a collection of parts whose assembly can be configured to create an array of furniture formations. Systemization - relationship of size, shape, and connection - is the field "mechanism" operative in the design process, and systemization is the dominant characteristic uniting the panels, the connectors, and especially the assembled formations as a field. Aesthetically the project is associated with the gridded and planar production of early twentieth century De Stihl painting, while conceptually it parallels works of late twentieth century Conceptual art.

This project was initially conceived as a system of solid plywood planes that could be assembled into a limited variety of configurations. The range of sizes, notched shapes, and the vertical and horizontal interchangeability of the planes set in motion a dynamic of assembly which manifest an affinity for the planar compositions of van Doesburg - for example his Architectural Analysis of 1923. This De Stijl alignment introduced the potential of an implied field as the basis for configuration to the project (as distinct from a strategy of predetermined functionally based assemblies).

As the design process progressed the mechanism of systematic order became articulate, and the possibilities of field explicit. Panel modularity was adopted as much as it was created. Starting with the 48" sheet width, panel ribs were spaced 12" on center, and then paired (to accommodate cut lines) in a 9" - 3" o/c rhythm. Connectors also work with the 9 - 3 module, thus extending this order into three dimensions. (It is worth noting that this system of integrated integer relationships - order - was not an a priori schema imposed, but emerged through the processes of fabrication.) From fabrication to assembly, the order of the parts became the order for configuration - the limiting context of formation. Assemblies also responded to the requirements of function, support, and stability. The combination of order, self-limit, and function did not reduce project production to a set of preprogrammed furniture types. Rather, the

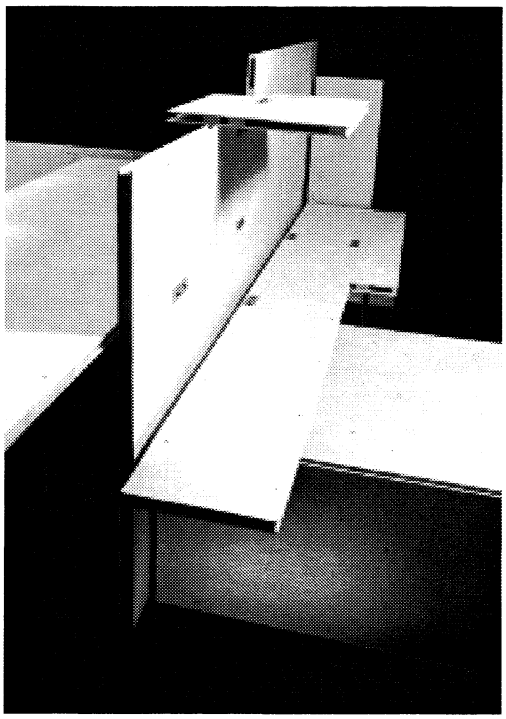


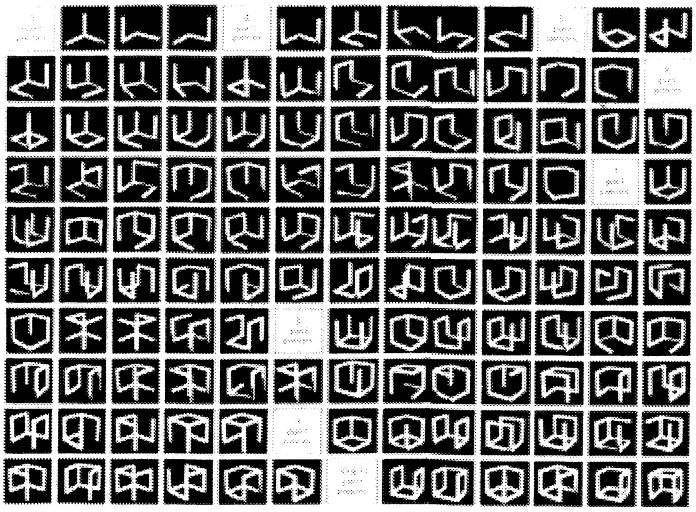


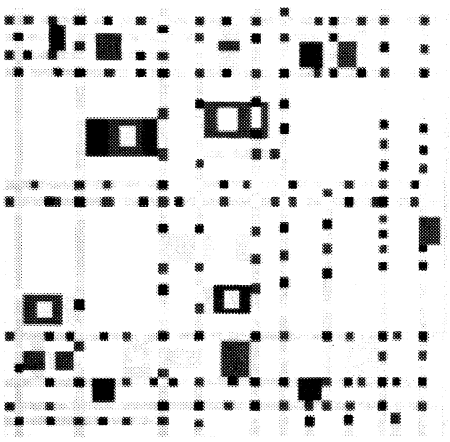


unified modularities of ribs, screws, shapes, connectors, and connection points resulted in a virtually unlimited number of assembly sizes and formations accommodating a range of functions - an open-ended array, rather than a set of finite objects.

Yet, an array of things does not necessarily a field make. Within all potential formations, as well as within each part of each formation, the formative order - the systematic logic - of their fabrication remains manifest. Thus inter-relatedness of shape and dimension, relationships of edge, face, and notch, and the punctuation of connector plates ("indexes" of connection), impart a non-hierarchic and systematized texture of surface, line, and point. Furthermore, in assembly the system is not subordinated to function. In fact it is not redundant to say that the assembled system is characterized by its systematic assembly, not by function as chair, table, etc. In this manner each formation completed maintains an emphasis on the system of its production, rather than on singular resolution. It remains its own matrix - a field.







Surface | Thickness

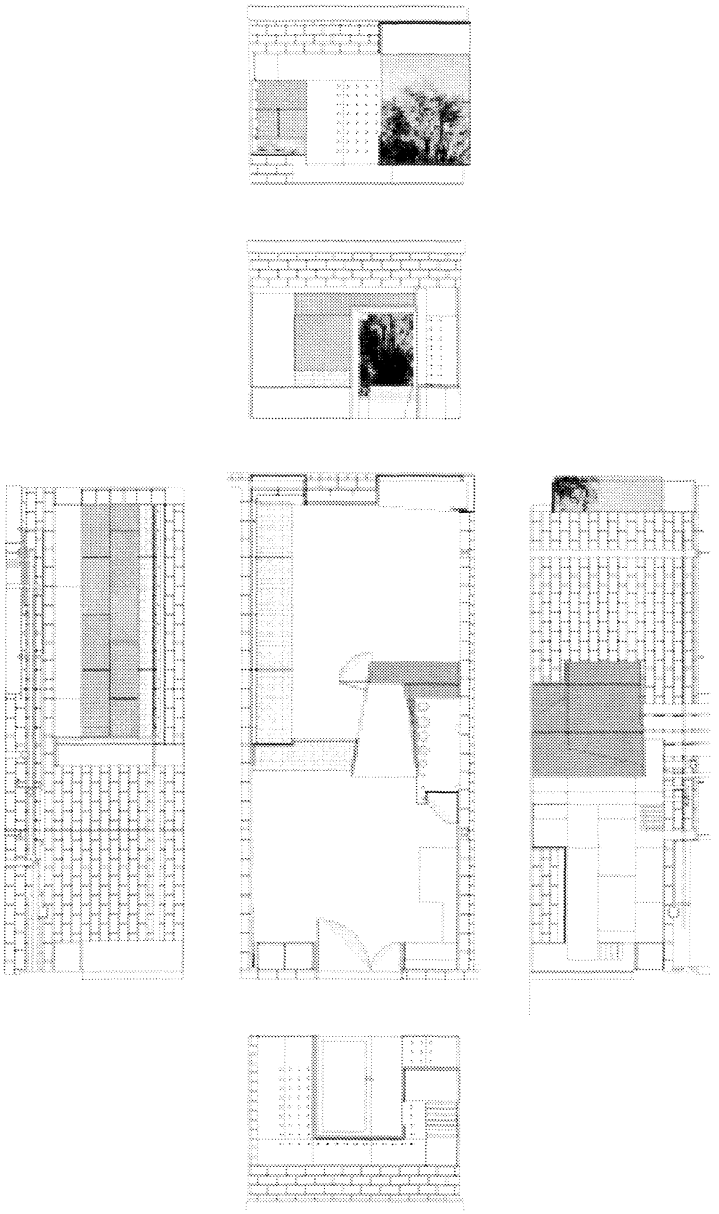
LISA IWAMOTO
CRAIG SCOTT
University of Michigan

The Building-Design Workshop at the Taubman College of Architecture and Urban Planning pursues the integration of teaching, design research, and the design build process. The program brings University sponsored projects into teaching contexts, offering a unique forum for testing pedagogies about making. The project shown here is a renovation of the College's Faculty Resource Room, a support facility for the research and teaching of the Architecture and Planning faculty. (fig. 1)

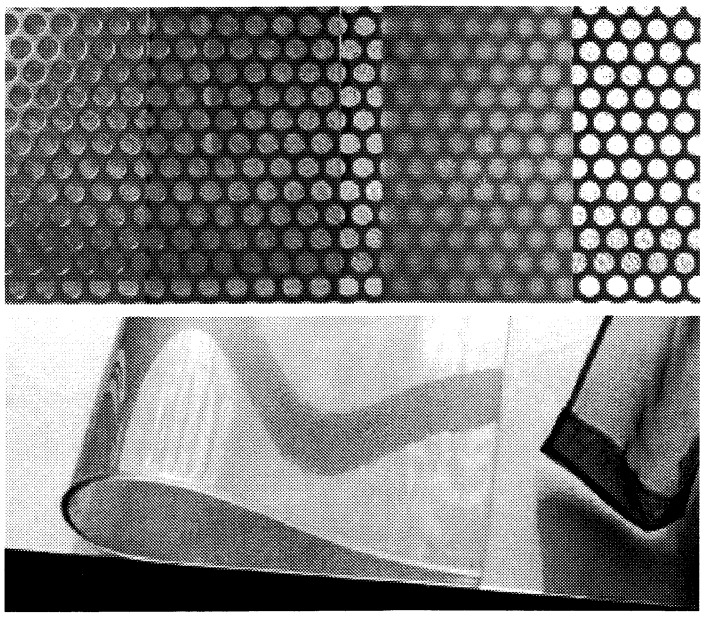
Capitalizing on the potential of the design-build process to amplify the dialogue between the design's conceptual terms and its materials and methods of construction, we focused on the visual and tactile qualities of materials and explored how they might be fabricated to gain desired effects (fig. 2, 3). Because we were ostensibly working with something as simple as a wall panel, we asked the students to test how the 'liner' might be made to reveal something about its materiality, use, or perhaps visual complexity. Together, we built mock-ups to test constructional capabilities and gauge visual results. In these investigations, the notion of thickness was likened to constructional methods that could resist the typical thinness of contemporary building products. We also used the material and constructional explorations to question the inherent thinness and planarity that the insertion of a lining nominally implies (fig. 4,5).

Very few working drawings were employed. Instead, implications of detailing and construction emerged through the making of prototypes, with material mockups and test pieces acting as visual specifications. Throughout this phase, the design-build process acted as a pedagogic tool to encourage the students to integrate construction technologies and materials into their thinking, and to bring full-scale fabrication into the design at an early stage.

The liner evolved into a series of separate but intertwining pieces that formed a snaking figure. We worked to maintain the visual continuity of this figure by alternating readings of edge, surface and volume. Materially, the liner became a variety of surfaces that both formed and suggested separate spaces, becoming storage, desk surface, window seating, lighting, photography backdrop, wall and floor covering, door frame, and room divider. This reconceptualization allowed us to expand our ideas of spatial thickness to the notion of multiple levels of 'interior.' We thought that

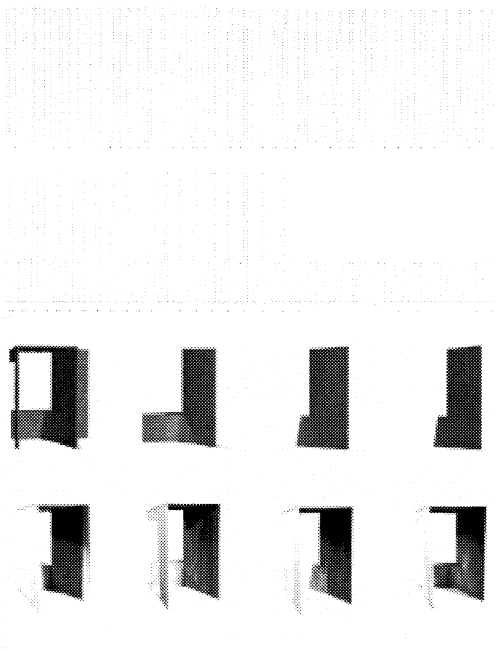


1. Unfolded plan of room



2. Desktop mousepad material studies

3. Top layer of rubber bench after casting

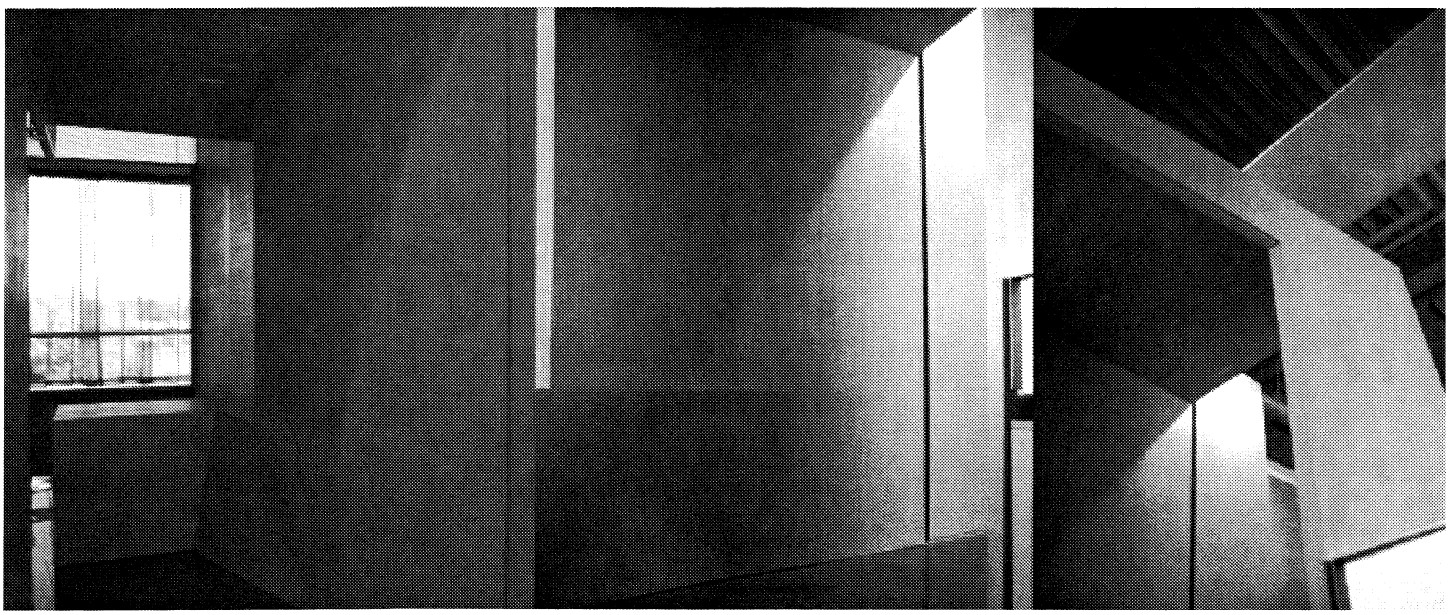


4. Above: Plots of funnel pieces in order of lamination: Below: Studies of funnel

certain constructed elements — such as the funnel, doorframe, and window seat — could be seen both as isolated moments inserted into the room and as parts of the liner. Using the visual agenda of the project to call out these and other predominant areas, we sought out materials that could both give visual depth and be responsive to particular programmatic needs. Here, we explored the sensuous possibilities of less conventional products such as cast rubber, liquid applied epoxy flooring, and sheet vinyl. Again, each material was tested to see how it could be transformed from its normative status through fabrication or use.

Students: Timothy Wong, Adam Clous, Daniel West, George Ristow, and Gerry Bodziak

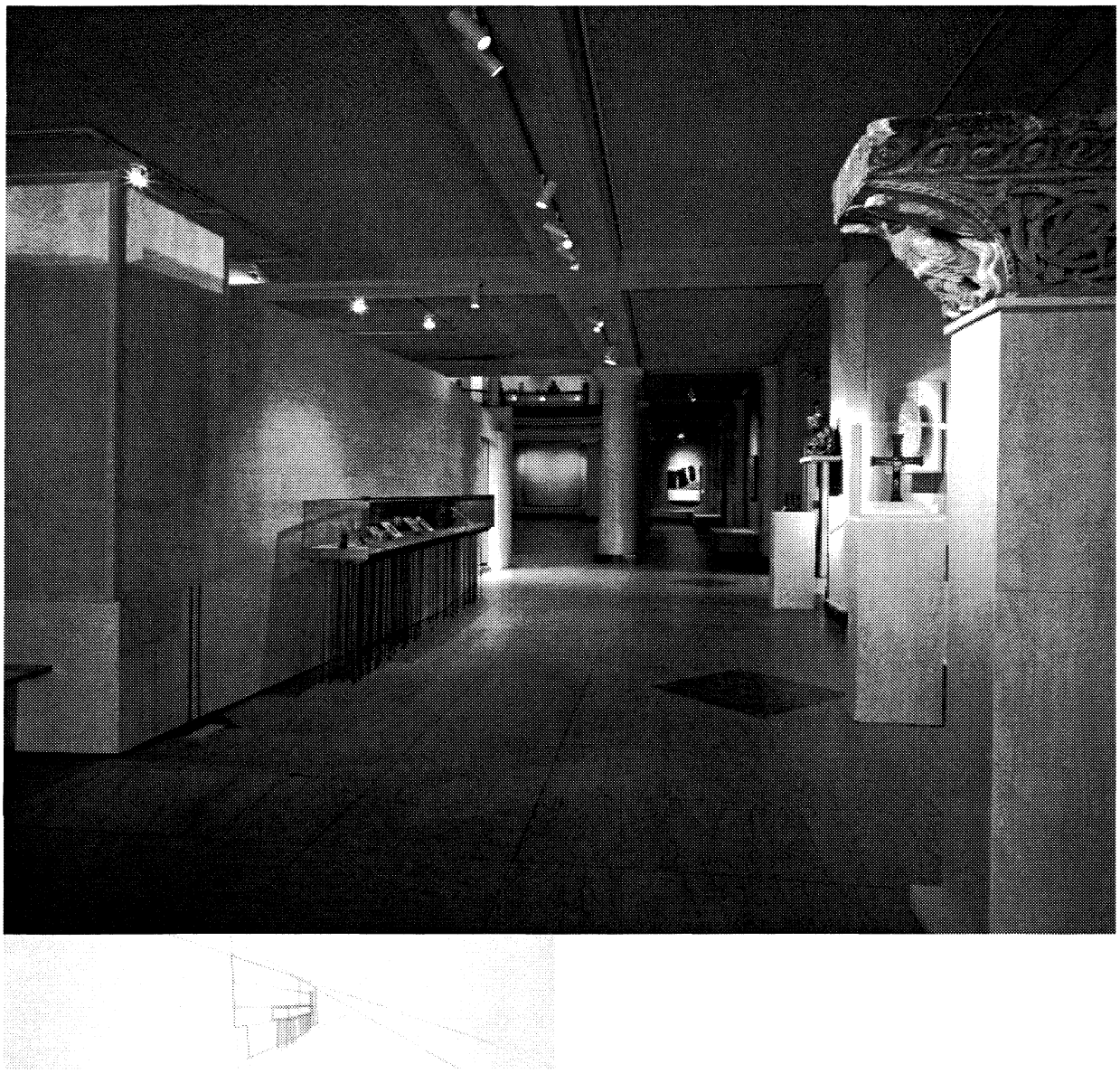
Assistants: John Comazzi and Anselmo Canfora

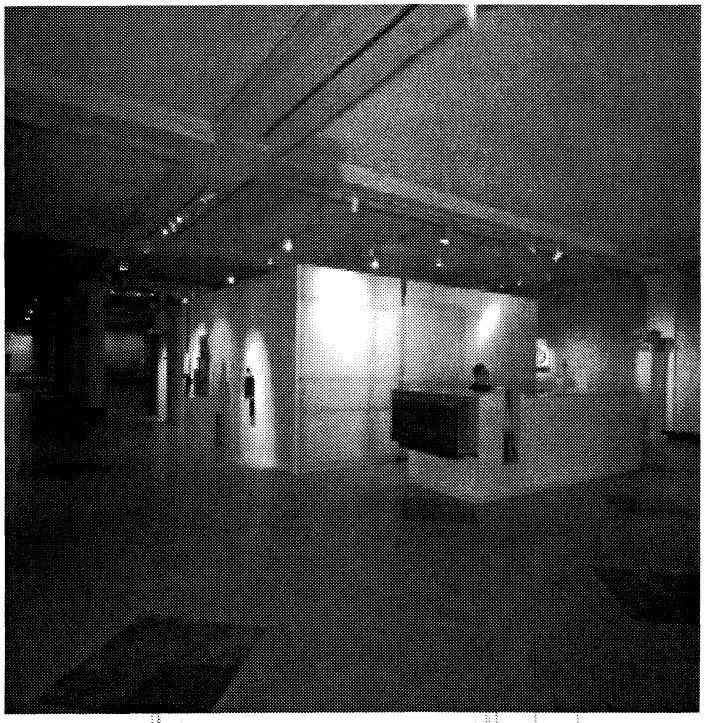


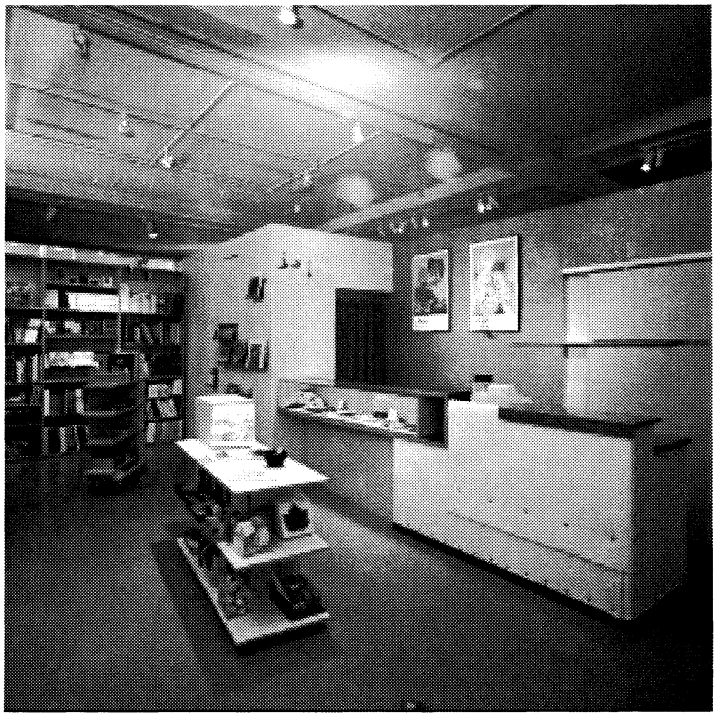
5. View of funnel

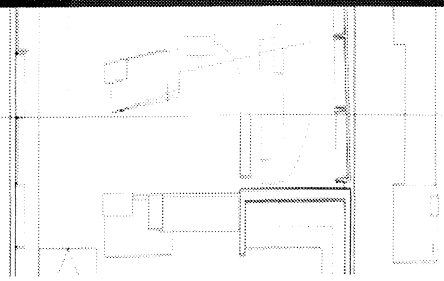
Museum Bookshop

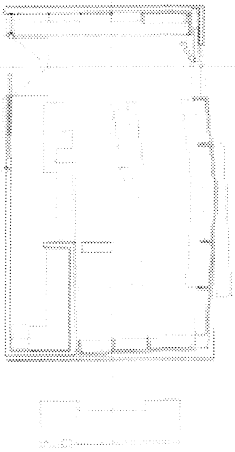
JASON YOUNG
University of Michigan











The new bookshop inside the University of Michigan Museum of Art is a five hundred-forty square foot, stand alone building constructed inside the main space. Its site, on the primary axis of a Beaux Arts building, obliges the new structure to perform as an object, comfortable with its prominent position on this ideologically strong line. Its program, a commercial enterprise embedded inside an academic archive, obliges the new object to fit in, to avoid calling undo attention to itself.

The design strategy entertained an interesting "double thinking" in that decisions were made as to maximize the impact of both obligations. The new bookshop is a reluctant object.

HISTORIOGRAPHY

Nature, the House, and the Office

Institution and the Gaze

Montage, Color, and the Ground

Space, Identity, and Ideology

Nature, the House, and the Office

Moderator: Susan Henderson, Syracuse University

Nature under Glass:

The Case Study Houses Redefine the "Landscape"

CHRISTINE MACY
Dalhousie University

OfficeLand:

History, Ecology, and the Plant-in-the-Office

WILLIAM W. BRAHAM
The University of Pennsylvania

Situating the Red House

MARY MCAULIFFE
University of Michigan
Reader: Lily Chi, Cornell University

Nature under Glass:
The Case Study Houses Redefine the "Landscape"

CHRISTINE MACY
Dalhousie University

Introduction

The natural landscape has served as a reference for American national identity since the foundation of the country, from Thomas Jefferson's ideal of the agrarian society to Frederick Jackson Turner's "frontier thesis." This paper is part of a larger work which looks at how the natural landscape has been represented in significant American architecture and planning projects of the twentieth century; that is, projects which were supported and instigated by both government and business interests. If we accept, as Homi Bhabha has argued, that the "nation" is "narrated," we can then explore how architecture might play a constitutive role in such a narration of nation.[1] While Bhabha looks at foundational texts — stories and histories — here, the focus is on architectural rhetoric, how buildings and landscapes "speak" of the citizen's relationship to nature.

The suburbanization of the United States that occurred after World War II was a phenomenon at a wholly new scale and one which included, for the first time, the vast majority of the country's inhabitants. The suburbs generated a new attitude to the natural landscape: one which sought for each citizen communion with nature in their backyard.[2] With the G.I. Bill and the provision of mortgage guarantees through the Federal Mortgage and Housing Administration, the U.S. government in the post war period effected an enormous transformation in the nation's landscape as the result of legislation aimed at individual homeowners. Each home would contain a bit of nature, and each citizen would have daily contact with it. As this essay unfolds, we will see that this privatization of nature in the middle class home held a kernel which would develop, through progressive stages of exclusion and paranoia, to the most extreme opposite of the glass house in the garden: the concrete bunker underground.

Sorting through the many "dream" houses and "model" houses that fill the national magazines of the mid 1940s, one house in particular stands out for the way it encapsulates this new relationship to the natural landscape. It was commissioned for the Case Study House program, a post war competition to design modern houses for the average "servantless" new home owner. Drawn up in 1945 by the young Minnesota architect Ralph Rapson, the "Greenbelt House" literally brought the open landscape of the prairie into the confines of the suburb. Designed for a small suburban lot, this project, in one bold move, drew the wide open spaces of the American landscape into the house itself. Each room looks onto the central ribbon of landscape, which is both farm and courtyard as it flows through the house. In Rapson's Greenbelt House, nature is in the house, not around it.

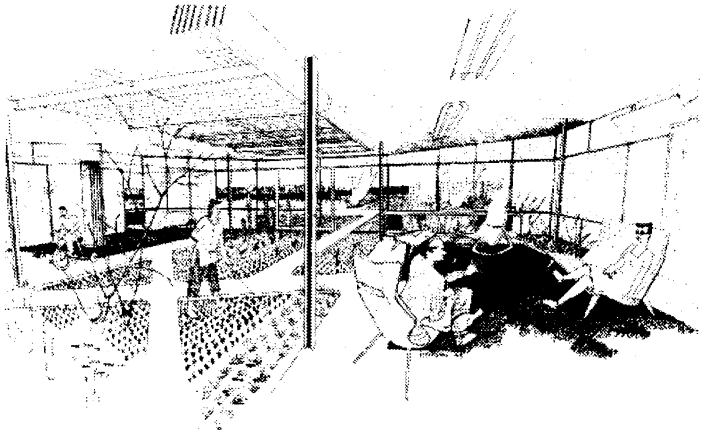


Fig.1. CSH 4. The "Greenbelt House." Ralph Rapson. 1945

The name of the project evokes the government-planned garden cities of the 1930s, such as Greenbelt, MD; Greenhills, OH and Greenfields, NJ. These schemes with their shared public open spaces and community facilities represented the most progressive urban planning of their time, and were still very much present in the minds of architects in the post-war years.[3] Rapson's "greenbelt" plays off these references, but also dramatically transforms the relationship between dwelling and nature. Rapson's design incorporates a strip of nature inside the house, while it suggests that the pre-fabricated modular dwelling that stretches out on either side can be multiplied into the infinite horizon of the American grid.[4] Although this house was never built, it impressed a generation of architects with the way it captured, in one elegant solution, a new attitude to nature, an attitude that greatly influenced the Case Study Houses that followed.

As we look at this house, it seems to us that the first lesson it teaches is that the natural landscape can be appreciated from within the

confines of a single family house. The "greenbelt" that was invented to separate cities from industries and one town from another was, in Rapson's house, put to work to separate bedroom from kitchen, and adult areas from children's spaces. Yet as the Greenbelt House encloses nature within its envelope, it changes how that landscape is understood. When he brings farmland into the house as an object of visual beauty, Rapson severs it from its primary purpose of feeding the population. His prototypical family may indulge in a little hobby gardening, but the main point of his project, he states, is to provide " a view — a place where children and adults alike might live and play in close association with nature."[5] In this way, the American landscape become food for thought and an object of reflection, not a site of production.

The second lesson of Rapson's house is that family life will benefit from contact with nature. Elaine Tyler May has shown that the post war family was "homeward bound," in both senses of the word. Tethered to their acre of land with a mortgage, father, mother and children form a productive and reproductive unit of society; a "natural" unit, it was understood, that would best be ensconced in a natural setting, where healthy instincts could be satisfied free from the constraints and pollution of cities. Women could give free rein to their mothering impulses, tending toddlers and watering plants, and men could get in touch with their natural selves, mowing the lawn and providing for the household. Children would thrive, playing in a safe little stretch of backyard greenery. As the cult of the nuclear family reached a historical high in the post war period, we find that it serves as ground zero for all of the important national discussions, including the question we look at here: how Americans should live in their vast landscape. Rapson was unequivocal as he says of his house with its strip of internalized nature, "Here, the individual might grow and develop."[6]

In this essay, I will first discuss the architectural devices that were used in the early Case Study Houses to open the house up to the garden, and then I will explore some of the reactions and anxieties generated by this suburban "over-exposure," leading to the "shelter craze" of the early 1960s and, ultimately, to a totally "contained" landscape shaped by individualism and made up of private spaces and left-over space. This dynamic, played out partly in the high art designs of the Case Study Houses and partly in the popular imagination that fed the shelter discourse, reveals the double bind of expansion and paranoia that infuse the Case Study House idea.

EXPANSION: A NEW SENSE OF SPACE IN THE POSTWAR HOUSE

Moving out of the city and out of doors

The Greenbelt House was one of nine houses commissioned by John Entenza, editor of *Arts & Architecture* Magazine for his Case Study program of 1945. In the years to follow, this program became one of the most effective initiatives to promote modern design in the country. The driving aesthetic was modern but casual, and it attracted notice nation-wide as the "California Look": indoor-outdoor living made possible by year-round sunshine, modern materials and manufacturing techniques adopted from Los Angeles's aviation and shipbuilding industries. And the packaging and promotion of the Case Study Houses also showed they came from the media capital of the United States; these houses were glamorously lit, peopled with models and beautifully photographed. Media icons, they reflected and magnified a mass-market ideal.

"Californian living" represented a nation-wide enthusiasm for moving out of the city and out of doors. While the average post-war house relied on picture windows or wallpaper of nature scenes to open up the space of the house, the Case Study architects could take advantage of the modernist architectural idea of the "open plan" invented by Frank Lloyd Wright and developed in Europe by Mies van der Rohe and Le Corbusier. They could also draw on the regional precedents of outdoor rooms, open air sleeping porches and open wall houses found in the work of Bernard Maybeck, Rudolf Schindler and Harwell Hamilton Harris. And with the advent of the sliding glass wall, this new generation of modernist houses could "borrow" the extra space of the garden and make it part of the house in all seasons, as Julius Ralph Davidson did in CSH 1, with a living room floor that seems hardly cognizant of the glass envelope as it shoots out to the terrace and beyond. Richard Neutra, of course, is the Californian architect most associated with the refinement of the sliding glass wall, but we could argue that the Case Study House program as a whole canonized the sliding glass wall as an essential feature of 1940s modern, with each of the first nine Case Study Houses employing this architectural device.[7]

Living and dining terraces, kitchen courtyards and garage patios were all ways of taking advantage of California's mild climate to increase the usable floor area of the small post-war house. Whitney Smith's CSH 5 managed to suggest that the whole house was a sort of encampment in nature, described by him as "living islands under one roof." Trees and shrubs are sprinkled liberally around this plan, which provided a number of small enclosures linked by an amorphous indoor-outdoor space. In all of the Case Study Houses, we see living space opened up, becoming more aerated and extending into the outside, as if it were necessary to reassure returning war veterans they would not be confined to four walls after years in the field and in the company of men.

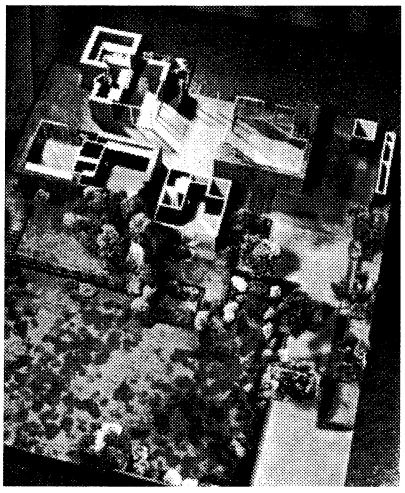


Fig.2. CSH 5. Whitney R. Smith. 1945-6

Not only did the Case Study Houses take advantage of outdoor space, but their interiors began to look like gardens as well. While Rapson's Greenbelt House is probably the most extreme expression of this tendency, all of the early Case Study Houses bring greenery inside with potted plants and free-form planters, and employ ground treatments traditionally associated with outside areas, like brick pavers and tiles, in the domestic spaces. For Rapson, the benefits are visual and therapeutic, "drawing nature inside the house," he believed, "would help overcome the disadvantages of the city lot; it would offer a built-in view while giving a space in which to pursue healthful leisure-time activity."[8] By bringing nature inside the house, the view of the garden is internalized and the leisure activities that take place there are privatized. At the same time, domestic life is re-invested with the primal experience of communing with nature. The house becomes a glass enclosure around the nurtured kernel of family in nature.

As the living spaces opened up to the outside, the garden changed too. Manicured, artfully arranged, and lit, it began to be considered as part of the whole composition of the house. Garrett Eckbo, writing for *Arts & Architecture*, was the foremost proponent of this new style of landscape design. For Eckbo, the modern garden should be designed like the modern house, that is, as a three-dimensional space, the only difference being that "one discipline produce[s] roofed space and the other spaces open to the sky."[9] His garden designs echoed the modernist designs of the houses and extended the "space" of the house to include the whole suburban lot.[10] Is the garden-house relationship one in which "indoor" becomes "outdoor" or is it the other way around? he queried. Rejecting the traditional middle-class conception of the backyard as a place of work, Eckbo's gardens are spaces of relaxation, peopled with young adults, occupied children, and thriving plants carefully tended by the housewife in her "leisure" moments.

All of these architectural devices — the glass wall, the introduction of greenery inside the house, and the design of the garden to extend the space of the house — reinforced the link between open spaces of modern architecture and the new-found cult of gardening promoted by journals such as *Sunset* magazine. While opening the house up to views of nature, they helped to promote openness and visibility in the home as positive values in their own right. Transparency in the home was a watchword for a more modern, more democratic, and more emotionally satisfying family life.

People who live in glass houses

By the 1950s, the constant pressure required to keep up appearances began to be recognized as a source of tension, anxiety, possibly even unhappiness for the woman at home. Open plans and glass walls created a uniform and perpetual regime of vision, in which everything is visible, potentially under scrutiny, and exposed to evaluation. It is then perhaps not surprising that concerns began to be voiced about the visibility of suburban home life. In his *Crack in the Picture Window* of 1956, John Keats condemned the stifling conformity felt by housewives who were simultaneously isolated and exposed in the suburbs.[11] With suburban houses going up cheek by jowl in new subdivisions, with no intermediate planting, new residents found that the visual transparency of suburban life took some getting used to. While the lawn and the picture window were signs of belonging to this new community, they also began to trigger anxieties about conformity and the associated social pressures and pretense required to "fit in." Next-door neighbors could sneak the occasional peek in from a ground level window or through sliding glass doors. Picture windows enjoyed for their view onto the world became "problem windows" that needed to be covered with curtains, blinds or shrubbery to avoid the "fish bowl" effect. The view was ideally a one-way view.

Even in the Case Study Houses, we see increasing anxiety about the openness of suburban life. In Craig Ellwood's work for the program from 1952 to 1958, translucent panels replace the sliding glass windows favored a decade earlier, while Pierre Koenig wraps the public faces of his CSH 21 (1958) in steel, reserving the open walls for the most intimate areas of the house. One might speculate that with the rise of McCarthyism, what was once seen as neighborliness might contain the threat of surveillance. Or it may have been that the suburban homemaker increasingly felt the need for some "down time", away from the scrutiny of others.

Nature as well, once the epitome of benign communion, acquired in the atomic age new and threatening overtones. Smog alerts in post-war Los Angeles spawned new fears about the air and were accompanied by visible evidence of rusting plants and withering gardens. And of course fallout was on everybody's mind as an omnipresent danger, leading to popular hysterias about pitted car windshields and contaminated milk.[12]

The Case Study Houses, as icons of American domestic expansion in the post war era, reveal two fundamental aspects of a changing attitude to the natural landscape: first, that contact with nature as a part of everyday life was within reach of the middle class majority of the nation's citizens; and second, that nature enclosed within the suburban lot was a private realm for the nurturing of family life, ideally sheltered from scrutiny, preserved and protected as part of the American way of life. Both of these attitudes fed directly into the home shelter program. As the long-standing dream of home ownership was made available to a much larger segment of the population, it re-affirmed and strengthened the sense that each home was sacrosanct, a family fortress. And as the house was brought into a closer relationship with nature, the family backyard stood in for the protective buffer of the wide-open wilderness. Again, Craig Ellwood's inward-looking translucent-paneled houses communicated that sense of fragility and foreshadowed the completely inward-turning psychology that produced that other atomic age phenomenon — the family fallout shelter in the suburban backyard.

CONTAINMENT: THE BACKYARD BUNKER

The Cold War ideal: a fortress of solitude

When we consider that the Case Study House program was being realized at a time when atomic anxiety was at its height, it becomes intriguing to explore these open, transparent houses in the leafy

suburbs of Los Angeles in juxtaposition to a rising popular awareness of the threat posed by the atomic bomb. If we see the GI Bill and the interstate highway program as elements of a national housing strategy which directed new growth into the suburbs, it is intriguing to explore the next big housing initiative of the Federal government — the home "shelter" program — as both an extension of and a reaction to post-war expansion.

As the U.S. developed multi-megaton hydrogen bombs in the mid-1950s that could "take out" any size of city, and the Soviets followed suit shortly after, the U.S. shifted its civil defense planning from cities to suburbs. The early scenarios for urban evacuation and the provision of collective underground shelters had been replaced by the idea of the "family fallout shelter" — in which every house would be a fortress against the "enemy threat." Well adapted to the increasing suburbanization of the country, this approach to civil defense also corresponded to the individualism of American society, asking every citizen to invest in a home shelter and provision it for the impending apocalypse. Federal pamphlets such as *By, For and About Women in Civil Defense: Grandma's Pantry belongs in your Kitchen* exhorted responsible citizens to practice the pioneer values of their forefathers, stocking up for adversity, taking responsibility for their own protection and survival. In this sense, the idea of the "family fallout shelter" played directly into the American myth that the suburbs were merely a continuation of a long-standing national tradition of independent, self-reliant homesteaders.

Yet the suburbanite of 1961 was not isolated on a rural farmstead. Rather he or she was watching nightly broadcasts and reading daily newspapers which described escalating Soviet-American hostilities over Berlin and Cuba, practicing Civil Defense drills, listening to radio shows that were interrupted by emergency broadcast system tests. Their houses were equipped with NEAR repeaters plugged into household outlets, which would trigger an alarm the moment the Soviet missiles were determined to be heading toward American soil. On October 5, 1961, President Kennedy went on nation-wide television to exhort every American family to build a home fallout shelter, and authorized FHA home loans to be used for shelter construction. A week later, all commercial and private flights over the U.S. and Canada were banned from 11 am to 11 at night (2,100 flights) and 1,800 NORAD fighter planes, 250 Strategic Air Command B-47s, B-52s and RAF bombers flew sorties over Eastern seaboard cities simulating bombing runs.

While it was initiated and instigated by the Federal government, the "shelter craze" that swept the country in 1961 was fundamentally a popular reaction to a feeling that the American family was exposed and vulnerable to forces beyond their control. In this sense, it was a reaction to the expansionism of the post war period. This is how Margaret Mead understood the "shelter craze." Writing for the *New York Times Magazine* in 1961, she reminds her readers that "ever since we dropped the first nuclear bomb on Hiroshima,... we were no longer protected by fixed boundaries. This recognition," she continues, "activated many kinds of expansion," from extended defenses around the world and the exploration of new frontiers in outer space, to support for trans-national activities such as the United Nations, bilateral aid programs and the Peace Corps. Mead sees this expansionist activity as a "reaching out into membership in the human race, in a planetary community that existed de facto though not yet in theory." She then proposes that "this centrifugal movement" has spawned a countervailing "centripetal pull of fear": fear of mass destruction, of distant and alien peoples, and suggests that Americans who were "unprepared to take these unexpected giant steps turned inward, ... back in space and time, hiding from the future and the rest of the world, they turned to the green suburb, protected by zoning laws against members of other classes or races or religions, and concentrated on the single, tight, little family."[13]

If, as the government had argued, the suburbs scattered over the face of the land were a strategic advantage in civil defense, Americans began to see the corollary — that it was in the suburbs that they would ultimately encounter the fallout from a nuclear war. Thus, the view from above takes on an additional symbolic importance. Descending on the Angeleno house like industrial smog or the ashes that followed one of the many hillside firestorms of those decades, danger, in the nuclear age, would rain from above.[14] The horizontal expansion of the postwar era, that Margaret Mead described as a centrifugal movement outward to a planetary community, is replaced by a vertical relation to nature: one which looks up to the sky in terror and down to the ground for salvation. The home no longer relates to nature as a horizon into which one expands (as Rapson's Greenbelt House suggests), but rather as a vertical axis which must be guarded and fortified in retreat. Contact with nature, in this instance, is realized by digging into the ground. The family lawn provides the sod for the family fortress. The home fallout shelter is the ultimate expression of this paranoid protective impulse. (insert Figure 3 here)

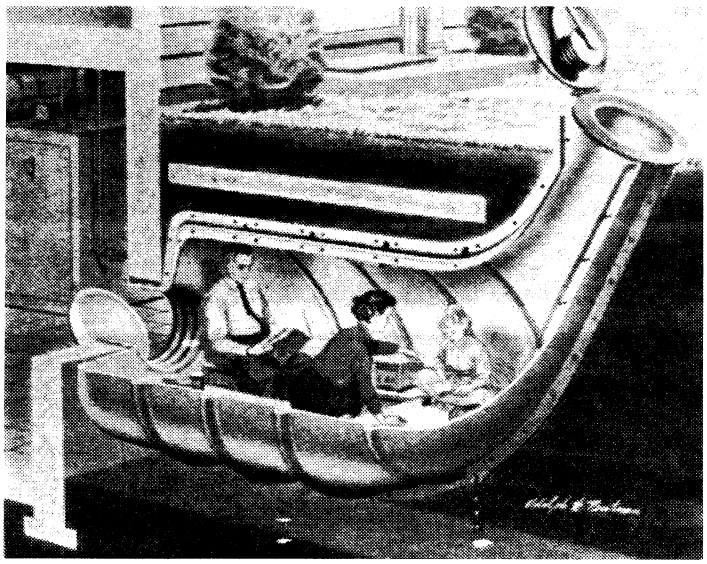


Fig.3. Pre-fabricated plastic home shelter designed by Arthur Bascomb. Life. *18 March 1957.*

Like Superman's isolated Arctic hideout (created during these years), the fallout shelter is an impregnable space dedicated to preservation of a "super" way of life. Shelters, survival enthusiasts were

told, had peacetime uses as well: they could serve as a teen hideout, a hobby space, and a second pantry — all suggestions which mirrored Superman's activities in his fortress — "getting away from it all," doing his hobbies like squeezing coal into diamonds and engraving metal with his x-ray vision, and mostly, storing his memories of his earthly achievements and his family origins (the city of Kandor protected under a glass jar).

The shelter is also the final solution to the "visibility problem" of the over-exposed suburban house, replacing the "space" of the suburb with the "security and containment" of the shelter. Thus, the open house, so prized in the idea of "Californian living," engendered, in the short space of fifteen years, an almost complete reversal as the nation scurried into the dark, private and contained underground spaces of the backyard shelters. Writing of that other post-war icon, the flamboyant and media-savvy Howard Hughes, the journalist James Phelan asked, "why did he let himself become a man that couldn't stand to be seen?"[15]

> *At the head of [Hughes's] bed, there was a projector, and on the side near his hand, the control mechanism with which he projected his films, always the same ones, while he always ate the same dishes. We find here a metaphor for vision, the Socratic myth of the cave (a dark chamber), which, carried to its conclusion, required everyone to turn their gaze toward the source of light ... to contemplate the real which is invisible.*[16]

Nestled in its shelter, the model family becomes the "real" to be protected, while the world outside is shut out, populated, in the imagination of the shelter dwellers, by demons, threats, and contagion.

Architecture underground

By the end of the 1950s, the decade-long love affair of Americans with the "transparent" suburban house had run its course. While the suburbs ensured that domestic life continued to be nestled in a green setting, the visibility (and vulnerability) of large sheets of glass had led modern architects to turn to translucent rather than transparent glazing, inward-turning gardens and tastefully-designed fences around private greenswards.

One of the last Case Study Houses, CSH 24 by A. Quincy Jones and Frederick Emmons, fuses the containment of the shelter with the indoor-outdoor relationship that had become a hallmark of the Case Study Houses. Published in *Arts & Architecture* the same month that Kennedy gives his fallout speech, this project for a 260-home tract on a former hobby farm near Northridge in the San Fernando Valley was meant to be the Case Study House "program's foremost statement about multiple suburban housing."[17] Working for the developer Joseph Eichler, architects Jones and Emmons developed a master plan and one of five prototype houses that would make up the subdivision.

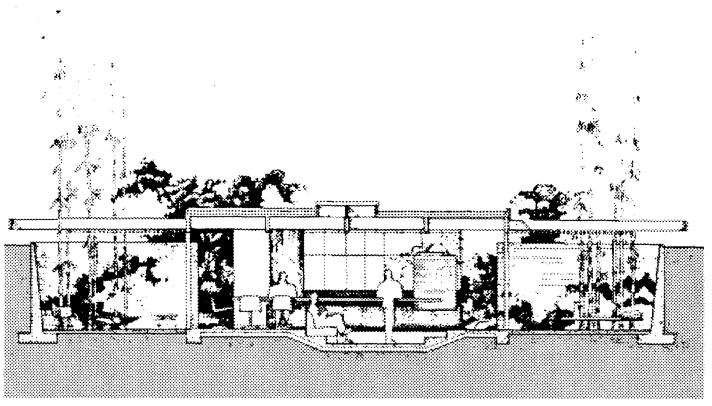


Fig.4. CSH 24. Model for a 260-home Eichler tract. A. Quincy Jones and Frederick Emmons. 1961

The prototype house, consisting of four bedrooms and a small living area extended by "sun gardens" and "shade gardens" on each side, is almost entirely below grade. Excavated earth is piled on three sides of the house, leaving only the carport easily accessible from the ground plane. The result is a case study house that offers total visual privacy. It is ironic that this project, which was the program's most ambitious community development, is made up of houses that are completely isolated from each other. Their below-grade "gardens" and earth-bermed walls were meant to visually and acoustically buffer each family from others in the neighborhood. The clerestory windows that surround the house read like a page taken from the FCDA shelter manual.[18] The small living room in the center of the house descends even deeper into the ground, in a conversation pit, mirroring the indoor pool (an emergency reservoir?). There is one exit only from the four bedrooms, and that is past the "multi-purpose room," a surveillance station positioned at the entry which is either a home office or in-law suite. The roof, not incidentally, offers protection from brush fires. Even the gardens are buried, and only the roofs hover above the endless sea of the surrounding landscape.

LEFT OVER LANDSCAPES

In the 1960s, we see the process of "containment" carried through all the levels of the American landscape: roads become limited access freeways, shopping streets become limited access "malls," renovated downtowns become inward looking "megastructures" (as in Victor Gruen's plan for Dallas-Fort Worth), and neighborhoods are set up as restricted communities according to class, race, and often religion. The psychology of "containment" begins with protecting the house and garden, but once unleashed, it infects all aspects of public lands and landscapes. To contain the threat, whatever it may be, one must first identify difference, and then isolate one use from other. Like conservation before it, "containment" is a scientific paradigm applied to social values.

In closing, we move up into the air, like Charles and Ray Eames in their *film Powers of Ten*, and look down on the landscape that has been created by "Californian living." From the air we see each of the many contained and privatized realms of the urban infrastructure — backyard, house, suburb, downtown mall, shopping center, freeway — fed and supported by the proliferating agri-business and military-industrial complex. As piece after piece of the public, civic, and national space becomes contained, protected and policed through the 1950s and 1960s, the rest of the national space is abandoned to "wasted" space, lost space, the transformation of "public space" into a no-man's land. It is in this "leftover" space that we see the consequences on the larger landscape of the abstract and individual relation to nature so well represented by the Case Study Houses. Space abandoned and neglected becomes a site for the proliferation of chemical dumpsites, parking lots, and junk yards. The aerial view allows us to criticize both the isolation and the environmental consequences of the suburbanization exemplified by post war Los Angeles. "Californian living" had indeed swept across the nation in the 1950s and '60s, and its legacy endures today.

NOTES

[1]Homi K. Bhabha, ed., *Nation and Narration* (London and New York: Routledge, 1990), 1-7.

[2]And with their front lawn. See Beatriz Colomina, "The Lawn at War" and Mark Wigley, "The Electric Lawn," both in *The American Lawn*, ed. Georges Teyssot (New York: Princeton Architectural Press, 1999).

[3]Frederick Gutheim, "Greenbelt Revisited," *Magazine of Art* (January 1946).

[4]In her essay originally published in 1979, Rosalind Krauss remarks on the dual nature of the grid: first, "a tiny piece arbitrarily cropped from an infinitely larger fabric," and second, "an introjection of the ... world into the interior of the work ... a mode of repetition." See Rosalind E. Krauss, "Grids," *The Originality of the Avant-Garde and Other Modernist Myths* (Cambridge, MA: MIT Press, 1985), 18-19.

[5]CSH 4 by Ralph Rapson, *Arts & Architecture* (August 1945), 32.

[6]Rapson, *Arts & Architecture* (August 1945), 33.

[7]Sylvia Lavin has analyzed in some depth Neutra's "intense concentration on dismantling conventional barriers between inside and out." The Avant-Garde is Not at Home: Richard Neutra and the American Psychologizing of Modernity," *Autonomy and Ideology*, ed. R.E. Somol (New York and Montreal: Monacelli Press / Canadian Centre for Architecture, 1997), 189.

[8]Jane King Hession, Rip Rapson and Bruce N. Wright, *Ralph Rapson: Sixty Years of Modern Design* (Afton, MN: Afton Historical Society Press, 1999), 37.

[9]Marc Treib and Dorothée Imbert, *Garrett Eckbo: Modern Landscapes for Living* (Berkeley, Los Angeles, London: University of California Press, 1997), 21.

[10]Esther McCoy says of Eckbo's gardens, "What was exciting at the time about the landscaping was that it looked designed." Esther McCoy, "Arts & Architecture Case Study Houses," *Blueprints for Modern Living: History and Legacy of the Case Study Houses*, ed. Elizabeth A.T. Smith (Los Angeles and Cambridge, MA: MOCA / MIT Pres, 1998), 23.

[11]John Keats, *The Crack in the Picture Window* (Boston: Houghton Mifflin, 1956).

[12]Spencer R. Weart, *Nuclear Fear: A History of Images* (Cambridge, MA and London: Harvard University Press, 1988),187, 190. Weart cites Nahum Z. Medalia and Otto N. Larsen, "Diffusion and Belief in a Collective Delusion: The Seattle Windshield Pitting Epidemic," *American Sociological Review* (1958): 180-6.

[13]Margaret Mead, "Are Shelters the Answer?", *New York Times Magazine* (November 26, 1961), 124.

[14]Disastrous summer brush fires blazed through the new suburbs of Los Angeles throughout the 1950s and '60s, aided by large, unprotected windows and wood siding, the lack of clearance between houses and native shrubs, and the narrow streets of the hillside communities. In 1955, the Refugio fire between Santa Barbara and Ojai burned 7,000 acres; in 1956, 44,000 acres burned in Orange and San Diego counties; 1958's Lake Elsinore fire consumed 68,000 acres. In 1961, two fires swept through the most exclusive districts of Los Angeles, destroying 43 houses in Laurel Canyon and the Hollywood Hills and 500 houses in the Santa Monica hills, Bel Air and Brentwood. See Richard Lillard, *Eden in Jeopardy. Man's Prodigal Meddling with his Environment: The Southern California Experience* (New York: Alfred A. Knopf, 1966), 109.

[15]Journalist James Phelan, *Howard Hughes* (Paris: Éditions Internationales Alain Stanké, 1977). Cited in Paul Virilio, *The Art of Disappearing*, 28.

[16]Virilio, *Disappearing*, 31.

[17]Amelia Jones and Elizabeth A.T. Smith, "The Thirty-six Case Study Projects," *Blueprints*, 75.

[18]Indirect daylighting like this would find its most widespread application in the California school system a few years later, when the Board of Education stated its preference for "distraction-free" school environments, forcing a generation of California school children to be educated in fluorescent-lit, air conditioned, viewless classrooms in the sunniest state in the nation.

OfficeLand:
History, Ecology, and the Plant-in-the-office

WILLIAM W. BRAHAM
University of Pennsylvania

"What new images and forms of the body and kinds of powers that regulate it are coming into existence contemporaneously with the dramatic shifts in political economic organization that is being brought about by flexible specialization?"
—Emily Martin[1]

"Cubicle Dwellers really have no history. Suddenly, there they were, in every office everywhere. If you look at old pictures of offices, the workers just sat around with no walls separating them. They could see from one wall of their company to the other. They were all typing on big loud typewriters. Nowadays, try to find an office like that. Good luck. It won't happen. I guarantee. If you do, good for you. But you won't. It doesn't work like that anymore." *—The Cubicle Dweller's Survival Page*[2]

What kinds of histories can we offer to explain the office, that ubiquitous and ever more connected place where Americans spend their working lives? Its formal development closely follows the progress of modern, globalizing capitalism, and we can trace its latest transformations, as businesses morph and change into ever more flexible and agile configurations, but we need more than a chronicle of its features. How do we understand the ecology of that vast landscape and explain the evolution of its particular habitats, inhabitants, and the habits that join them.

My invocation of ecology is not casual. The model of a complex system guided by the inexorable logic of natural selection informs nearly every aspect of this new configuration, from management philosophies to facilities planning to concepts about the health of employees. As Emily Martin observed, the "the complexly interconnected world in which we now live seems to say that both the [complex systems] model and its implications fit the current nature of reality. All is in flux, order is transient, nothing is independent, everything relates to everything else, and no one subsystem is ever in charge."[3] Grow or Die has become the watchword of companies, workers, and their tools in the most brutal Darwinian sense, though the new ethic demands a growth in complexity and interdependence, not merely in size or power.[4] This is no longer the crude social Darwinism of the first industrial revolution. Robert Wright argues that mutually beneficial relationships, Non-Zero sum interactions, in contrast to zero sum, winner-takes-all, games like war have produced our increasingly complex and productive organizations, from chiefdoms to the nation state to the global economy.[5] The new workplace is explained both as a result of these evolutions in the market-as-a-system and as a specific ecological niche increasingly perfected for the accommodation of the mobile worker.

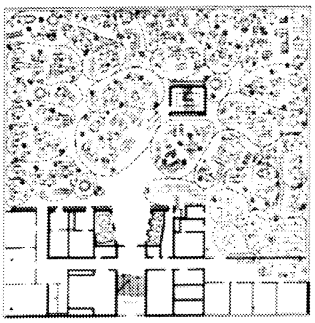
To understand the office as an ecological system, the analogy must be applied rigorously, providing explanations of the form-generating processes without reference to external plans, goals, or notions like progress. In the terms defined by Gilles Deleuze, explanations of the office-as-a-system must include accounts of its content and expression, the content of work and working and its expression as a workplace in the activities of work.[6] Such histories begin from the bottom-up, recognizing that each new development emerges from aspects of the previous formation, which also persists in some altered form. There are plenty of rigidly hierarchical offices and executives within the hotels, dens, and clubs of the new workplace.[7] The fundamental premise of such an analysis could not offer a greater challenge to romantic historiography: "to conceive the genesis of form (in geological, biological, and cultural structures) as related exclusively to immanent capabilities of the flows of matter-energy-information and not to any transcendent factor, whether platonic or divine."[8] Which means that the specific form of the office emerges, blindly, from the interactions of its many participants, and not from the intentions of its planners. Still, progress is promised in many invocations of systems theory, offering greater connectivity and a smoother flow of information as virtues themselves. Such goals are implied at many levels and as "a drive toward increased perfection, or a promised land, or even a socialist pot of gold at the end of the rainbow."[9] How can we understand offices without such goals, how do we examine the history of an emergent form?

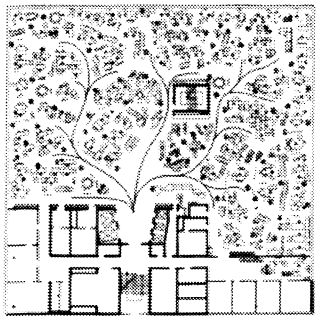
Writing an architectural history without notions of progress requires measurements of accomplishment other than increased flow or complexity and historical subjects other than the system itself. In his book Pandemonium, Branden Hookway charted the ascendancy of systems thinking in the economic, political, and military circles after World War II and the steady transformation of the city-as-a-citadel into the metropolis-as-a-system. He recorded the influence of those ideas on the development of the modern office and offered a compelling image of its new architecture: a computer screen, white noise generator, and plant sitting on a Herman Miller Action Office cubicle. But if the office is really an emergent formation, then it has

been shaped by the everyday tactics of its occupants, as well as the logic of the system-as-system. Biological life modified the geological habitats it territorialized, and cultural life is now modifying that biological milieu genetically. Even the prescient Quickborner Team, who planned the first office landscape in the 1950s, could not have imagined the dreary conditions lampooned by Scott Adams in the cartoon strip Dilbert.[10] They might argue that better flows of communication would relieve the suffering of the cubicle dweller, but it is precisely the unpredictable resistances to more efficient flows, the accretions, reinterpretations, and even sabotage of the office-as-system, which shape the actual formation we now encounter. As Mies van der Rohe advised in his own encounter with industrialization: "Let us accept changed economic and social conditions as a fact. All these take their blind and fateful course. One thing will be decisive: the way we assert ourselves in the face of circumstance. Here the problems of the spirit begin. The important question to ask is not "what" but "how."[11]

CUBICLES

While the small office has a long history, large bureaucratic offices only appeared during the American Civil War, as a result of the dramatic growth in industrial production. The techniques for handling the increase in paper work began a steady exchange between the office and the factory that continues to this day, though the two sites have industrialized at different rates. Office mechanization only took off after World War I, with new machines and furniture being patented and produced at a furious pace. But even in the 1930s as Lewis Mumford recorded the full ascendancy of Frederick Taylor's techniques of scientific management and Henry Ford's assembly line, he noted the increasing importance of "form, pattern, configuration, organism, historical filiation, [and] ecological relationship" in the arts, medicine, and planning. "We now realize that the machines, at their best, are crude uncertain approximations compared to the flying duck: our best electric lamps cannot compare in efficiency with the light of the firefly: our most complicated automatic telephone exchange is a childish contraption compared with the nervous system of the human body."[12] The image of nature was transformed from that of the machine to that of a system.





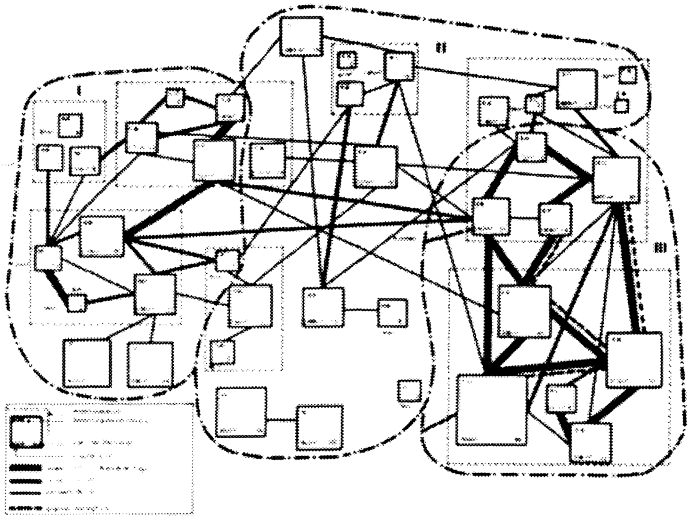
The acceleration of those ideas after World War II became evident in research agendas and the further automation of the factory. And even as highly rationalized, seemingly mechanized offices were being completed, like the CIGNA headquarters by Gordon Bunshaft and Florence Knoll, the Quickborner management consulting group were quietly inventing a new form of office layout: the Bürolandschaft or office landscaping.[13] Based on a rigorous analysis of the paths of communication within an office, charted through exhaustive interviewing techniques and diagrams, they dissolved the walls of the office-as-production-line. The analogy to a natural landscape was evident in their pathway diagrams, and in the compelling idea that the form of the office layout was not designed, but emerged from the process of analysis. Their detailed diagrams of communication paths and intensities were the tools that generated the landscape plans, which resembled nothing so much as the meandering "desire paths" that animals, savages, and undergraduates chart with their feet.

Those ideas were rapidly communicated throughout the planning community and by 1964 the Herman Miller furniture company had formalized them in a revolutionary line of office equipment: Action Office I. Under the guidance of their research director, Robert Probst, they developed the first moveable panels, worksurfaces, and storage units that came to define the cubicle and made office landscaping possible. By the late 1960s, the effects were visible everywhere, and the concept of organic planning offered a new kind of proportion or regulating system for office layouts:

> *The rigid patterns of office layout that had become standard during World War I, assumed the character of time worn tradition by 1960. . . . The executive cubicles that fringed the perimeters were themselves scaled to the window bays, while in the interior, precise mathematical relations governed the placement of desks, lighting and equipment. In effect, a kind of classical harmony had been achieved so that, as in a Palladian façade, a logical order reigned that united the smallest part with the whole. But it failed for precisely that reason. Classical systems are inherently inflexible. Since they embody intellectual-aesthetic ideals of harmony and order, to disrupt any one element is to destroy the whole. Change is inadmissible. When a classical order is imposed upon an organic system - one whose parts are related by functions and processes that are themselves in flux - the result is apparent order and actual chaos. An office is such an organic system. Its organicism, however, is not revealed in those hierarchical charts that bear so curious a relation to feudal concepts of the social orders on earth and in heaven. But, since the actual relations between office personnel defy the caste system codified in charts and embodied in layouts, attitudinal and physical barriers were created that seriously blocked lines of communication.*[14]

In close sympathy with structuralist ideas in anthropology and sociology and exhibitions like Architecture without Architects and Learning from Las Vegas, the natural forms of Bürolandschaft planning offered anti-authorial design strategies that appealed to the generation of '68.[15] As Francis Duffy reported about his own efforts to spread such ideas, "Anthropology with its rigorous comparative techniques, its search for cross-cultural patterns between artifacts, behaviour, societal norms and their technologies was an obvious model for architectural research. The interrelated three-part model

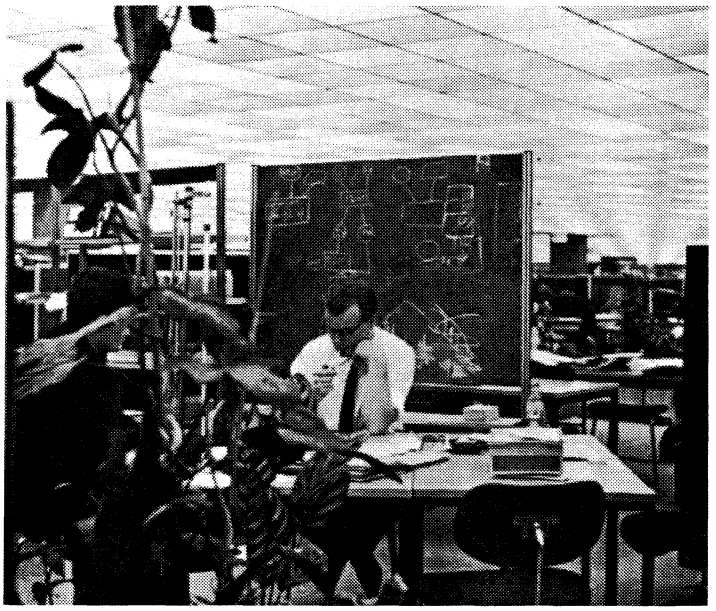
of buildings, people and technology . . . was firmly implanted."[16] The techniques of the Quickborner Team were quickly applied to hierarchical offices in Europe and then America. The landscaping of the management offices of Dupont Nemours 1967 make the paradigm shift clearly visible.



The fashion for total landscaping according to the organic methods of Quickborner passed relatively quickly, though its components, especially the cubicle, became a standard part of the office layout palette. In Duffy's observations at the time, he reported a spectrum of different "scenery" types selected according to business type and location: cellular, group, open plan (though rectilinear), and landscaped. In his most recent summary, he explained the dynamic variety according to the interaction among four types of office work and the arrangements to which they lend themselves: individual processes (Hive), group processes (Den), concentrated study (Cell), and transactional knowledge (Club). The impact of new communications technology has been overwhelming, both in terms of physical accommodation and redefining office arrangements, introducing new possibilities like hoteling, hot-desking, and tele-commuting, whose signature image would have to be the employee in a coffee shop with a laptop computer and cell phone. Nevertheless, the rationalized layout of the factory-like hive retains an important place in the office, and it is the combination of the older ethic of discipline and control with the three-sided, low-walled cubicle that created Dilbert's world. It is at that level that the strategies of resistance and accommodation become so interesting, especially when we ask "how" people have asserted themselves in the face of circumstances.

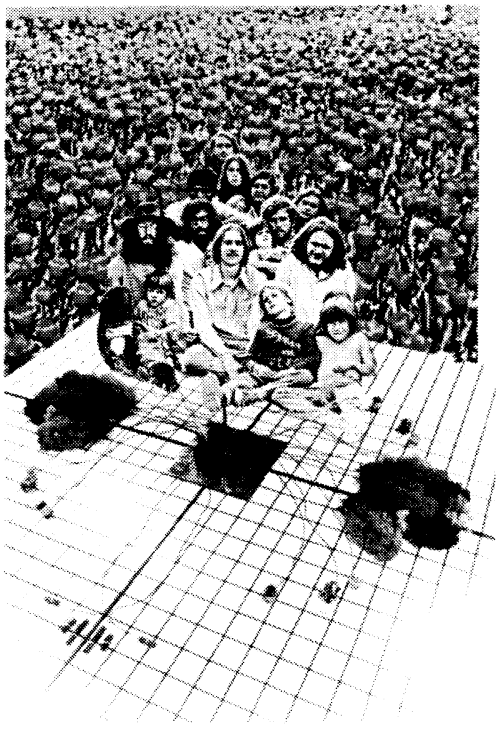
PLANTS

One of the most intriguing and largely unexamined histories within the new workplace would have to be the use of plants. Even in the most perfectly preserved of the hive-like arrangements of the 1950s, such as the Bunshaft's CIGNA offices, we can detect a more recent photograph by the appearance of the tropical plant-in-a-pot. The deployment of indoor planting strongly characterized the Büronlandschaft layouts from the beginning, though they were later at some pains to explain that "landscaping" was a much larger planning idea and not merely associated with the decorative use of plant materials. Plants served both as another form of mobile space divider, and as non-orthogonal elements to further disrupt the older image of the office-as-factory, introducing new suggestions of the office as home or cafe.



I have found no rigorous history of the indoor plant, though one can find evidence of the plant-in-the-window in almost every period and locale. Those plants would have been relatively local plants whose growing season was extended by being brought indoors. The possibility of the plant in the middle of the room began with the importing of tropical understory plants in the mid-nineteenth century, the palms, ferns, and rubber plants of the Victorian glass house (remember the desperate plant transplanting mission of Captain Bligh and the Bounty). The totally mobile indoor plant was only made possible by the refinement of the fluorescent light in the 1930s and the subsequent increases in interior lighting levels, which are nevertheless still lower than exterior levels by at least an order of magnitude. But although the physical conditions existed in the immediate post-war period, we only see a real increase in the use of plant material in the office after 1970, when office landscaping converged with new concerns about pollution and environmental quality.[17]

Perhaps the most prescient image from that period was Superstudio's "network of energy and information extending to every properly habitable area," a network in which "nomadism becomes the permanent condition: the movements of individuals interact, thereby creating continual currents . . . as with fluids, the movement of one part affects the whole."[18] That extended, distributed network used the natural landscape as the condition of enclosure. Mountains, cactuses, and meadows appear in their different proposals, like so much furniture, and their final image uses a sea of tulips as a backdrop for a human gathering at one of the node points of the network. The plant-in-a-pot carries a whole host of such referents in its mobile form and their deployment came to characterize a host of newly green urban habitats like the fern bar and the atrium, which has a complex history that parallels the plant-in-the-office.



The plant-in-the-office attained an even more powerful role after the tightened ventilation standards of the energy crisis produced the "sick building syndrome" of the 1980s.[19] With the new awareness of indoor air pollution, growing plants were discovered to not only produce oxygen, but to metabolise toxic substances like benzene and formaldehyde. They became tools for environmental management: indicators of environmental quality, like the canary in the coal mine, and a technique for improving it. This made the idea of the office as an ecological niche more technical, and in the spirit of "nothing is independent, everything relates to everything else," the worker immune system became one more element in the business-as-complex-system. Health maintenance was directly linked to productivity and became another object for management. [Fig. 6]

Understanding the plant-in-the-office as a mobile decorative element and a tool for health maintenance, allows us to understand the content of the workplace as more than productive work. In this sense, work and health operate as a kind of conceptual pair, partly opposed, but even as health became a product for management, the idea of work was modified by reference to health. Frederick Kiesler arrived at a similar conclusion in the late 1930s, when he applied complex systems analysis to design, arguing that man coevolves with his natural and technological environments. They each change one another, and even a quantity as rigidly objectified as the "needs" on which functional planning is based can be shown to change over time as well. His most astute observation, and one which certainly puzzled the readers of the Architectural Record, was that health was the final criterion of building design.[20] The extension of the complex systems model to the most intimate activities of the human body and to the most anonymous process of the world marketplace make evident how important such an ambiguous measure can be. While health remains a central concern of doctors, and is now a regulated product of the HMO, our experience of healthiness belongs to a much broader set of social and cultural conditions. As Ivan Illich observed, healthy can be used as an adjective to describe any number of activities, and the aspirations for the plant-in-the-office exemplify that broader sense of the term.[21] In the generic sense, health is an index of comfort, happiness, and relief from suffering and, like aesthetics or leisure, opposes the reduction of the human condition to needs that can be satisfied by work. I have heard two doctors express the same urge, to somehow write prescriptions for their patients that provided a change of life, something more than a vacation and less than a pilgrimage.

UNDER-STORY LIGHT

As a designer, I have spotted another development related to the plant-in-the-office. The first Bürolandschaft schemes eliminated walls and rectilinear arrangements, and introduced the mobile plant, but they were all deployed below the same ceiling of flatly uniform light. That pattern of office illumination had originally been conceived as wholly natural. It had been modeled on skylighting, and the "cool-white" lamps that powered it sought to precisely reproduce the cool color of illumination transmitted by a cloudy sky. But the uniformity of the lighting and its tendency to appear as glaring

reflection in computer screens eventually overrode its appeal as a natural condition. Through the 1980s and 1990s, schemes of indirect lighting with darker ceilings and dappled patterns of distribution became the hallmark of healthier and more comfortable offices. The similarity of that dappled light with the lighting of the forest understory should remind us that the tropical plants that now serve as indicators of the healthy office belonged to the original ecological niche in which human life evolved. Does this new formation-office plant and dappled light-indicate an unconscious attempt to return to those original conditions? It should certainly remind us that, like the factories that preceded them, the new forms of working must still operate with our slower biological bodies. The everyday efforts to establish a healthy workplace offer a stubbornly inventive form of resistance in the new workplace, finding forms of expression, for example, in the preference for offices with plants and dappled light.

NOTES:

[1]Emily Martin, *Flexible Bodies: Tracking Immunity in American Culture-From the Days of Polio to the Age of Aids* (Boston: Beacon Press, 1994), 245.

[2]The cubicle dweller's survival page. http://www.suba.com/~neveu/

[3]Martin, *Flexible Bodies*, 250.

[4]"'Grow or die' state of organizations," in Robert Probst, *The office-A facility based on change* (Elmhurst, Illinois, The Business Press, 1968), 13. G. Ainsworth-Land, *Grow or Die: The unifying principle of transformation* (New York: Wiley, 1986).

[5]Robert Wright, *Non-Zero: The logic of human destiny* (New York: Pantheon Books, 2000).

[6]Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (Minneapolis: University of Minnesota Press, 1987).

[7]Duffy calls them hives and describes the evolutionary interaction among the types of work and work place. Francis Duffy, *The New Office* (London: Conran Octopus, 1997), 60-7.

[8]Manuel De Landa, *A Thousand Years of Non-Linear History* (New York: Swerve Editions, 1997), 263.

[9]De Landa, *A Thousand Years of Non-Linear History*, 273.

[10]*http://www.peanuts.com/comics/dilbert/*

[11]Ludwig Mies van der Rohe, "The New Era," in Philip Johnson, *Mies van der Rohe* (New York: The Museum of Modern Art, 1953)

[12]Lewis Mumford, *Technics and Civiliation* (New York: Harcourt, Brace and World, 1934), 371.

[13]A revised version of their 1963 publication. Ottomar Gottschalk, *Flexible Verwaltungsbauten: Panung Funktion Flachen Ausbau Einrichtung Kosten Beispiele* (Quickborn: Verlag Schnelle, 1968).

[14]"From Grid to Growth," *Progressive Architecture* (November, 1969): 100.

[15]Bernard Rudofsky, *Architecture without Architects: A Short Introduction to Non-Pedigreed Architecture* (New York: The Museum of Modern Art, 1965). Robert Venturi, Denise Scott Brown, and Steven Izenour. Learning from Las Vegas (Cambridge: The MIT Press, 1972).

[16]Francis Duffy, *The Changing Workplace* (London: Phaidon Press, 1992), 3.

[17]The USDA records the amount imported tropical foliage plants for interior applications. They showed an increase from $27.7 million in 1970 to $313 million in 1980 to $521.4 in 1985. Stuart D. Snyder, *Building Interiors. Plants. and Automation* (Englewood Cliffs, NJ: Prentice Hall, 1990), 7.

[18]Emilio Ambasz, *Italy: The New Domestic Landscape. Achievements and Problems of Italian Design* (New York: Museum of Modern Art, 1972): 240-51.

[19]A summary of "The Indoor Air Quality Dilemma" and "Biological Solutions to Indoor Pollution." In Stuart D.Snyder, *Environmental Interiorscapes: A Designer's Guide to Interior Plantscaping and Automated Irrigation Systems* (New York: Whitney Library of Design, 1995)

[20]Frederick Kiesler, "On Correalism and Biotechnique: A Definition and Test of a New Approach to Building Design," *The Architectural Record* (September, 1939): 60-75.

[21]Ivan Illich, *Medical Nemesis: The Expropriation of Health* (New York: Bantam Books, 1976).

Situating the Red House

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In broad narratives of mid-nineteenth-century British architectural history, the Red House maintains a far greater iconic status than many of the large public projects of the time. Designed by architect Philip Webb for the noted Arts and Crafts reformer William Morris, and constructed in 1859, the house is still regarded as a pioneering example of Arts and Crafts values (straightforward construction methods, modest planning, convenient interior layout). The aim of this paper is twofold: firstly, to provide a brief review of the slight changes in the assessment of the house, prompted by shifts in the historiography of the modern movement; and secondly, to argue, through a sketch analysis of some of the house's spatial aspects, for a more attentive treatment to the particular physical and cultural context of artifacts, even within the constraints of broader historical surveys. Such attention, I would argue, would productively challenge the persistent tendency towards historical narratives based on the opposition between innovative and conservative tendencies.

THE RED HOUSE AND THE HISTORIANS

The Red House did not seem to figure prominently in accounts of British architecture until the end of the nineteenth century. As has been pointed out by historian Sir John Summerson, it received little critical attention from contemporary journals when it was built. There was little reason at that time as to why it should merit notice. It was a modest house, and the first independent commission given to its young architect. The client, William Morris, was a young bohemian of independent means, just a few years out of Oxford - not the major national figure he would become twenty years later. And Philip Webb, the architect, was notorious for his resistence to publicity, refusing to have any of his work published during his lifetime. But it would be overstating the case, as Summerson went on to argue, that its lack of national press coverage meant that the house had little or no contemporary influence. The circle of visitors it accomodated during the Morris family's brief six-year ownership included some of the most prominent artistic figures of the day. It was a social and artistic circle which would later attract an important group of clients around what became known as the Arts and Crafts Movement. Any accounts of life in the house under Morris's ownership, we owe to brief passages in the memoirs of members of this artistic circle, by Georgiana Burne-Jones (wife of painter Edward Burne-Jones), and others.

Apart from Pre-Raphaelite biographies, the first critical evaluation of the architecture of the house may be found in Hermann Muthesius's *The English House* (*Das Englische Haus*) published in Berlin in 1904-5, in which he characterized the house as " the first private house of the new artistic culture, conceived as a unified whole inside and out, the very first example in the history of the modern house." (1) Muthesius's description of the house was accompanied by floor plans and a black-and-white photograph of the rear garden. It was not until 1936, however, and Nikolaus Pevsner's *Pioneers of the Modern Movement*, with its significant subtitle, *From William Morris to Walter Gropius*, that the link between Morris's design reforms and later reforms in German industrial design and education exemplified by the German werkbund and the Bauhaus was made explicit. (2) (Muthesius himself, of course, was a key figure in this narrative thread). Pevsner cites the picturesque qualities of the house, the honest construction of its plain red brick walls, and the overlaid pointed and segmental arches of its window openings, mentioned previously. He also stresses its middle-class affiliations, its exterior expression of interior demands, the rustic simplicity of its interior, and the soundness rather than brilliance of its architect.

H-R Hitchcock, whose *Architecture. Nineteenth and Twentieth Centuries* successfully resists the temptation to emphasize nineteenth-century architectural history as prophetic of Modern Movement developments, may be the first survey historian to provide an architectural ancestry for the house. (3) In a chapter on High Victorian Gothic developments in England, Hitchcock notes the well-laid brick walls, the informality of the novel plan, the high roofs and red tile, the multi-arched window openings attended to by previous commentators. However, in accordance with the typological emphasis of the text, he connects these features to Butterfield's vicarages of the 1840's, and notes that Webb had worked on similar domestic projects while working (as did Morris) in the office of G. E. Street in the early 1850's. (4) In a later chapter on nineteenth-century Anglo-American domestic planning, Hitchcock expands on the important role played by the parsonage house in the early nineteenth century. As a model, the parsonage, by the efficiency of its domestic plannning, offered a combination of economy, dignity,

and amenity, to a family of modest means. Hitchcock cites as examples, Butterfield's complexes of church, vicarage, and schools, such as Coalpit Heath and Baldersby St James developed from earlier Tudor Pictureque parsonages, noting their attention to the amenity of rooms, variety of window size and shape, and their relatively generous circulation. (5) Hitchcock concludes this chapter with the Arts and Crafts houses of Shaw and Voysey in the U.K., and Stanford White and Frank Lloyd Wright in the U.S. When he returns to refer to the Red House in the context of this discussion, it is to claim that it is "considerably less revolutionary than has sometimes been supposed." (6)

Hitchcock's placement of the Red House in the context of wider developments in domestic planning, based in particular on the model of the parsonage, set the terms of a revised dominant narrative in more recent histories. The first chapter of British historian Kenneth Frampton's *Modern Architecture. A Critical History* (1980) begins with a quote from Morris. (7) In this chapter, Frampton's account moves from the English Gothic Revival movement to the Arts and Crafts movement, culminating in the turn-of-the-century Garden City planning movement, and uses Morris as a central figure. He makes link between Pugin and the 'craft ideals' examplified by the Red House, via Ruskin and the Pre-Raphaelite painters of Morris's acquaintance, also noting the precedents of Street and Butterfield's vicarages. Frampton's account adds to the prevailing narrative, brief references to the relevance of Morris's pre-Raphaelite intellectual milieu, and a new emphasis on house's sensitive siting and use of local materials. This passage is illustrated by the usual rear garden view of the house and its floor plans.

More specific recent treatments of the house have tended, in their expansion of the narrative conventions mentioned already, to suggest further lines of enquiry. In a 1986 article on the house, Peter Blundell-Jones clearly disagrees with the emphasis on functionality and autonomy promoted by commentators such as Muthesius and Pevsner. (8) He situates the house more forcibly in the intellectual context of Puginian and Ruskinian doctrines (both influential on Webb) and cites again Street and Butterfield's parsonages, illustrating Butterfield's Alvechurch rectory (1855), and Street's Church Cottages at Boyne Hill (1857) as architectural forebears. He also delineates the circumstances of the commission, and provides a clear analysis of the siting and spatial organization of the house, using Webb's original drawings and new color photographs. In his treatment of the house's critical reception, Blundell-Jones suggests a repeated overemphasis on generalized picturesque qualities, common to both the accolades of Arts and Crafts admirers, and the condescension of classicist critics like Summerson. Very pertinently, Blundell-Jones opens up the word 'function,' as applied to the house, to a historical reading involving aspects of symbolism, ritual and ceremony. This tantalizing suggestion, however, remains at the level of a general semantic redefinition, and doesn't animate any major new departures the specific analysis of the house. Phaidon's *Architecture in Detail* series devotes a volume to the Red House, copiously illustrated by photographs and Webb's drawings. (9) The volume opens with a loving introduction by Eric Hollamby, owner of the house since 1952, which insists on the significance of Morris's literary intent, citing aspects such as its location on Chaucer's pilgrims' route to Canterbury. Again, these hints remain tentative and undeveloped.

The modifications traced here in the particular role played by the Red House in the plot of nineteenth-century and twentieth-century architectural histories, reflect the increasing influence of a broader cultural history on the narrative conventions of these histories. The houses's introduction, begun by Muthesius and circulated by Pevsner, as a revolutionary originator of Arts and Crafts principles, has been expanded to include its role as part of a wider currents of the domestic reform of bourgeois housing types. These shifts in the narrative, although significant, are attended by certain ambiguities: although no longer seen as completly originary and innovative work, the Red House continues to be illustrated more prominently (in lectures and books) than the parsonage and cottage models with which it is now usually linked, showing the persistence of the iconic pattern set by earlier modern movement histories of the 'instrumental' kind, to use Tafuri's term. Thus it continues, in representing a large part of the story of nineteenth-century domestic developments, to be linked with *innovation.* Paraoxically, it is also linked, implicitly at least, with *conservatism*, as typical of ongoing broader evolutions of modest domestic types. This conservative account, however, leaves unexplained both the specific attributes of the parsonage and other models to which the house is ostensibly related, and the specific transformations of such models the house might suggest. Thus, the enfolding of the house into a more complex cultural narrative has merely expanded an account based on successive innovations, to one based on the oscillation between innovation and conservative typicality. Using the proposal that any artifact effects a *specific transformation* of cultural practices and material, the remainder of my paper will be devoted to suggesting that two aspects of Webb's design might offer clues to a fuller reading of the Red House: its siting and garden design, and selected spatial relationships within the house.

RED HOUSE: GARDEN AND SITE

The most usual illustration of the Red House, a photograph of the rear garden side of the house from the south-west, shows a foreground of lawn with a herbaceous border arrangement - a layout reflecting developments in the garden design after Morris's brief tenure during the 1850s. This view does emphasize the close connection between the organization of the house and the lush amenity of the garden, a relationship far more intimate than that of the contemporary parsonage example and its small rear scullery yard. To piece together some idea of the intent behind the garden design, we could begin with Webb's earliest surviving site sketch. The L-shape of the house, with its stair tower projecting at the inside corner, is already evident, as are is its immediate surroundings: a rural Kent site with an existing apple orchard (in which a clearing was to be made for building), the house's entry sequence and frontage to the main road from Upton, and the neighboring group of cottages in a hollow called Hog's Hole. In addition to ease of access to London (the recently built railway ran a few miles away through Upton) Morris and Webb looked for a site with mature vegetation. The ex-

isting orchard rooted the land in an old Kentish agricultural tradition. This clearing made for the house was not as extensive as it appears today, and included, in addition to the main garden to the rear, a narrow strip for lawn bowling (a favorite sport of Morris and his colleagues at Oxford) to the West of the house. The proximity of the orchard to this face of the house is remembered almost claustrophobically in many early descriptions, which involve laiden apple trees despositing their cargo through open windows in early Fall, and boisterous indoor games of pitching windfall apples across the upper level drawing room.

Completing the L-shape of the house, Webb drew a border emphasising its seclusion, and worked closely with Morris (who already had very clear ideas on garden design) on the choice of planting and landscaping. Flowering creepers, planted soon after the walls were constructed, are visible in Webb's elevation drawings, and appear to have overgrown its entire surface in Muthesius's later photographs. A well, connected to a more convenient water supply location in the kitchen by a pipe, and echoing the main materials of the house in miniature, became the focal point of the rear garden. Contemporary accounts of the garden detail a modest area sheltered by the apple trees, and bordered by flower-laden trellises. Georgiana Burne-Jones account of the garden is the most vivid:

> *In front of the house it was spaced formally into four little square gardens making a big square together: each of the smaller squares had a wattled fence round it with an opening by which one entered, and all over the fences rose grew thickly. The deep porches...were at the front and back of the house: the one at the back was practically a small garden-room. There was a solid table in it, painted red, and fixed to the wall was a bench where we sat and talked or looked out into the well-court, of which two sides were formed by the house and the other two by a tall rose-trellis.(10)*

Perhaps a lecture entitled "Making the Best of It" (written by Morris in 1879, and given as a lecture to the Birmingam Society of Artists), will give us some clues as to his design for the gardens at Red House. His intention in this lecture was to suggest improvements in the design protential of the middle-class urban dwelling. Morris began with the small garden, suggesting that the modern taste for miniaturized landscape gardening with formal planting was misguided, and should be replace by simple, orderly boundaries surrounding informal floral planting:

> *... the merest common sense should have taught them to lay out their morsel of ground in the simplest way, to fence it as orderly as it might be, one part from the other (if it be big enough for that) and the whole from the road, and then to fill up the flower-growing space with things that are free and interesting in their growth, leaving Nature to do the desired complexity, which she will certainly not fail to do if we do not desert her for the florist..." (11)*

Color masses of flowers were to be of small wild varieties of roses, poppies, sunflowers and cornflowers. Surrounding fences were to be of hedge, stone, wood, or wattle material, never iron. The small garden would thus be a secluded enclave, and should not imitate the wildness of nature, but look compatable with the house: "it should, in fact look like part of the house," divided " and made to look like so many flower-closes in a meadow, or a wood, or amidst the pavement." (12) Morris's illustrations and many Pre-Raphaelite paintings depict epic narratives in which figures are surrounded by the shallow bounded 'interiors' of such gardens.

The idyllic seclusion of the Red House's garden was offered to a steady trickly of house-guests during the Morris' early married years. Webb, Rossetti, Lizzie Siddal, the Burne-Jones' and others formed a kind of extended family to which its hospitality was offered. Accounts of the experience of arrival for weekend visits include being met by Morris at the country station at Abbey Wood, then driven uphill along three miles of winding road in a covered wagonnette specially designed by Webb. The house's presence would be announced by the gateway past the row of cottages, and perhaps, over the treeline, by a metal weathervane, designed by Webb to crown the roof of the rear stairtower. This beacon used the graphic power of white paint against the sky, and juxtaposed Morris's initials WM with his father's family crest of a white steed. (A family crest purchased by Morris's businessman father, as was the priveledge of relatively 'new' Victorian money.) The deep front entrance porch was intended to offer the hospitality of the house to the weekender 'pilgrims' from London, as an interlude in the Medieval epic journey whose theatrical staging had begun at Upton station, or perhaps before.

RED HOUSE: INTERIORS

The convenience and amenity of the Red House's L-shape plan and its openness to the South-East has been mentioned by many commentators. The kitchen of the house no longer lay in a dark basement, but on the southern end of the ground floor service wing - an innovation shared by the comparable contemporary vicarages. However, despite what modern-day commentators might regard as desirable orientation of living space towards the morning and afternoon sun, most of the rooms are oriented toward the north-western 'outside ' leg of the L. The inner garden is almost completely surrounded by corridor and stair circulation space, and viewed on the move small leaded window lights, set deep in the wall.

Another feature that sets the Red House apart from its vicarages prototypes is the arrangement of its living space. The typical vicarage plan had downstairs living rooms and kitchen space, bedrooms upstairs, and a formal parlor off the entrance hallway for conducting parish business. In the Red House, the major living space on the ground floor was the dining room, occupying the corner of the plan, and served by the kitchen wing. The main drawing room was located on the upper floor, over the dining room. The remainder of the ground floor plan was given over to a guest bedroom on the north and the service wing to the west. The remainder of the upper floor was devoted to servants' bedrooms in the west wing, and the Morris' own bedroom and dressing suite in the north wing of the house. The house can be seen then as three tower houses, consisting of a living/dining room core at the corner, a bedroom north wing,

in front, and a service wing to the west - a subtle hierarchy visible in Webb's manipulation of the roof surfaces.

The upper level drawing room, immediately off the stair as it approached the upper landing, was the focus of much of the house's initial decoration. The door opened onto a bay window/niche, pushed outward to catch the western sun, with leaded lights in all directions. Some of Morris's furniture from his previous London lodgings was moved and redesigned to fit the rooms of his new house. These settles, wardrobes and sideboards were first attempts by Morris and his friends (already known as 'The Firm') to produce painted furniture for modest houses using Medieval craft principles. One such settle,with images of Dante and Beatrice by Rossetti on its upper doors, was positioned in the drawing room between the door and the bay window. Wood-panelled wainscotting along the wall linked the furniture and the window recess. Wall paintings by Rossetti, of the wedding feast of Sir Degrevaunt, taken from Arthurian legend (with portraits of Morris and his new wife Jane Burden as the wedding couple) were completed on either side of the settle, above the wainscotting. Other decorative schemes for the dining room, bedrooms and hallway, based on either Medieval or Ancient Epic tales, were completed, using painting, stained glass and tapestry and embroidered wall-hangings.

To facilitate the decoration of the drawing room, the Morris' and their early guests congegated the room at the other end of the north wing upper floor, which, with the drawing room, bookended the couple's living/bedroom suite. This was to be Morris's own studio and office - he had ambitions at the time of being a painter, like many of his colleagues. It occupied a position of unusual amenity in the house, at the end of circulation routes, with exposure to the east, south over the garden, and into the cleft in the roof between the two pitches. Georgiana Burne-Jones describes it a " a most cheerful place...with windows looking three ways and a little horizontal slip of a window over the door, giving upon the red-tiled roof of the house where we could see birds hopping about all unconscious of our gaze." (13) Morris's own desk to be placed in the room's inner sanctum, in front of a window looking south over the garden, over the garden porch below. On emerging from the seclusion of this study, Morris could view along the wide upper corridor towards framed views of the living room and its bay window. Jane Morris's embroidery stand still occupies this window recess (Morris himself had taught her to embroider) and she would sit in the window seat with her handiwork in the mornings, completing the tableau of domestic industry and virtue. Much has been written about enigmatic voyeurism of the Pre-Raphaelite images of women (narratives using the images of the women in their own circle, including Jane Morris, not as portraiture, but for idealized narrative effect), and the architecture of the Red House participates in staging similar framed views of domestic life.(14)

CONCLUSION

When he left the house in 1865, Morris did so because the proceeds from his father's copper-mining stocks, the source of his independent wealth, had dwindled, forcing him to commit to making a living. He then chose to develop the furniture-making activities of 'The Firm,' until that time an enjoyable hobby, into an organized business. To do this, he chose to move back to London, although not without considering the possibility of establishing a workshop with Burne-Jones on a site near the Red House. Webb prepared a design for an extension to the Red House, to accommodate the Burne-Jones family. This design, which extended the house around the rear garden, and converted Morris's upstairs studio into a new drawing room for the Burne-Jones', was not executed. At this time, Morris elected a future in commerce and the city, and his friends quickly began to liken the idyllic years at the Red House to a memory of early childhood. Although Morris never returned, the memory of the Red House as an experimental theater revealing the heroicism of bourgeois domestic life, remained with him, testament to the power of an artifact Rossetti described as "more a poem than a house."

NOTES

[1]Muthesius, H., *The English House*. New York: Rizzoli, 1979, p17.

[2]Pevsner, N., *Pioneers of the Modern Movement. From William Morris to Walter Gropius*. London: Faber & Faber, 1936.

[3]Hitchcock, H.-R., *Architecture. Nineteenth and Twentieth Centuries*. Harmondsworth: Penguin, 1958.

[4]Ibid, p178.

[5]Ibid, p257

[6]Ibid, 259

[7]Frampton, K., *Modern Architecture. A Critical History*. London: Thames & Hudson, 1980.

[8]Blundell-Jones, P., "Masters of Building: Red House," *Architects Journal*. Jan 15, 1986, pp36-56.

[9]Hollamby, E., *Red House. Philip Webb. 1859, (Architecture in Detail)*. London: Phaidon Press.

[10]Burne-Jones, G., *Memorials of Edward Burne-Jones*, Vol 1. London: The MacMillan Company, 1904, p212.

[11]Morris, W., "Making the Best of It," *The Collected Works of William Morris*. Vol 22. New York: Russell & Russell, 1966, p87

[12]Ibid, p91

[13]Burne-Jones, op cit, p211.

[14]See, for example, Callen, A., *Women Artists of the Arts and Crafts Movement 1870-1914* (New York: Pantheon, 1979) and Pollock, G., *Vision and Difference* (London, New York: Routledge, 1988).

Institution and the Gaze

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Buildings, Institutions, and Architectural History

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Foucault and Lacan:

The Gaze and its Operation within Historiography

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Where Pleasure and Mystery Overcome the Practical:

The Paradox of Old South Myths and New South Progress in New Orleans Architecture

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INTRODUCTION

In his 1961 lectures at Cambridge University, E. H. Carr criticized the nineteenth-century historian Ranke, who had remarked that the historian's work was "simply to show how it really was". On the contrary, Carr believed that an event of the past became historical fact through a process of selection, interpretation, and acceptance by the body of historians – in other words, by an institutional sanction, conscious or otherwise.[1] He suggested that the events of the past become historical facts through mediation with the present to which the historian belonged, that "[history is] a continuous process of interaction between the historian and his facts, an unending dialogue between the present and the past."[2] Carr has had his share of critics, and at least some of the criticism leveled against him was appropriate.[3] This does not undermine the importance of issues in historiography that he brought out. Particularly, the distinctions between events of the past and historical facts, between objectivity and subjective judgment, the processes of selection and construction, remain important. Hayden White asserted recently:

> *By history (considered as an* object *of historical research), we can only mean the sum total of all* events *... that happened 'in the past'. The events have to be taken as a given; they are certainly not constructed by the historian. It is quite otherwise with 'facts'. They are constructed: in the documents attesting to the occurrence of events, by interested parties commenting on the events or the documents, and by historians interested in giving a* true *account of what* really *happened in the past and distinguishing it from what may only* appear *to have happened. It is 'facts' that are unstable, subject to revision and further interpretation, and even dismissible as illusions on sufficient grounds.*[4]

This distinction between events of the past and historical facts has important implications for architectural history, as seen in the changing interpretations of modern architecture from the time of Giedion and Pevsner through to the present day. Juan Pablos Bonta's important research on the Barcelona Pavilion and my recent paper on Wright's Guggenheim Museum explain, in different ways, how individual buildings themselves may be subject to changing significance.[5] This paper takes the notion "historical fact" as a point of departure to comprehend the relationships between architecture and other institutions it houses, and their potential manifestation in built form. The Boston Public Library building (1888 – 95), by Charles McKim of McKim, Mead, and White elucidates those relationships. That the library is significant both architecturally and as an institution makes it a resonant example. The paper discusses historical constructs of architecture and the public library in late-nineteenth century America where the Boston Public Library assumes importance. Next, interpretations of the building in historical and critical texts are discussed. Last, the lacunae left by historical writings, particularly in addressing the relationship between architecture and other institutions as are addressed. A broadening of epistemological frameworks in the historical examination of architectural works is called for, so that a closer relationship between history and design may be established.

HISTORIES OF ARCHITECTURE/LIBRARIES

The idea of a "search for order" in a dynamic and transforming environment underlies much of historical writing on the late-nineteenth century America. While earlier historical writing emphasized a democratic consensus among Americans aiming to rationalize and order their world, later writings have seen these aims as riddled with conflict, with different groups attempting to impose their ideas of "order" on the environment. Architectural and library history of the period follow the trajectory set by American historiography in significant ways.[6] Over the last several decades, positions accorded to American Beaux-Arts architecture (of which McKim's building is seen as a prominent example) and the Public Library as "historical facts" have also varied. For architecture, it has shifted from being accorded a prominent position in its heyday, to being rejected by modernist critiques, through to being subject to more serious consideration in recent times. For the library, it has shifted from being an exemplar of democratic ideals to being an institution that has also exerted its powers to differentiate and even discriminate between its patrons.

At the end of the nineteenth century, American architects trained in the principles of the Ecole des Beaux-Arts were prominent in the architectural community. The shear number of commissions they received, as well as their role in organizing profession and discipline education is testimony to this. That they lost prominence af-

ter the advent of modernism is evident in the histories that were written since the mid-twentieth century. Histories that saw the root of American modernism in the work of the Chicago School architects over-emphasized the conservative nature of Beaux-Arts architects in the nation.[7] Other writings examined important contributions of Beaux-Arts architecture to give it greater historical significance. Many, whether in a critical mode or otherwise, recognized that the idea of attaining particular kinds of "order" was significant to those architects. The architectural search for order was seen to manifest in these ways: first, Beaux-Arts architects were seeking a formal order derived both from classical architecture and from design methods taught at the French school.[8] Scientific eclecticism, based on an academically received knowledge of historical works, and principles of composition, distribution, symmetry the *marche*, and the like equally informed them. Second, they were responding to larger social and cultural conditions of a modernizing nation, to control them with traditional and even retrogressive values that that architecture was supposedly charged with.[9] The genteel tradition, with the respect accorded to a peculiar European heritage and to particular values in individual behavior and artistic manifestations, is seen as significant to this. Third, those architects were striving to rationalize their newly-formed profession through the promotion of universal standards of practice and education, thus seeking an internal order particular to institutions of architecture.[10] The established system of education that the Ecole des Beaux-Arts was an example to emulate in a nation with no formal architectural education until the year 1865. Historical writing charges Beaux-Arts architecture with a complex web of meanings, making it retrogressive in its formal vocabulary, progressive in its response to changing professional and disciplinary conditions, and traditional in its cultural underpinnings.

Early historians of the public library in America, such as Jesse Shera and Sidney Ditzion, interpreted the development of the institution since the nineteenth century as a consequence of a democratic impulse.[11] The public library was to be a progressive institution open to all, keenly interested in the education and uplift of a diversifying population. Rosemary Du Mont suggested that library historians followed the schema set forth by Ditzion and Shera at least until the 1970s.[12] By this time, however, a growing number of historians, including Du Mont, were seeing the growth of the public library as more problematic. The egalitarian impulses of librarians were now judged complicated by conservative leanings and genteel idealism, by their authoritarian nature, by a fear of growing working-class unrest that needed mechanisms of social control of which the library was a part, by the ambivalent and often paternalistic intentions of public philanthropy, and by the exclusionary attitude of institutions toward women, children, and the minorities.[13] However, this did not mean that those early histories had no foundation in past events. Rather than debunking contributions made by those historians, Dee Garrison saw them as offering incomplete understandings of the past.[14] Accordingly, it was not as though there were no common set of ideals that brought together the librarians of the nineteenth century. Even as many historians later interpreted the supposedly progressive nature of library-institution as being strained by the conservative, they still saw among its members a certain ideological consensus typified by a genteel, educated middle-class. Moreover, as much as architects, librarians were also responding to the need of organizing their institutions, aiming to rationalize their services. A search for order, perhaps restricted to a group, was still comprehensible in its cultural manifestations and professional activities. And it seemed crucial in shaping the public library and its buildings.

At least since 1876, when the American Library Association was formed, pioneer librarians such as Justin Winsor and William Poole were addressing the problems related to the design of library buildings, implicitly understanding the dilemmas of housing novel institutions with their peculiar functional programs in buildings.[15] This was not simple task; for it dealt with both, forces of modernization exemplified in the concern for the planning of library buildings and tradition-based values librarians may have harbored. Complex issues, ranging from the distribution of the public in their buildings based on social and cultural distinctions, to the forging of public and private realms within the buildings, through to the organization of books and their spatial relationship with the public were given attention by them. In the design of central library buildings, the situation was further complicated when architects, coming from similar cultural backgrounds to those librarians and sharing many of their ideals, also approached architectural problems in ways that conflicted with librarians' ideas on their buildings.

THE BOSTON PUBLIC LIBRARY AND ITS CRITICAL RECEPTION

As plans for a new building went under way in the early 1880s, the Trustees of the Boston Public Library asserted that were no precedents for its peculiar program. Since its inception over three decades earlier, the library was viewed as a "people's library" with an aim to circulate books to all. However, its collection grew in two distinct directions, of which popular material represented only one. The other part comprised the research material used by scholars and the cultural elite of Boston. The earlier building, designed by Charles Kirby and completed in 1859, housed these collections in distinct quarters, with the popular, circulating books in publicly inaccessible alcoves on the first floor and the research material in a hall on the second floor.[16] Although the design of the earlier building was emulated in others, as the library grew the building was judged by its administration to have serious functional shortcomings. Particularly important was the decade from 1868 to 1877, when Justin Winsor was in charge of running the library. Not only did he reorganize the administration of the institution, he also altered the architectural layout of the building to make it more effective.[17] But by the beginning of the 1880s, the Trustees made it clear that only a new building would effectively undo the problems in the existing building, which included not just delays in service and insufficient room, but also poor ventilation and lighting.

In their initial estimation the new building was to be a functional library – an envelope for the books. However, by the time McKim, Mead and White were commissioned in 1888, the Trustees' conception had become more complex. According to the Annual Report of 1889: "The trustees have insisted that convenience and use-

fulness should not be sacrificed to show, and that the internal arrangement of the building should be first considered. They did not, however, lose sight of the fact that the building was to be a 'palace of the people,' and, as such, should be a monumental building, worthy of the city of Boston."[18]

Consequently, it was believed that neither architectural form nor institutional function needed to suffer at each other's expense. But upon completion, the building was both hailed as a major architectural landmark as well as criticized for its functional problems. An independent examining committee wrote that the Trustees were to be congratulated as, "They have spared us an essay in archaeology, and given us, especially in the interior, grace and dignity, in a style associated with one of the grand eras of human progress." Ralph Adam Cram maintained that the library was "beautiful in that sense in which things have always been beautiful in periods of high human culture."[19] Other architectural writers of the time thought the building too austere and unoriginal, while prominent art and architectural critic Mrs. Van Rensselaer defended the architects by writing that they had "won a victory, not only for their own building, but for the general cause of architectural sobriety, dignity, simplicity and refinement."[20] Whatever the tenor of comment, architectural writing of the time gave greater credence to the formal characteristics of the building, with relatively little consideration to function. This was not true for librarians. Represented by William Poole, they took the view that the architects, by stressing too much on form, had been rendered poor in every function. The debate between Poole and Trustee and Superintendent of the library, Samuel Abbott is an indicator of this.[21] Poole criticized almost every aspect of the building and its design; both the accommodation of books and readers was found wanting by him.

The library and its building have been given a fair share of attention in historical writing too. Among the early examples is the house history of the institution written by its superintendent Horace Wadlin, and the two chapters on the commission in Charles Moore's *The Life and Times of Charles McKim.*[22] The former included a largely uncritical documentary on the construction of the building. Moore's text, on the other hand, hailed McKim's effort as an artistic endeavor. More significant than those are the later histories written by Walter Muir Whitehill and William Jordy, noted earlier. Whitehill's history of the institution has a discussion on the various schemes drawn before the McKim commission, and the controversies that continued well after the building was completed. Giving much of the credit to McKim and to the Trustee Abbott who consistently supported him, Whitehill echoed the praise lavished upon the building over the years. But writing in the context of late-nineteenth century architecture, Jordy was far more critical of the building. Placing it firmly within a Beaux-Arts tradition, Jordy suggested that the most fundamental problems with the building arose from the formalist tendencies of McKim, which lead to the poor functional layout of the building. If for Whitehill, the success of the building was due to the architect, then for Jordy the failings of the building were to be blamed on McKim and his academism. Surprisingly, while both mentioned earlier ideas – verbal and visual – on the shape that the building would take, neither saw them as informing the architectural program of McKim's building.

INSTITUTIONS AND ARCHITECTURAL DESIGN: RECONSTRUCTING INTERPRETATIONS

Jordy cited several historical sources for McKim's formal scheme, including the Coliseum, Alberti's San Francesco at Rimini, Labrouste's Bibliotheque St. Genevieve, and Richardson's Marshal Field's Wholesale Store. Significant as these may have been for McKim, they all lay outside the institutional boundaries of the Boston Public Library. But there were several architectural precedents within that institution, impacting both the form and the functional layout of the building, implying intersections between institutions of architecture and the library. These included:

1 Changes that Winsor made to the administration and spatial organization in the earlier building, following critical appraisals by him and independent examining committees. Not only did he form new departments such as the Shelving Department, the Ordering and Receiving Departments, but he also allocated specific spatial requirements for these and other work areas such as those for Cataloguing. Each of these would be included in all the future architectural schemes for a new building.

2. The early schemes that were drawn by the City Architect George Clough (1883) and Henry Van Brunt, who had acted as consultant for the Trustees. Particularly significant is Clough's scheme for a building on the present, Copley Square site. Like McKim's building, that scheme placed the main reading room (Bates Hall) on the second floor, laterally aligned to Copley Square, with the stacks at the rear. Also similar was the arrangement of administration, workspaces and special reading rooms along the north and south wings of a building punctuated by courtyards.

3. The design competition held in 1884, and the winning entries. Although none of the entries were seen as entirely satisfactory, the brief and the four winning entries are important indicators of the layout that the library judged suitable for housing their institution. The brief and the designs resemble Clough's drawings (and McKim's scheme) in the layout of functions, the organization and location of stacks and reading room, and in the overall formal arrangement of a building with courtyards.[23]

Plans published at the beginning of the design process in 1888 and after the completion in 1897 show that McKim maintained his formal parti throughout.[24] In the arrangement of functions, McKim seemed to have used the requirements set forth by the library in the earlier schemes, and even organized them in a more reasoned way. His design was of a near square building organized around an open court, with the main reading room in front and the stacks behind. As with the earlier designs, administrative spaces were set on the south wing, with secondary public spaces and reading rooms in the north. Yet, the special libraries, all on the top floor were better organized than those scattered in the residual spaces in earlier designs.

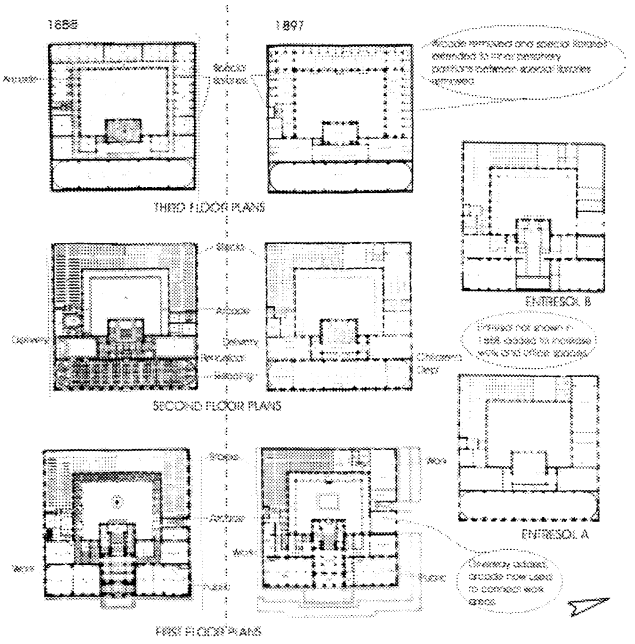

Figure 1: McKim's plans for the Boston Public Library. the initial scheme of 1888 (left) and the completed scheme. 1897. Both published in Annual Reports of the Trustees. Boston Public Library.

But balance also had to be maintained between all those functional requirements and the professed principles of composition and "scientific eclecticism". In all the iterations of McKim's plans, while publicly accessible areas such as vestibules, the grand staircases, the main reading room and lobbies, remained symmetrically disposed, those away from public view were not. Indeed, those internal spaces seem to have been guided by functional concerns rather than formal ones. The division of spaces between those that express a tendency towards formal composition and others seem to tell, in this particular case, of the division between public and private realms of the institution. But further, it also speaks of the coexistence of two institutions – architecture and the public library – within the same building. The publicly visible spaces, designed with scholarly knowledge of principles of design and of historical precedent, quite literally formalize the special skills of the maturing architectural profession in the nation. But that that very scholarship also promoted the traditional cannot be denied.

In the initial iteration, certain spaces, such as the arcades around the central court set at various levels, seemed to serve little purpose apart from providing an architectural experience of the building. On the other hand, the continual changes made to the functional organization of the building, which intruded on "architectural" space like the arcade, show the library as an institution in the throes of modernization. But they also described an institution with room for deference to recognized architectural traditions. Moreover, rather than dividing up the stacks into the popular and research sections with their own public access areas as in the older building, the library chose to combine the two collections in McKim's building, citing a policy of non-discrimination.[25] Even Herbert Putnam, an important librarian admitted in 1897 that the building was an "experiment" These changes, and indeed the criticism levied by Poole and others need be understood in the larger context of the library-institution which had little consensus on the design of its buildings. Debates between Poole who advocated the arrangement of books and readers in subject departments and Winsor, who supported a singular closed stack, surely had formal implications. Poole's criticism of the Boston Public Library and its stack system needs to be seen in the light of his own, regularly presented ideas on library design in the forums provided by the library-institution.

Thus, concealed within the form/function duality may be deeper issues that strike at the very basis of relationships between architecture and the other institutions that it must necessarily house. This is especially observable when these institutions are themselves in the process of maturing and deciding on the relationships between values from the past and the exigencies of the present. This necessitates a re-examination of events of the past, including buildings and discourses on their design as well as earlier constructions of historical facts now seen as events, and thus a broadening of epistemological frameworks for historical study. Based on the awareness that we are not so far removed from fundamental dilemmas of modern architecture, architectural history and historiography may themselves become tools to comprehend conditions that inform design and the institutional environments in which it necessarily operates.

Figure 2: View of McKim's building from H. H. Richardson's Trinity Church across the square. and a sequence of interior public spaces from the entrance. to the grand staircase through to the vestibule leading to reading and delivery rooms. Photographs by author.

NOTES

[1]See *What is history?* (New York) 1967, p.5.

[2]Ibid. p.35.

[3]Arthur Marwick, "'A Fetishism of Documents'? The Salience of Source-Based History," *Developments in Modern Historiography*, Henry Kozicki, ed. (New York) 1993.

[4]See "Response to Arthur Marwick", *Journal of Contemporary History*, Vol.30 (London, Thousand Oaks CA, and New Delhi) 1995.

[5]Bonta, *An Anatomy of Architectural Interpretation : A Semiotic Review of the Criticism of Mies van der Rohe's Barcelona Pavilion* (Barcelona) 1975. Samiran Chanchani, "Between Icon and Institution: The Vacillating Significance of Frank Lloyd Wright's Guggenheim Museum," *The Journal of Architecture* 5:2 (Summer 2000) 159 – 188.

[6]Michael Krauss and David D. Joyce, *The Writing of American History* (Norman OK) 1985, provide an informed and critical survey of American historiography.

[7]John Burchard and Albert Bush-Brown, *The Architecture of America: A Social and Cultural History*. (Boston and Toronto) 1961,1966: See especially part III which covers the periods 1885-1913, pp. 141-234. Also, Lewis Mumford, "The Imperial Façade," *Sticks and Stones: A Study of American Architecture and Civilization* (New York) 1924: 123-54.

[8]See, for example, Vincent Scully, *American Architecture and Urbanism* (New York and Washington) 1969: 135-39.

[9]Apart from Burchard and Bush-Brown and Mumford, examples of this treatment of Beaux-Arts-trained architects and of their works abound in histories of Modern Architecture. See, for example, Manfredo Tafuri and Francesco Dal Co, *Modern Architecture* (New York) 1979: Kenneth Frampton, *Modern Architecture: A Critical History* London and New York, 1985: Leonardo Benevolo, *History of Modern Architecture* (Cambridge MA) 1971; William Curtis, *Modern Architecture since 1900* (New Jersey) 1996.

[10]See Joan Draper, "The Ecole des Beaux-Arts and the Architectural Profession in the United States," *The Architect: Chapters in the History of the Profession*. edited by Spiro Kostof, (New York) 1977, 1986:209-37; William Jordy, "The Beaux-Arts Renaissance: Charles McKim's Boston Public Library," *American Buildings and their Architects: Progressive and Academic Ideals at the Turn of the Twentieth Century* (New York) 1972:314 – 375.

[11]Shera, *Foundations of the Public Library: The Origins of the Public Library Movement in New England*. (Chicago) 1949. Ditzion, *Arsenals of a Democratic Culture: A Social History of the American Public Library in New England and the Middle States from 1850 to 1900*. (Chicago) 1947.

[12]Du Mont, *Reform and Reaction: The Big City Public Library in American Life*. (Westport CT and London) 1977:6-7. Du Mont also mentions Gwladys Spencer as being one of the pioneers in seeing the relationship of the public library with a larger social context in her dissertation *The Chicago Public Library: Origins and Background*. (Chicago) 1943.

[13]See Du Mont, op. cit. and the following texts: Dee Garrison, *Apostles of Culture: The Public Librarian and American Society, 1876 – 1920*. (New York and London) 1979. Phylis Dain, "Ambivalence and Paradox: The Social Bonds of the Public Library," *Library Journal* 100 (1975) 261-66. Ellen Fain, "Books for New Citizens: Public Libraries and Americanization Programs, 1900-1925." In *The Quest for Social Justice: The Morris Fromkin Memorial Lecture. 1970 – 1980*. edited by Ralph M. Aderman (Madison WI) 1983:255-76.

[14]Garrison, xi – xvi.

[15]For Winsor's scheme, see "Library Buildings." *Public Libraries in the United States of America: Their History, Condition and Management, Part I*, Department of Interior, Bureau of Education, (Washington DC) 1876: 465 – 75. For Poole's ideas, see "The Construction of Library Buildings." *Library Journal* 6 (April, 1881) 69-77.

[16]The old building is discussed in Walter Muir Whitehall, *Boston Public Library: A Centennial History* (Cambridge MA) 1956: 55-75.

[17]See the *Annual Report of the Trustees of the Boston Public Library* (Boston MA), especially 1868 – 1898, for discourses on the design of the building. Changes effected by Winsor, and his ideas are discussed in the years 1868 to 1877.

[18]*Thirty-eighth Annual Report*, 6..

[19]Cited in Whitehill, 162.

[20]Discussed in Jordy, Op. cit.

[21]See *The Library Journal*. 10 (October 1890) 297-302. Jordy discusses the debate.

[22]Wadlin, *The Public Library of the City of Boston: A History* (Boston MA) 1911: 69 – 107. Moore, *The Life and Times of Charles Follen McKim* (Boston and New York) 1929.

[23]For the competition brief, see *Preliminary Description of the Building for the Public Library of the City of Boston in the Competition for Designs 1883* (Boston) 1883. The discussion of the competition drawings and of Clough's schemes is based on a survey of the collections at the Fine Arts Department, Boston Public Library, conducted for my forthcoming dissertation.

[24]Apart from architectural publications such as the *American Architect and Building News*, various iterations of the plans were published in the Annual Reports, 1889, 1897 and 1898. These are the sources for the illustrations of McKim's schemes.

[25]See Whitehill, 155.

Foucault and Lacan:
The Gaze and its Operation within Historiography

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The epistemology of sight is one of the most important sources of knowledge. Plato praised sight as the most exalted of the senses. Through sight knowledge and wisdom might be attained.[1] Indeed the philosophical term for theory comes from the Greek word for spectators, theatai.[2] Some philosophers argue that the culture of modernity, and the philosophical discourse that has taken place within it, are dominated by vision and a paradigm of knowledge, truth, and reality that is vision centered.[3] Hannah Arendt states that

> *from the very outset, in formal philosophy, thinking has been thought of in terms of seeing... The predominance of sight is so deeply embedded in Greek speech, and therefore in our conceptual language, that we seldom find any consideration bestowed on it, as though it belonged among things too obvious to be noticed.*[4]

In her book "Body Criticism," Barbara Maria Stafford argues visual imagery constitutes a new form of global communication. Whether this is viewed as a welcome occurrence or not, the image has become a formidable instrument of power. Modern visualization technology is predicated on the fact that half of our neurological machinery is devoted to vision.[5]

Paradoxically, Stafford points out that the visual arts are damned to the bottom of the Cave of the humanities in that in "today's text-based curricula, sensory and affective phenomena continue to be treated as second-rate simulations of second-class reflections."[6] Images are viewed as misleading illusion without the guidance of discourse. The tension between vision's ability to enlighten, yet at the same time deceive, goes back to Plato. Although Plato praised sight as giving the clearest knowledge of the natural world he also believed that appearances were suspect. Sight above the other senses was most often deceiving, since what it showed was always fleeting and incomplete.[7]

The work of Michel Foucault and Jacque Lacan offer a critique to the ocularcentrism that is central to our culture. For Foucault the modern gaze has joined forces with technology and technocracy. "The gaze that sees is the gaze that dominates and masters."[8] For Lacan, the gaze is an important element in the constitution of the self and like Foucault's gaze, is subject to domination and exploitation. Foucault's panoptic gaze exemplified by Bentham's idealized prison and Lacan's gaze articulated in the "Mirror Stage" of human psychological development have significant implications for architectural historiography. Foucault's chapter on "Panopticsim" in *Discipline & Punish* exposes the matrix of knowledge and power sustained by the panoptic gaze that inscribes its domination on docile bodies. Foucault demonstrates knowledge through vision is never neutral and is extremely vulnerable to exploitation. Foucault implies architecture is an element in the power/knowledge matrix through its complicity in the mechanisms of surveillance. The history of a visual artifact is never a documentary but a political narrative.

While Lacan's critique of the scopic regime of modernity is much more difficult to connect to historiography it is just as significant. Lacan has focused our attention on the reciprocity of the visual realm in the formation of identity. Visual information is never neutral, but constructed, by both the subject who is a receiver and the object or visual text that is in a sense transmitting. I will argue the psychoanalytic approach with its corresponding shift from the visual text or artifact toward the "spectator" or more precisely toward the spectator-text relations are central to the process of meaning, and have much to contribute to our understanding of architectural discourse. Viewing visual texts, whether painting, film, architecture or television in a spectator-text framework suggests a method of critical analysis that is both ancient and very modern. I will argue that the *techne* of classical rhetoric is well suited to unveiling the persuasive effects within the spectator-text dynamic.[9]

However, before ending this paper with a discussion of rhetoric, I will begin with a discussion of Foucault. In his chapter on "Panopticism" in *Discipline & Punish*, Foucault describes the gaze beginning with measures taken by local authorities to combat the spread of the plague. These measures are based on a system of surveillance, spatial segregation, and record keeping, as well as penalties. Foucault uses Bentham's Panopticon as the architectural realization of this system of surveillance. Foucault is clear that the Panopticon is not a dream building but a diagram of a mechanism of power reduced to its ideal form. It is in fact a figure of political technology that may and must be detached from any specific use. It is polyvalent in its applications; it serves to reform prisoners, but also to treat patients, to instruct school children, to

confine the insane, to supervise workers, to put beggars and idlers to work. It is a type of configuration of bodies in space, of distribution of individuals in relation to one another, of hierarchical organization, of disposition of centers and channels of power, which can be implemented in hospitals, workshops, schools, and prisons. Whenever one is dealing with a multiplicity of individuals on whom a task or a particular form of behavior must be imposed, the panoptic schema may be used.[10]

Although Bentham's Panopticon was used to illustrate how the power of surveillance can operate, Foucault emphasizes that it is a metaphor, where one can be seen from any position and from multiple points. One is aware of being seen but does not see who is doing the looking. It is the effect that is important. In the case of the prison, the inmate is induced into a state of conscious and permanent visibility that assures the automatic functioning of power.[11] According to Foucault whoever is subjected to a field of visibility and who knows it, assumes responsibility for the constraints of power; the subject makes them splay spontaneously upon itself; the subject inscribes in itself the power relation in which each simultaneously plays both roles; the subject becomes the principle of its own subjection.[12]

For Lacan the gaze penetrates the subject from all sides and is similar to Foucault's in that as the subject tries to adapt to it, the subject becomes the object. In his *Four Fundamental Concepts* Lacan stresses not only the otherness of the gaze, but its distinctness from what Lacan calls the eye. Although the gaze might be said to be "the presence of "Others" it is not necessarily any individual viewer, or group of viewers. It issues "from all sides," whereas the eye "sees only from one point." The gaze, moreover, is impossible to seize or get hold of.[13]

Lacan explains

> *The gaze I encounter – you can find this in Sartre's own writing – is not a seen gaze, but a gaze imagined by me in the field of the Other. It is for this reason that* le regard *can include non-visual phenomena like the rustling of leaves. More important, the unseen character of the gaze meant it was not necessarily that of another subject looking threatening at the original subject, but might rather be understood as a function of the desire of the original subject, the desire for the* object a*...*[14]

The "*object a* " was Lacan's term for the object of lack or the missing object that will seemingly satisfy the drive for plentitude, "a" being the first letter of the French word for "other" (*l'autrui*). According to Lacan, at it's most fundamental level, it is the phallus which the child (regardless of sex) wishes to be in order to make up for the mother's alleged lack of a penis. From the moment that this gaze appears, the subject tries to adapt to it.[15]

Lacan's account of subjectivity was developed in the context of a fiction he called the "Mirror Stage." There is a period in the child's development between the ages of six and 18 months where the infant is physically uncoordinated and is yet unable to walk or even to stand up.[16] While in this state of powerlessness, the infant anticipates on the level of the imaginary the mastery of its own body. When a child sees its image in a mirror, it mistakes this unified whole for a superior self.[17] The mirror can be the mother's face or anyone perceived as a whole.[18] The child identifies with the mirror as something that both reflects the self and something other and finds in it a kind of unity that it cannot experience in its own body. The infant internalizes this image as an ideal ego and this process forms the basis for all other identifications, which are imaginary in principle.[19]

Lacan's account of the "Mirror Stage" elaborates the notion of exteriority which is internalized by the subject, first in the "gaze" of its mirror image and subsequently by parental imagoes, and later in the form of a whole range of cultural representations.[20] What Lacan designates, as the "gaze" appears initially external to the subject, first through the mother's look as it facilitates the "join" of infant and mirror. It is much later that the subject might be said to assume responsibility for "operating" the gaze by "seeing" itself being seen. Consciousness, as redefined by Lacan, hinges not only upon the internalization but also upon the "elision" or suppression of this gaze of oneself being seen.[21] What determined (the subject), at the most profound level, in the visible, remarks Lacan, "is the gaze that is outside."[22] Using a camera as a metaphor, Lacan states that it is through the gaze that the subject enters light and it is from the gaze that he or she receives its effects. Hence the gaze is the instrument through which light is embodied and through which the subject is photographed."[23]

In his seminar, entitled "the Line and the Light," Lacan reformulated his discussion with superimposed triangles to illustrate the relationship between the eye and gaze. The first triangle represents the position of the eye, signified by Cartesian perspectivalist vision Alberti first described in *Della pictura*, in which the viewer's monocular eye was at the apex and the object at the opposite side of the triangle. The image was on another line parallel to that side, but halfway between it and the eye/apex. The second triangle, that of the gaze, put a point of light at the apex, the picture at the far wall, and what Lacan called the screen halfway between. Here the subject is placed not at the apex, but at the midpoint, as if it were an image on a screen in a generalized perceptual field, not a seeing eye. This subject, Lacan contended, "is caught, manipulated, captured in the field of vision.

Lacan's third diagram explicitly conflates the image in diagram 1 with the screen in diagram 2. Lacan inverts and superimposes his two visual triangles. The interposition of the two planes created a new figure in which the middle sections of both triangles, the image in that of the eye and the screen in that of the gaze, coincided in the form of a divided subject. At its center was an opaque line very different from the transparent window typical of the Albertian subject's view on the world.[24] (Figure 2) The "screen" is the image or group of images through which identity is constituted. Just as Lacan's infant can see him or herself only through the intervention of an external image, the gaze can "photograph" the object only through the grid of the screen.[25]

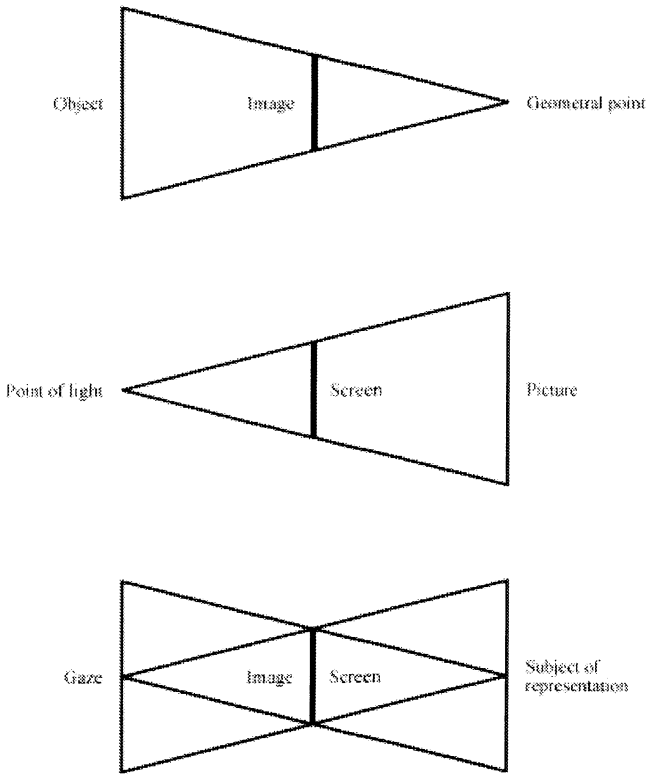

Figure 1. Lacan's Diagrams of Vision

The screen is the culturally generated image or repertoire of images through which subjects are not only constituted, but also differentiated in relation to class, race, sexuality, age and nationality.[26] As Kaja Silverman points out, the possibility of "playing' with these images then assumes a critical importance for political resistance.[27] Lacan holds that the human subject is not entirely caught up in this imaginary capture. The subject maps itself in it. A person, in effect, knows how to play with the mask, as that beyond which there is the gaze. The screen is the locus of mediation."[28]

In "The Gaze in the Expanded Field," Norman Bryson adopts Lacan's concept of the screen and applies it to analyze art.[29] Moreover, he applies it in the context of Foucault's discourse theory. A discourse for Foucault is a way in which knowledge is articulated in society by the both institutional and private forms. Knowledge produces and transmits power and influences social practices, ways of producing meaning, and all types of control. Things have no meaning outside their discourse, and each discourse is apart of a wider network of discourses.[30]

Bryson places his notion of the gaze within the context of discourse. According to Bryson, for human beings collectively to orchestrate their visual experience they require socially agreed descriptions of an intelligible world. Vision is socialized. Any deviation from this social construction of visual reality can be measured and named as hallucination, misrecognition, or "visual disturbance." Between the subject and the world is inserted the entire sum of discourses which make up visuality, that cultural construct, and make visuality different from vision. Between retina and world is inserted a screen of signs, a screen consisting of all the multiple discourses on vision built into the social arena.[31] This network is greater than its individual agents or operators. As Bryson suggests when one learns to speak, you are inserted into a preexisting systems of discourse.

> *Similarly when you learn to see socially, that is, when I begin to articulate my retinal experience with the codes of recognition that come to me from my social milieu, I am inserted into systems of visual discourse that saw the world before I did, and will go on seeing that which exists independently of my life and outside it: my individual discoveries, the findings of my eye as it probes through the world, come to unfold in terms not of my making, and indifferent to my mortality.*[32]

Bryson notes how the painting "Ambassadors", by Hans Holbein exemplifies the screen that mortifies sight and demonstrates "everything I see is orchestrated with a cultural production of seeing that exists independently of my life and outside it."[33] The viewer standing directly in front of this painting will see the ambassadors as masters of learning, in possession of all the codes of knowledge, of science and of art. However their visual field is cut across by something they cannot master, the skull which casts itself sideways across their space, through anamorphosis.[34] (Figure 2) The scull was meant to signify man's mortality, but is also a reminder of an alternative visual order that the presence of the observer cannot efface. Holbein subverted and decentered the unified subject of vision constructed by the dominant scopic regime. It illustrates that the subject who sees is no more the center of visual experience than the subject of language at the center of speech.[35] The Ambassadors was also used by Lacan to demonstrate how the painting had captured the gaze.[36] Vision unfolds to the side of, and tangent to, the field of the other. And to that form of seeing Lacan calls seeing under the gaze.[37]

Figure 2. The Ambassadors

Bryson points out that Lacan's gaze marks a fundamental shift away from a Cartesian perspectivalism, which was dominated by a theory of vision in which the truth lay in the retina, in the physiology of the eye and the neurology of the optical apparatus. We now understand vision as social construction which can be manipulated for political ends.[38] It reveals how power disguises and conceals its operations in visuality, in mythos of pure form, pure perception, and culturally universal vision. Lacan has demonstrated that what we see is not natural but constructed. He has described the role of the gaze in structuring both representation and identity. The very constitution of the self depends on this construction and is highly vulnerable to it.

The work of Foucault and Lacan have had far reaching implications for historiography in general and architectural history in particular. Foucault has challenged the assumptions implicit in historical method, the assumptions of objectivity and the myth of the "fact."[39]

We know meaning is always the product of interpretation, facts are constructed by discourse and objectivity is a way to mask self interest by those in power. Every historian "shapes" his materials according to what Popper calls a "framework of preconceived ideas,"[40] or in accordance with his own narrative strategy, ideology, or system of ideas and values; Gadamer would call them prejudices. No one approaches a text innocently. The historian, like any writer of prose discourse fashions his materials. He may fashion them so as to make them conform to a "framework of preconceived ideas," of the sort that Popper ascribes to Hegel and Marx, or he may fashion them to a "preconceived selective point of view" of the sort the novelist occupies in his function as the narrator of a story.[41] Stories of the founding of cities or states, of the origin of class differences and privileges, of fundamental social transformations by revolution and reform etc. are the subject matter of history. Levi-Strauss suggests all such stories whether presented under the aspect either of social science or history partake of the mythical inasmuch as they "cosmologize" or "naturalize" what are in reality nothing but human constructions which might well be other than what they happen to be.[42] History, Levi-Strauss insists, is always written for a specific social group or public.[43]

Foucault's influence on architectural history was immediate and is pervasive.[44] He has effected a shift in the way history is constructed and expanded the scope of its inquiry.[45] Foucault's challenge of "origins," in favor of genealogy, his introduction of discourse and épistème have become commonplace. The role of the scopic regime in architecture is acknowledged and has been investigated.[46] Architectural historians have also appropriated Lacan's contribution to psychoanalysis through his notion of the gaze. Spaces are now often described as pre-Oedipal " and analyzed in terms of the gaze and spectatorship.[47] Pychopathologies of urban space have become the subject of psychoarchitecural analysis.[48]

However, I believe Lacan's more significant contribution has been adopted by film and communication theorists who have used the psychoanalytic approach to shift the focus from the film or artifact towards the "spectator," or more precisely toward the spectator-text (or object-subject) relations, that are central to the process of meaning-production in film.[49] Communication analysis and media critics have turned to the discipline of rhetoric, to assist them in analyzing the text-spectator relation implicit in television and film. Because the central question in rhetoric is who are you trying to influence and what is the most effective means of doing so, the audience, or spectator becomes central. Critics read television shows, commercials, and movies as texts, to see how discourse is structured and organized, and to examine what kind of effects these forms and devices produce in their readers, viewers, or users. For instance, a television commercial can be analyzed rhetorically through mode of address, form, style, and other discursive techniques and strategies to discover how advertisers use market research into our values to gain our sympathies and ultimately persuade us to buy their products.[50]

The ancient discipline of rhetoric, which was the received form of critical analysis developed by the Greeks and continued to the eighteenth century examined the way discourses were constructed in order to achieve certain effects. While the classical rhetorician would not have had access to market research he or she would have been a keen observer of the human condition and would have very carefully considered mode of address, form, style and their effect on an intended audience. Its objects of enquiry could be spoken or written, poetry or philosophy, fiction, historiography and the arts. Leon Battista Alberti used his knowledge of classical rhetoric in his discourse on the arts and architecture and eventually to design buildings.[51] Rhetoric's horizon can extend to the entire field of discursive practices in society as a whole, and in identifying forms of power and performance.[52] Architecture is a rhetorical artifact that identifies and appeals to certain audiences. It has the power to enlighten or inhibit, restrain or empower, foreground certain groups and background others. Since rhetoric has always focussed on the spectator-text operation, it is a particularly useful tool in critical historiography.

Lacan and Foucault's critique of our ocularcentric culture is a continuation of an ancient tension between the epistemology of vision and its interpretation. Ancient philosophers realized that sight was the most important source of knowledge yet distrusted visual information. Foucault extends the critique of the epistemology of vision by exposing its operations through the gaze in the power/knowledge matrix. Lacan unpacks the effects of the gaze in the formation of identity and by focusing on the importance of the reciprocity implicit in *le regard* for the subject-text relationship, has made a significant contribution to historiography. Foucault's concept of discourse and Lacan's notion of the screen remind us that all historical sources are constructions, interpretation is never neutral but screened by ideologies or frameworks. Interpretation is always partial, polarized and necessarily provisional. I would like to end this paper by returning to the Greek notion of spectator and theory as elaborated by the philosopher Diogenes. Diogenes believed "life is like a festival: just as some come to the festival to compete, some to ply their trade, but the best people come as spectators (*theatai*)."[53] The nobility of the spectator lies in their "active nonparticipation," allowing them to judge the actors involved in the competition. History might be compared to the competition that draws those who

come to ply their trade, or compete for fame or search for truth. I would agree with Diogenes that the best historians come as "active nonparticipants,"[54] as spectators who understand their role in the world of the spectated.

NOTES

[1]David Summers, *The Judgement of Sense* (Cambridge: Cambridge University Press, 1987): 32.

[2]Peg Birmingham, Hannah Arendt: The Activity of the Spectator," in *Sites of Vision*, ed. David Michael Levin (MIT Press: Cambridge, 1997): Birmingham is discussing Arendt's understanding of the term theory. She quotes her quoting Diogenes "Life is like a festival: just as some come to the festival to compete, some to ply their trade, but the best people come as spectators (theatai), so in life the slavish men go hunting for fame (doxa) or gain, the philosophers for truth." The nobility of the specators lies in their "active nonparticipation," allowing them to judge the actors involved in the competition. The concern for fame or opinion makes the actor in the event dependent on the spectator's judgment. It is through the opinion of the audience and the judge that fame comes about.

[3]David Michael Levin "Keeping Foucault and Derrida in Sight," in *Sites of Vision* (Cambridge: MIT Press, 1997): 400

[4]Hannah Arendt, The *Life of the Mind* (New York: Harcourt Brace Javenovich, 1978): 110-111.

[5]Barbara Maria Stafford, *Body Criticism* (Cambridge: MIT Press, 1991): 474

[6]Ibid. p. 2.

[7]Summers, p. 42.

[8]Foucault, *Birth of the Clinic*, p. 39.

[9]Aristotle, *The Art of Rhetoric*, trans. H.C. Lawson-Tancred (London: Penguin Books, 1991): 14-16. By classifying rhetoric as a *techne*, Aristotle was locating it in a philosophical landscape and giving it a structure of its own. He makes clear the central purpose of rhetoric is the detection in any given subject matter its persuasive aspects. Rhetoric is given a universality that gives it an affinity with dialectic.

[10]Foucault, *Discipline and Punish*, trans. Alan Sheridan (New York: Vintage Books, 1979): 205.

[11]*Ibid.* p. 202.

[12]Ibid. p.203.

[13]Kaja Silverman, "Fassbinder and Lacan: A Reconsideration of Gaze, Look and Image," *Camera Obscura* 19 (July 1991): p. 59. Silverman argues that feminist film theory which equates the male voyeur with the gaze. She points out that it is at precisely the moment when the eye is placed to the keyhole that it is likeliest to find iself subordinated to the gaze. It is at this moment, which Lacan observed that the subject finds itself disturbed, surprised by the gaze, and reduced to shame.

[14]Martin Jay, *Downcast Eyes* (Berkeley: University of California Press, 1994): 362.

[15]Ibid.

[16]Jacques Lacan, *Ecrits*, trans. Alan Sheridan (New York: W.W. Norton, 1977): 1.

[17]Ibid. p. 2 Lacan states that the total form of the body by which the subject anticipates in a mirage the maturation of his power is given to him only as *Gestalt*, that is to say, in an exteriority in which this form is certainly more constituent that constituted, but in which it appears to him above all in a contrasting size (un relief de stature) that fixes it and in a symmetry that inverts it, in contrast with the turbulent movements that the subject feels are animating him.

[18]J. Laplanche and J. B. Pontalis, *The Language of Psycho-Analysis*, trans (New York: Donald Nicholson, 1973): 250. I have relied on Laplanche and Pontalis repeatedly to translate Lacan's notoriously obscure discourse.

[19]Sandy Flitterman-Lewis, "Psychoanalysis, Film, and Television," in *Channels of Discourse. Reassembled* (Chapel Hill: University of North Caroline Press, 1992): 208.

[20]Jacqueline Rose, *Sexuality in the Field of Vision* (London: Verso, 1986): 53. Rose points out that Lacan is careful to stress that misrecognition is not restricted to the field of the visible alone, but the mirror should be understood as an object which reflects – not just the visible, but also what is heard, touched and willed by the child.

[21]Kaja Silverman, "Fassbinder and Lacan: A Reconsideration of Gaze, Look and Image," *Camera Obscura* 19 (July 1991): 57.

[22]Ibid.

[23]Jacque Lacan, *Four Fundamental Concepts of Psycho-Analysis*, trans. Alan Sheridan (W.W. Norton: New York, 1978): 106.

[24]Jay, p. 365.

[25]Silverman, p. 76.

[26]Ibid.

[27]Ibid.

[28]Lacan, *Four Fundamental Concepts*, p. 107

[29]Norman Bryson, "The Gaze in the Expanded Field," *Vision and Visuality*, ed. Hal Foster (Seattle: Bay Press, 1988): 87-108.

[30]Michel Foucault, *The Archaeology of Knowledge and The Discourse on Language*, trans. A.M. Sheridan Smith (New York: Pantheon Books, 1972): 33. Foucault describes the discursive field of medicine. "It was no longer a group of traditions, observations, and heterogeneous practices, but of a corpus of knowledge that presupposed the same way of looking at things, the same divisions of the perceptual field, the same analysis of the pathological fat in accordance with the visible space of the body, the same system of transcribing what one perceived in what one said (same vocabulary, same play of metaphor); in short, it seem to me that medicine was organized as a series of descriptive statements."

[31]Ibid. p. 92.

[32]Ibid.

[33]Ibid.

[34]Lacan used the Ambassadors to illustrate the gaze. Using a technique called anamorphosis an extreme case of perspective, where the viewpoint is at the side, and near the plan, of the picture itself. When viewed from this point or as a reflection of a curved mirror, the image returns to normal. Alison Cole, *Perspective* (London, 1992): 32, 33. Spectators viewing the Ambassadors must simply discover the improbable viewpoint – about 6 1/2 feet to the right of the edge of the painting, at the eye level of the two ambassadors – to unscramble the skull image and so understand its symbolic meaning.

[35]Ibid. 93.

[36]Lacan, *Four Fundamental Concepts*, p. 89. The scull makes visible the subject as annihilated.

[37]Bryson, p. 94.

[38]Ibid. p. 107.

[39]Peter Novick, *That Noble Dream: The "Objectivity Question" and the American Historical Profession.* In his ambitious book Novick traces the development and importance of the myth "objectivity" to the American Historical Profession and discusses Foucault's challenge to this concept.

[40]Hayden White, Metahistory*: The Historical Imagination In Nineteen-Century Europe* (Baltimore: John Hopkins University Press, 1973): 102.

[41]*Ibid.* p. 106.

[42]*Ibid.* p. 102.

[43]*Ibid.* p. 104.

[44]Manfredo Tafuri, *The Sphere and the Labyrinth* (Cambridge: The MIT Press, 1987): 3-21 Tafuri's book was published in Italian in 1980. Tafuri discusses the implications of both Foucault and Lacan to architectural history.

[45]Foucault's challenge of "origins," in favor of genealogy, his introduction of discourse and épistème, have become commonplace.

[46]Alice T. Friedman, "Architecture, Authority, and the Female Gaze: Planning and Representation in the Early Modern Country House," *Assemblage* 18 (1992): 43. She uses Lacan's notion of the' gaze' to focus on the role of visuality and vision in the creation of categories that create identities and confer authority and powerlessness.

[47]Beatriz Colomina, *Privacy and Publicity: Modern Architecture as Mass Media* (Cambridge: The MIT Press, 1994): 9 Colomina describes the modern transformation of the house produced by spaces defined by walls of (moving images). This is the space of media, of publicity of spectatorship.

[48]Anthony Vidler, Warped Space: *Art. Architecture. and Anxiety in Modern Culture* (Cambridge: The MIT Press, 2000)

[49]Sandy Flitterman-lewis, p. 210.

[50]Mike Budd, Steve Craig and Clay Steinman, *Consuming Environments: Television and Commercial Culture* (New Brunswick: Rutgers University Press, 1999): 100.

[51]Hanna H. Gray, "Renaissance Humanism: The Pursuit Of Eloquence," *Journal of the History of Ideas* Vol. XXIV, No. 4 (Dec. 1963): 506. The humanists applied to their analysis of many disciplines the ideas of the vocabulary of rhetoric. Alberti, for instance, adapted the teachings of ancient rhetoric to the formulation of an 'art' of painting. In their discussions of the 'art' of history, Renaissance humanists utilized rhetorical doctrines in describing the structure and purposes of historical writing and defined history within the classification of eloquence. The humanists also assimilated the concepts of rhetoric to precepts of another nature. The terms "*decorum*" and "*imitatio*," for example, are central in both rhetoric and moral philosophy, and the humanists often appear to fuse their meaning whatever the context. Thus, the imitation of stylistic and of ethical models are spoken of in identical terms; or the idea of always speaking appropriately, of suiting style and manner to subject, aim, and audience is treated as the exact analogue of behaving with decorum, of choosing the actions and responses which are best in harmony with and most appropriate to individual character and principles on the one hand, the nature of circumstances on the other. p. 506.

[52]Terry Eagleton, *Literary Theory: An Introduction*, 2nd edition. (Minneapolis: The University of Minnesota Press, 1996): 179 Eagleton proposes rhetorical analysis of 'discursive practices' replace literary theory, which he views as an illusion.

[53]Refer to footnote 3.

[54]Leo Braudy, *The Frenzy of Renown* (New York: Vintage Books, 1997): 33. Diogenes knew a little about life and by extension historiography and a lot about power. When Alexander the Great was in Corinth, he went to visit the Diogenes and found him sitting under a tree. Alexander left his military escort to approach Diogenes and asked him what he could do for him. Stay out of the way, Diogenes said, you're blocking the sun. The solders were horrified, expecting one of Alexander's famous outbursts of anger. But Alexander just laughed and remarked that if he were not Alexander, he would like to be Diogenes.

Where Pleasure and Mystery Overcome the Practical:
The Paradox of Old South Myth and New South Progress in New Orleans Architecture

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NEW ORLEANS AND THE NEW SOUTH—STANDING BETWEEN TWO WORLDS.

In 1885 the Louisiana Industrial and Cotton Centennial Exposition closed its gates. It was also the year in which George Washington Cable's *The Silent South* was published. No longer a New Orleans resident, the author, whose stories of "Tite Poulette" and "'Sieur George" exposed the harsh realities underlying the glittering surface of Creole society, condemned racial policy and practice in the South.[1] Also in 1885, Walter H. Page abandoned his "mummified" North Carolina home for New York, convinced that if only the South could forget "constitutional questions which have been irrevocably settled," it could have its own golden cities and skyscrapers.[2] One year later, Henry Hobson Richardson, a native of St. James Parish, Louisiana, died. Although his contributions were widely recognized as seeds of a new and uniquely American architecture, his landmark Trinity Church (1874) stood in Boston's Copley Square, while his precedent-setting Marshall Field Warehouse (1885) was in Chicago.[3] Critics of Southern culture have judged the end of the nineteenth century harshly, lamenting that the first generation of the New South made almost no contribution to its own native culture. Resurgent historicism and the embracing of national trends in design suggested that the supposedly *New* South remained a cultural and economic backwater, trapped between dying traditions and burgeoning modernity.[4] Architecture was a tangible vehicle for mediating this disparity. This was especially true in New Orleans where the very image of the city was a site of cultural conflict, caught between the national popularity of its antiquities and the local promotion of modern American architecture.

Stereotypic Doric columns and pediments of ante-bellum plantations and Garden District mansions rendered the Old South in harmony with established touchstones of Western civilization from Vitruvius to Palladio. But the essence of Western civilization on the precipice of the new century was the realization of the project of modernity. The latter necessarily meant industrialism, which demanded a new kind of city that New South spokesmen saw as the salvation of their region. Already equipped with a revitalized port, established as a center of trade, and blessed with high cultural production in the great houses that extended north along the St. Charles Avenue corridor, turn-of-the-century New Orleans—the South's largest city—was primed to become that urban model. In the years between the emergence of the New South and the appearance of the New Deal, New Orleans's architecture reveals the complexity of American modernization in a cultural climate shaped by the legacy of French and Spanish colonial history and Old South legends. Cultural contradictions, often manifested in the physical stuff of the city, abounded. Tourists dined at Antoine's, writers who would become literary giants contributed to the *Double Dealer*, and immigrants hung peppers and macaroni from their wrought iron balconies within a few blocks of the Vieux Carré. The city's architects housed its elite in both concrete boxes and Georgian piles. The skyscraper, the slum, and the plantation did not merely coexist. They expressed a complex relationship between the past and the present which irrevocably colored the representation and reading of the city.

"IT DOESN'T LOOK LIKE THE SOUTH."

At the height of pre-Depression prosperity in the South, W.J. Robinson described the region through pointed comparisons:

> *Skylines that once pictured ancestral trees today bear the outlines of factory stacks and skyscrapers. Hills and meadows that once knew only the deer and the fox and the path of the lonely mountain folk support roadbeds of trunk line railroads and great highway systems.*[5]

The characterization well captured New Orleans. During the first quarter of the twentieth century factory stacks punctuated the riverfront, skyscrapers refigured the business sector, and spectacular steel bridges linked the city with the outside world. As early as 1910, *Collier's* praised New Orleans as one of the most interesting and picturesque of Southern cities: "It is growing marvelously...Modern office buildings are being rapidly substituted for the squatty architecture of ante-bellum days."[6] This assessment is all the more telling, for it was reprinted in *Architectural Art and Its Allies*, the organ of the New Orleans Chapter of the American Institute of Architects.

Edited by architect and civic leader Allison Owen (1869-1951),[7] *Architectural Art and Its Allies*, published from 1906 through 1912, offered a forum for "essays on civic improvement and Southern ar-

chitecture."[8] Articles documenting the history of New Orleans architecture also appeared occasionally, as did pieces picked up from the national press, including such noteworthy contributions as Louis Sullivan's "What is Architecture. A Study in the American People of Today."[9] Expressly directed to construction and real estate interests as well as to architects, the journal's rhetoric propounded the values of modernism and progress, but its conceptual bases appeared broad and inclusive. Preserving the city's antiquities could be accomplished while promoting the construction of all buildings that "express the spirit of their age."[10]

Architectural Arts and Its Allies did not hesitate to express the spirit of its age: "Wonderful progress in sky-line buildings, up-to-date skyscrapers," the buildings that would take the place of the city's "antiquated structures."[11] The journal's 1910 essay "Modern New Orleans," a chronicle of the structures that would place New Orleans foremost among world-class modern cities, extolled the technological progress and aesthetic grandeur of the city's contemporary buildings. As an historical document, "Modern New Orleans" provides a succinct portrayal of the rising cityscape's most telling architectural features. On the surface, the article offers a laundry list of those buildings that comprised the swelling central business district north of Canal Street. On a deeper level, it firmly establishes modernity and marketability as concomitants in the New South city. Modernity and its attendant industrial progress are implicit in discussions of lighting, fire-proofing, and ventilating systems; marketability is suggested in head counts of Otis elevators, sunlight in office planning, and elegance of lobby decoration. Discussion of style is conspicuously absent.

In commercial building, New Orleans was far from being out of step in the advent of American turn-of-the-century architecture. Among the earliest examples included in "Modern New Orleans" is the Hennen Building (Thomas Sully, 1894-95), then considered the "first modern office building erected in New Orleans."[12] The essay described it in practical terms, as if scale and cost were the only criteria for great architecture: "Eleven stories high, occupying a 90' x 120' lot, and built at a cost of $500,000."[13] The Hennen Building demonstrates Sully's considerable debt to the formulas of the Chicago School in its articulated base of rusticated stone, a soaring vertical shaft enhanced by six stories of bay windows surmounted by a range of Roman-arched windows, and its relatively striped attic story that terminates in an overhanging cornice. A significant counterpoint to the evolution of the American tall building is presented through another example of Sully's work, the Liverpool and London and Globe Insurance Company (1894, demolished approximately 1919). Its "beauty of construction" and "excellent location," were mentioned in "Modern New Orleans;" so were its airy interiors and their harmonious decorations.[14] As in the Hennen Building, Sully employed the half-hexagonal bay window, engaging cast terra cotta ornament in a Sullivanesque mode. The brick and terra cotta structure was, however, rare among New Orleans skyscrapers, for its seven stories terminated in a deep Mansard roof, anchored by a pyramidal capped corner tower and punctuated with elegant dormers.

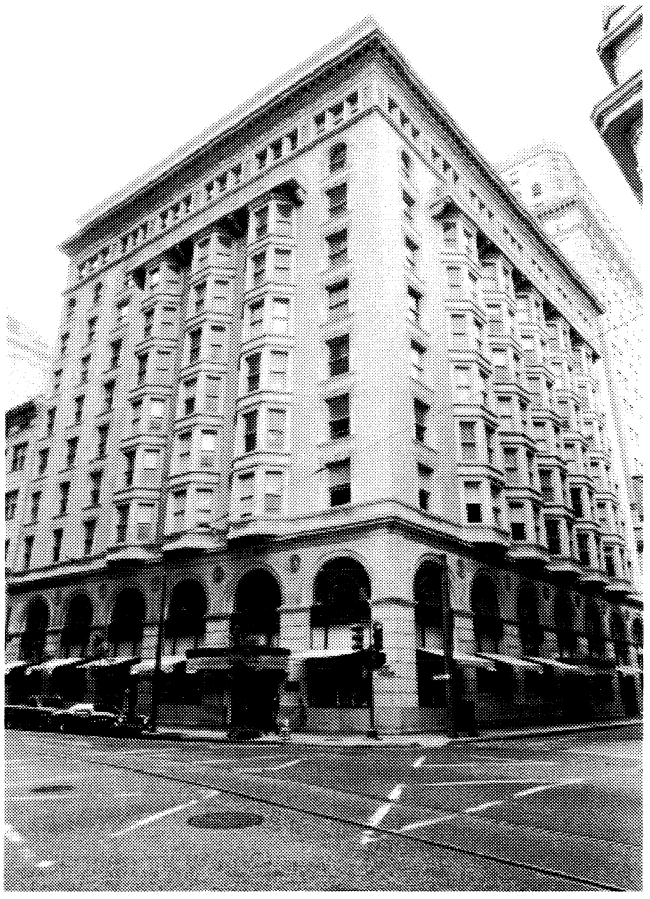

Fig. 1. Thomas Sully. Hennen Building. 1894-95.

Together, the Hennen Building and the Liverpool and London and Globe Building might have suggested that the New Orleans skyscraper, like those of New York, would not follow a single solution.[15] "Modern New Orleans" indicated otherwise. Photographs of an array of high-rise buildings revealed their architects' adherence to a ubiquitous, early-twentieth-century formula, constituted of the square-cut shape of the Sullivan skyscraper, but more heavily clad, invariably evidencing fashionable ornament derivative of the Academic Classical sensibilities that were so influential in American building since the World's Columbian Exposition. Prominent among the newest structures featured was the nine-story Canal-Louisiana Bank Building (1907), a work produced by journal editor Owen and his partner Collins Diboll with Moise Goldstein. *Architectural Art and Its Allies* celebrated the bank building's $350,000 construction cost, fire-proof concrete and steel structural system, electric lighting, and oak and marble interior fittings. This influential model was iterated in an array of American sector commercial structures: office buildings, including the Perrin Building (Favrot & Livaudais, 1906-07), and the Whitney Central Bank Building (Emile Weil with Clinton & Russell, 1908); department stores, notably the lush glazed terra cotta facade of the Maison Blanche (Stone Brothers, 1907-09), an early mixed use structure incorporating mercantile and office spaces; and hotels, especially the St. Charles (Thomas Sully, 1896, demolished 1974), designed on the model of the Italian Renaissance palazzo but at the great,

exploded scale of twentieth-century commerce.[16] In short, early-twentieth-century New Orleans was beginning to look like other places. The icons of modern New Orleans well fit New South historian W.R. Cash's characterization of the skyscrapers in the South: "Magnificent performers of splendor, testifying to their land and to vindicate it before the world's opinion." Nonetheless, Cash worried that Southern towns had little more use for skyscrapers than "a hog has for a morning coat."[17]

Fig. 2. Diboll and Owen with Moise H. Goldstein. Canal-Louisiana Bank Building. 1907.

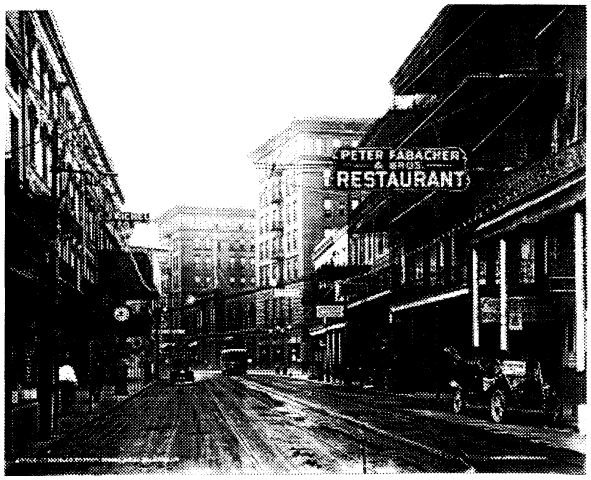

Fig. 3. Thomas Sully. Third St. Charles Hotel (background, center). 1896 (demolished 1974). View from Canal Street, c. 1910. Courtesy Library of Congress

Members of the Northeastern architectural establishment who traveled south to assess how the Old South's building traditions were faring in the New South's cities reviewed the region's architecture relative to their conception of a normative indigenous style in the manner of Jefferson and Mills—not that of their Louisiana counterparts Gallier and Henry Howard.[18] They were compelled to assimilate Southern progress, a veiled term for conveying architectural parity with the North, on the scale of the skyline rather than through the character of discrete structures. Aymar Embury's introduction to his "Old New Orleans" is thus revealing.

> *One's first impression of New Orleans is curious. About a dozen tall modern buildings, ranging from twelve to fourteen stories in height are dotted around the business section, and between and around those are the old brick commercial buildings of fifty years ago, facing on narrow streets its infinitesimal sidewalks and overhead trolleys...the old quarter lies to the south, and the fact that NewOrleans is at present interesting to the architects has arisen from the development of the business district, not in its former position, but in a new one.* [19]

Russell Whitehead's seminal "The Old and the New South" was more acrid in its early and incisive recognition of the degree to which the skyscraper irrevocably changed traditionally perceived Southern sense of place, characterized in New Orleans's indigenous residential forms.[20] New building paled in comparison. With endless repetition and wearisome monotony, the South was producing skyscrapers just like those of the North.

From Whitehead's critique of regional trends and sensibilities emerges a promotion of one proper style, Academic Classicism. Although he disdained the commercialism and vanity he saw in the construction of the high-rise in Southern towns, where "lower and less pretentious erections would be much more to the practical purpose," Whitehead showered praise upon Hale & Rogers' Shelby Country Courthouse in Memphis, Yale & Sawyer's Carnegie Library in Montgomery, and the Nashville Parthenon—all Classical piles. His bias served New Orleans well. Hale & Rogers' Post Office and Court House (1906-14, currently the Court of Appeals), steeped in Beaux Arts Classicism, costly, spacious, and the work of a "foreign" firm, was according to Whitehead, "the most important public building of the New South" .[21] Another well-known monument of New Orleans's Academic Classicism, Daniel Burnham's New Orleans Terminal Co. Station (1907, demolished c. 1948) was no architectural asset according to the critic—merely a convenient object lesson in the difference between "style and bloat."[22] If Whitehead liked his Classicism, he did so critically and selectively.

RECONCILING OLD SOUTH MYTHS WITH NEW SOUTH METHODS

A Federal building might have been an architectural gem, but is was no signifier of Southern pride of place. A nationally dominant syntax of design alone was not enough to symbolize nascent wealth and power in the New South. Even as New South cities displayed their desired modernity in hegemonic American architectural

clothes, the mystique of the Old South endured, its collective history popularized in place-bound images constructed of visual portraits and narrative description. The Old South was mythologized as an array of stately mansions with Grecian columns while New Orleans was idealized as a place of elegant aristocrats and exotic Creoles.[23] For the first three decades of the twentieth century, the popular press fueled these myths.

Articles seductively titled, "The Romance of Creole New Orleans," "The Charm of New Orleans," and "The Charm of Old New Orleans," placed a retrogressive lens on the city. New Orleans may have been a cosmopolitan Southern capital, but it was also a "city of pleasure, the renewer of youth;" during Mardi Gras, a place where "sojourners from the North seem to catch the intoxicating spirit of abandon most readily."[24] "Latin taste molded the form and decreed the decorations of all the old buildings of the Vieux Carré," to the degree that one could easily "imagine yourself in Seville, Naples, old Paris or Habana." [25] Photographs of courtyards, the French Market, and Royal Street, much like those illustrations that represented the city for Cotton Centennial revelers, accompanied descriptions ranging from the glamour of wrought-iron railing and patio archways to the romance of masked balls and vivacious women.

The voice of the professional press was no less vigilant in the construction of Old South myths vested in built forms. In a tribute to the cultural meaning and climatic fit of classicism, notably a Greek Revival classicism more prevalent along the River Road than in New Orleans proper, [26] *Southern Architectural Review* boasted that "All over the world wherever people know the South they know the traditional Southern house as well as if it were the trademark of that section."[27] In the parlance of the architect, New Orleans's built heritage could be addressed in terms of the climatic adaptation of balconies or the "extraordinary refinements practiced in the proportioning of openings and disposition of story heights," but the collective memory of the plantations that once dominated the faubourgs above Canal Street remained strong.[28] It was such houses on Bayou St. John—for example the Louis Blanc House (c. 1798), the Evariste Blanc House (c. 1834), and the Pitot House (1796-99) with their principal stories raised on massive columns above the damp ground and severely pitched overhanging roofs—that *Architectural Record's* critic preferred.[29] These relics of the faubourgs that surrounded the old city evoked the plantation myth, but New Orleans urban boosters had another time-tied mystique with which to contend, that of the Vieux Carré.

Fig. 4. Pitot House. 1796-99. View from Bayou St. John.

Long bounded by the commercial buildings of American progress, pitted by trolley tracks, and strung with electrical lines, Canal Street remained a blatant line of demarcation between old myths and new hopes in the twentieth-century city. On the one hand, it was "bustling with energy and ambition, noise and electric lights, shops, movie theaters, banks, tourist offices, skyscrapers, and streetcars."[30] On the other hand, it was the impenetrable fortress that held the world of business at bay, "the strip one crossed to enter an older world where pleasure and darkness and mystery overcame the practical."[31] Urban boosters shuttled visitors to the modern American sector, hailing its utter and absolute modernity, as if the history of the Vieux Carré was an obstacle to progress and prosperity:

> *She is modern...the old New Orleans is dead. Of course...we regret the passing of so delightful a creature. But you know, she was perverse: she was dreadfully dangerous.* [32]

New Orleans's dilemma was how to have twentieth-century progress and antique enclaves existing at the same time?

Fig. 5. Canal Street. c. 1910. Detroit Publishing Co.. Courtesy Library of Congress.

Through its first two centuries, the Vieux Carré, the traditional symbol of the New Orleans preservation ethos, was the site of considerable change in population and economic profile. By the start of the twentieth century, it was falling into a serious decline which has never been entirely reversed. The myths of New Orleans past and the reality of its present were poignantly wedded by Faulkner, who characterized the city as "a courtesan, not old and yet no longer young, who shuns the sunlight that the illusion of her former glory be preserved."[33] The Vieux Carré was shunned by the majority of New Orleanians to whom it was at best an eccentric appendage to the twentieth-century urban core and at worst a slum. In contrast, it was venerated by a community of artists and writers, "huddle(d) together for some dim communal comfort" and who, compelled by its exoticism, bid to make it a Southern Greenwich Village.[34] When Storyville, New Orleans's legal red light district closed in 1917, many feared that the Vieux Carré would be overrun with brothels and saloons. According to Lyle Saxon, "there was even, at one time, a movement among a group of citizens to tear down the entire Quarter as a rat-infested slum not in keeping with their views as to what a city should be."[35] Images of the depression era French Quarter are equally sobering, revealing a neighborhood ravaged with dereliction and decay.[36] As Lafcadio Hearn wrote: "Without roared the iron age, within it one heard the murmurs of a languid fountain."[37] It was a fitting description for a place constructed of paradoxes—progress and tradition, beauty and decadence, and reality and fantasy.

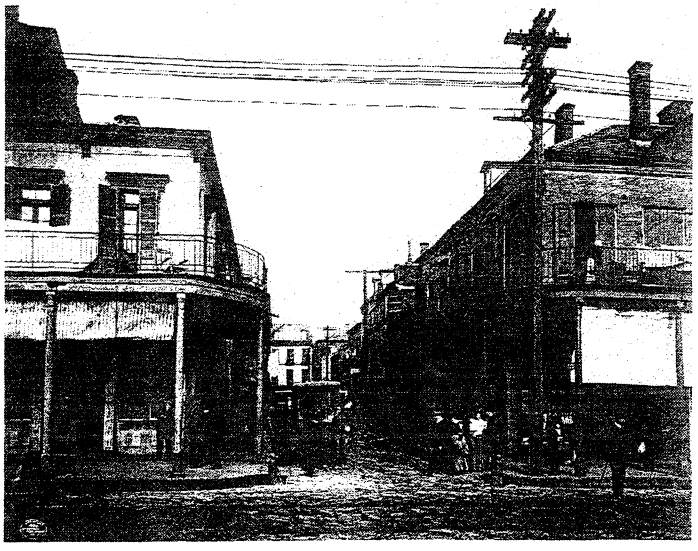

Fig. 6. Exchange Place in the Vieux Carré, c. 1906. Detroit Publishing Co., Courtesy Library of Congress.

William Faulkner's acid critiques of the mores of money in the American sector, Saxon's tales of haunted houses and Creole youth, and the *Double Dealer's* growing reputation as a literary voice provided evidence for the unique quality of life that thrived in the French Quarter.[38] So too were Moise Goldstein's and Nathaniel Curtis's pleas for the preservation of the architectural fabric of New Orleans's past.[39] These lucid voices in defense of the old city were not necessarily embraced in the local mainstream, but they were heard. Historical concerns need not lead to a backward slide into antiquarianism; they could be progressive, an intrinsic part of the evolution of the city. To the New Orleans business community, the Vieux Carré with its singular architectural legacy was no mean reminder of a distant past; it could be harnessed as yet another commercial resource, a device for promoting contemporary agendas.[40]

Building upon established perceptions of the old city, the past was handily partnered with the present in the promotion of New Orleans. Historical architecture and the unique cultural landscape it comprised were the visually accessible vehicles for so doing. As early as 1908, *Architectural New Orleans Illustrated*, a promotional brochure published by the Contractors and Dealers Exchange, featured photo montages of French Quarter monuments—the Cabildo, the Mint, and the Beauregard-Keyes House—were mingled with construction photographs of Favrot & Livaudais's high-rise Perrin Building, new wharves, and a new plant for the American Sugar Refining Company. In the 1920s, the St. Charles Hotel promoted its modern hostelry with thumb-nail sketches of the 1834 and 1851 structures that constituted its own architectural history. The hotel also published a promotional brochure, provocatively titled *The Paris of North America*, which offered sketches of French Quarter landmarks occupied by figures in period clothing, intended to evoke the antique.[41]

Pre-Depression era railway brochures provide some of the most graphic evidence of the manipulation of the past and present conveyed through built-environment imagery and place-bound rhetoric. Missouri-Pacific's *New Orleans, City of Commerce and Carnival*, presents a complex portrait of place. The tone of the promotion is established in the pamphlet's cover which depicts a masked woman in Spanish dress posed against the riverfront, the port framed by skyscrapers. St. Louis Cathedral embodies the legacy of the traditional city in the scene A border design evoking the profile of the port and the central business district skyline frames each page. These establishing images are urban caricatures, representing a place where Mardi Gras offers spectacles that cannot even be imitated elsewhere, and which are as much a part of the city's life as its ever busy dock and impressive growing skyline...(it is) as full of business as it is full of fun.[42]

Even in advertisements, placemaking in New Orleans leant itself to contrast and contradiction. Mounting bank deposits, immense tonnage figures, and a teeming waterfront coexisted with quaint restaurants and beautiful patios.

The packaging of New Orleans to attract tourists or investors underscored that it was the visitor to the city, especially from the North, who would have a special appreciation of the unique Vieux Carré. With striking acuity, the national press, usually a willing partner in perpetuating a magnolia-scented New Orleans frozen in time since ante-bellum days, read this blatant commodification of place clearly, and with tacit acceptance. "For better or worse, it's Lafcadio Hearn versus the Association of Commerce, " declared *Outlook:* "New Orleans has become definitely and cheerfully standardized and

commercialized. It has in measure sold, or is selling, its French-Spanish birthright for a substantial American mess of profitable pottage."[43] This was not necessarily a critique: if architecture could sell New Orleans as efficiently as gumbo and pralines, it was simply another signal that modern American culture was the product of nationalization and capitalism, as well as the marketing that powered both enterprises.

By the time that the Depression signaled the beginning of the end of the New South, the modernization of New Orleans architecture had climaxed with the construction of such new landmarks as the Hibernia Bank Tower (Favrot & Livaudais, 1919), which met the street with a Doric colonnade but terminated in a domed cupola twenty-three stories above ground, and the American Bank Building (Nathaniel Curtis for Moise H. Goldstein, 1928-29), which rose to a cathedral-like lantern ornamented with lightening-bolt motives, strictly in the spirit art deco, the newest Northern style tall buildings. Bold and easily recognizable in the skyline, these towers soon rivaled the visual power of St. Louis Cathedral and the Cabildo in the popular imaging of the city. For 1920's arbiters of taste, they were further evidence of the South's obsession with keeping its architectural work abreast with contemporary buildings in the country at large. Fiske Kimball was especially critical of the national tendencies in Southern architecture as opposed to those "scarcely realized" Southern traditions which offered "an individual point of departure."[44] In the South, there was not one but many local traditions, all of which, Kimball recognized, offered design principles susceptible to modern negotiation and interpretation.

Fig. 7. View of Carondolet Street from Canal Street showing American Bank Building. Nathaniel Curtis for Moise H. Goldstein. 1928-29 (left of center) and Hibernia Bank Tower. Favrot & Livaudais. 1919 (cupola right of center).

SOUTHERN TRADITIONS AND AMERICAN PROGRESS.

The tenacity of old myths, symbols and images in tension with progress did not stop the search for a usable past as a means of fostering the emergence of a new Southern architecture, nor did it inhibit a blending of the opposing ethos of place-bound regional architecture and high modernism. As promotion of the Vieux Carré suggested, Southern identity was as much a matter of the power of the region's historical collective as it was a product of national themes in commerce and culture. Embracing the project of modernity and championing regionalism were not entirely incompatible. Perhaps in response to the derivative nature of Southern building in the first decades of the twentieth century, architects aspired to create a uniquely Southern architecture, "if not a distinctive style, at least a manner of practice...distinctive from other sections."[45] New building could be colored with the heritage of Southern tradition, yet remain free of the limitations of past styles and expressive of modern tendencies. With nearly religious zeal, *Southern Architectural Review* set forth the challenge of so doing:

> *The architects of the South (must be united) in a determination to create that which will express again the philosophy of Southern life as well as meet the now more varied demands of that society and provide for all conditions of climate and topography.* [46]

These sentiments echoed Nathaniel Curtis's observation twenty years earlier: "The old architecture of New Orleans abounds in curious and interesting detail, much of which would undoubtedly be of suggestive value to modern design." [47]

As the agenda of the New Deal outstripped the legacy of the New South, New Orleans had not only retained its privileged position as the largest city in the South, but the image of a culturally and commercially thriving city that had been the subject of popularization and promotion since the turn of the century was just that, an image—a rhetorically and imagistically constructed urban agglomerate. New Orleans, like other New South cities, had become a place where one had to drive by the prosperous suburbs where raised cottages could be moved in and renewed while new regional architecture was poured in place, circumvent the central business district where the hegemony of tower-studded skylines reigned, and chose carefully one's haunts in the Vieux Carré to find art that could not be bought as consumer goods. Together, isolated architectural monuments and romantic national accounts of the glories of the past, promoted uncritically to fuel development in the center city, extended the dialectic of the past and the present in the construction of New Orleans's identity as an American and a Southern cultural text. They still do.

Monuments of American architecture's highest styles, from the turn-of-the century's Hennen Building to the postmodern Piazza d'Italia render New Orleans and the South one with a national cultural hegemony. Treasured remains of colonial settlement in the Vieux Carré, the relics of industrial vernacular along the riverfront, and the enduring influence of the plantation defy such categorization. The ever-present intertextuality among the architectural fabric of the past and the present, the ancient and the modern, and the regional

and the global is part and parcel of making cultural sense of the city. It is also the essence of modernity—to make ourselves at home in a constantly changing world. The contemporary paradox of the Southern city is no longer merely a matter of unhurried speech spoken in an automobile speeding along a six-lane highway. It is the paradox of intimate collective memory vested in place juxtaposed furiously against mass mediated memory and historiography evoked in words and images.

ENDNOTES

[1]See Alice Hall Perry, "Native Outsider: George Washington Cable," in Richard S. Kennedy, ed., *Literary New Orleans. Essays and Meditations* (Baton Rouge and London: Louisiana State University Press, 1992), 1-7.

[2]Burton J. Hendrik, *The Training of an American. The Early Life and Letters of Walter H. Page. 1855 - 1915* (Boston: Houghton Mifflin, 1928), 146 cited in C. Vann Woodward, *Origins of the New South*, 1877-1913 (Baton Rouge, Louisiana State University Press, 1951), 163.

[3]See Woodward, Origins, 452-54. Woodward read Richardson's case as part of a "swelling migration of Southern talent to the northeast." He noted that another great father of American modernism, John Welborn Root, was a native of Georgia. Strictly speaking, Richardson's own works are absent among the buildings of New Orleans and Louisiana. The Howard Memorial Library (1887), finished by the successor firm, Shepley, Retan, and Coolidge—purportedly according to Richardson's design—is often attributed, posthumously, to him. In form, massing, and detail of the exterior, this Romanesque Revival structure, executed in sandstone is strongly reminiscent of Richardson's Crane Memorial Library (Quincy, Massachusetts, 1880-83). For Richardson see especially, Marianna Griswold Van Rensselaer, *Henry Hobson Richardson* (Boston, 1888); Henry-Russell Hitchcock, *The Architecture of H. H. Richardson and His Times* (New York: Museum of Modern Art, 1936; Hamden, CT: Archon Books, 1961); and Jeffrey Karl Ochsner, *H. H. Richardson Complete Architectural Works* (Cambridge, MA: MIT Press, 1982).

[4]See George B. Tindall, *The Emergence of the New South. 1913-1945* (Baton Rouge: Louisiana State University Press, 1967), 787.

[5]William J. Robinson, *The Changing South* (New York: Boni and Liverwright, 1927), 14.

[6]Excerpt from *Collier's Weekly* cited in "'Ad' For A City," *Architectural Art and Its Allies* 6 (September 1910): 8.

[7]Owen was a principal in Dibboll & Owen, one of New Orleans's leading early twentieth-century firms. Among their works in the city are the Baroque influenced Sacred Heart Academy (1899-1900); the Richardsonian Romanesque First Methodist Church (1906, demolished 1950s); the Beaux Arts Classical Old New Orleans Public Library (1907, demolished 1940s), and the Canal Louisiana Bank Building (1907), one of the city's early skyscrapers.

[8]See *Architectural Art and Its Allies* 6 (July 1910): 8.

[9]Louis Sullivan, "What is Architecture. A Study in the American People of Today," *Architectural Art and Its Allies* 1 (March 1906): 15-20. Prominent among the articles featuring the historic fabric of New Orleans is Moise Goldstein, "The Architecture of Old New Orleans," *Architectural Art and Its Allies* 1 (March 1906): 1-7, 9.

[10]Goldstein, "Old New Orleans," 7, 9. Goldstein argued for a culturally constructed architectural history of the city. Questioning the rightness of strict chronology in the writing of history, he posits that understanding of evolution of New Orleans's built environment and its sense of place is determined by the respective French and Spanish cultural milieus that fueled its construction.

[11]"Modern New Orleans," *Architectural Art and its Allies* 6 (September 1910): 9. Trained in Austin, Texas and New York, Thomas Sully (1855-1937) is credited with introducing into New Orleans several popular late-nineteenth century architectural styles, particularly the classical modes of Richard Morris Hunt and McKim, Mead and White. After opening his New Orleans office in 1882, Sully enjoyed a successful, if regional, practice. See William Cullison III, *Architecture in Louisiana. A Documentary History* (New Orleans: Southeastern Architecture Archive, Tulane University: 1983) 18-19.

[12]See *Architectural New Orleans* (New Orleans, Contractors and Dealers Exchange, 1908), unpaginated, which featured a full-page photograph of the Hennen Building.

[13]"Modern New Orleans," 10.

[14]Ibid.

[15]For a salient discussion of the American skyscraper as an urban form see Vincent Scully, *American Architecture and Urbanism*. 2nd ed. (New York: Henry Holt and Company, 1988), *107-11, 144-46.*

[16]The St. Charles Hotel offers an interesting subtext in the architectural history of the city. The 1837 structure, a Greek Revival style building capped with a landmarking dome, was the work of James Gallier, Sr. and Alexander Jackson Davis, architects of considerable regional and national renown. The first St. Charles Hotel burned in 1851; the hotel was rebuilt, according to designs that have been attributed to both James Gallier, Jr. and Isiah Rogers. The second St. Charles also was a victim of fire in 1894. From the time of the construction of the first building until the demolition of the third, the St. Charles Hotel occupied the same site.

[17]W. R. Cash, *The Mind of the South* (New York: Alfred A. Knopf, Inc., 1941), 224-25.

[18]See Whitehead, "Old and New South," and Fiske Kimball, "Recent Architecture in the South," *Architectural Record* 55 (March 1924): 209-240.

[19]Aymar Embury, "Old New Orleans, Picturesque Buildings of the French and Spanish Regimes," *Architectural Record* 30 (1911): 85.

[20]See Whitehead, "Old and New South," 5.

[21]Ibid., 13-14. In addition to narrative references, the article featured plans of the first and second floor, and a rendered principal elevations of the building.

[22]Ibid., 24-25.

[23]See Cash, *Mind of South*, 5, 18.

[24]Lynn Tew Sprague, "The Romance of Creole New Orleans," *The Outlook*, 23 April 1919, 931.

[25]Edward Larocque Tinker, "The Charm of Old New Orleans," *Scribner's*, May 1919, 540.

[26]Cash, Mind of South, 5, 18.

[27]"New Forms from Old Ideas," *Southern Architectural Review* 1 (August 1936): 3. See also "Toward a Distinctive Southern Style," *Southern Architectural Review* 1 (September 1936): 3, and William Spratling, "The Architectural Heritage of New Orleans," *Architectural Forum* 48 (May 1927): 409-413. Spratling's sketches are quick, imagistic line drawing, suggestive of local forms and typologies; included are: "Maison Lemonier, Royal Street," "A Walled Courtyard and Overhanging Balcony in the Vieux Carré," and "Interesting Roofs and Dormers in the French Quarter."

[28]Spratling, "Architectural Heritage," 409.

[29]Embury, "Old New Orleans," 94-96.

[30]Mildred Cram, *Old Seaport Towns of the South* (New York, 1917), 289.

[31]Lafcadio Hearn cited in Hephzibah Roskelly, "Cultural Translator: Lafcadio Hearn," in Richard S. Kennedy, ed. *Literary New Orleans* (Baton Rouge and London: Louisiana State University Press), 26-27.

[32]Cram, *Old Seaport Towns*, 269-70; 273-74.

[33]William Faulkner, *New Orleans Sketches* (New York, 1968), 13.

[34]Tennessee Williams, *Where I Live: Selected Essays* (New York, 1978), 4.

[35]Lyle Saxon, *The Friends of Joe Gilmore* (New York: Hastings House, 1948), 134. Saxon's articles in the New Orleans Times Picayune provided the initial inducement for writers and artists who sought out New Orleans as a haven for their cultivating creativity.

[36]See especially Janet M. Gwaltney, ed., *The Carnegie Survey of Architecture of the South. 1927-1943: Photographs by Frances Benjamin Johnston*, microform edition (Teaneck, NJ: Chadwyck-Healey, 1985).

[37]Lafcadio Hearn, "A Creole Courtyard," *Creole Sketches* (New York and Boston: Houghton Mifflin, 1924), 81.

[38]For Faulkner, see *New Orleans Sketches*, ed. Carvel Collins (New York: Random House, 1958), and Cleanth Brooks, *William Faulkner. Toward Yoknapatawpha and Beyond* (New Haven: Yale University Press, 1978); for Saxon see especially his "Have A Good Time While You Can," *Century*,

October/November 1928, 84-94, and *Fabulous New Orleans* (New York: Appleton-Century, 1928). The *Double Dealer* was published from January 1921 through May 1926 (New Orleans: Double Dealer Publishing); Walter B. Rideout's "The Most Cultural Town in America: Sherwood Anderson's New Orleans," *Southern Review* 24 (Winter 1988): 79-99, offers an informative glimpse into one author's relationship with the journal. Mencken's contemptuous "The Sahara of the Bozart" appeared in his *Prejudices: Second Series* (New York: Alfred A. Knopf, 1917); see Jack Temple Kirby, *Media-Made Dixie. The South in the American Imagination*, rev. ed. (Athens and London: University of Georgia Press, 1986), Chapter IV, for a useful historical context for this piece.

[39]See especially Allison Owen, "The Architectural Charm of Old New Orleans," *Journal of the American Institute of Architects* 1 (1913): 426-35; N. C. Curtis, "The Work of the Louisiana Chapter in urging the preservation of the historic architecture of New Orleans," *Journal of the American Institute of Architects* 4 (May 1916): 219-33; and N.C. Curtis and William P. Spratling, "Architectural Tradition in New Orleans," *Journal of the American Institute of Architects* 13 (August 1925): 279-96.

[40]See Brownell, *Urban Ethos*, 197.

[41]*New Orleans. The Paris of North America*, Published by the St. Charles Hotel (New Orleans: Alfred S. Amer & Co., 1926).

[42]Missouri Pacific Lines, *New Orleans. City of Carnival and Commerce* (St. Louis: Woodward & Tierman Printing Co., 1929), unpaginated.

[43]George Marvin, "The Mistress of the Mississippi, New Orleans turning from the gracious memories and traditions of old Creole days, works for a constructive commercial future," *The Outlook*, 15 April, 1925, 569.

[44]Kimball, "Recent Architecture," 212.

[45]Harvey Smith, "Towards A Distinctive Southern Style," *Southern Architectural Review* 1 (August 1936): 3.

[46]"New Forms," 3.

[47]N.C. Curtis, "Work of the Louisiana Chapter," 220.

Montage, Color, and the Ground

Moderator: Paulette Singley, Woodbury University

Building in the Middle Ground

TED CAVANAGH
Dalhousie University

no manuscript available at press time

Mies van der Rohe's Photocollages of the Weimar Era

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Poême de Murs—

The Color Concept of the House La Roche

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A SHIFT IN MODE

Interlaced among Mies van der Rohe's realized buildings of the 1920's were two particularly prolific and important groups of unrealized proposals. While fallow of construction, these two ideational phases held great consequences for his career: the first for establishing his reputation as a "radical innovator" of visionary architecture in Germany, and the second for prefiguring the more sedate, tectonically driven concerns of his subsequent corporate American practice.[1] The proposals in the first group were his pioneering and canonical 'five projects' of 1921-24; those in the second were his 'skin study' entries for four competitions of 1928-29.[2] Due to their import, neither group has suffered any lack of scholarly study or reproduction in the Miesian literature. Yet when these two are juxtaposed a curious disparity arises between them that has escaped analysis. In bringing these speculative groups before the public as *representations*, Mies in the first predominantly used wholly conventional methodologies of perspective, physical model, and orthographic, while in the second he predominantly used the more novel, technologically modern medium of photocollage.[3]

While this shift in presentation mode might seem an inconsequential topic within Mies's weighty and eventful career, it gains significance when viewed in its Weimar Republic context. The socio-politically minded artists of Berlin between the wars raised the orchestration of photographs (montage/collage) to momentous heights.[4] Today, eighty years later, their clipped and grafted works still inspire intense scholarly excitement and set the benchmarks for what critical theorists of art choose to valorize as 'truly' avant-gardiste (i.e.: negatively Marxian) and choose to dismiss as hopelessly mainstream (i.e.: affirmatively bourgeois). That Mies himself went 'public' with photographic formulations in the charged context of the Republic begs investigation. Given their Weimar context, it is natural to attempt to place Mies's photocollages upon what Paul Mann calls the "polarized field" of dialectical discourse between resistance and mediation in the representational arts.[5] Is Mies an architectural parallel to John Heartfield, the Dada montagist?[6] Given contemporary critical theory's widespread identification of the word 'montage' with leftist sensibilities, my insistence upon labeling Mies's output as photo*collage* (instead of the more socio-politically loaded photo*montage*) already exposes my belief that Mies stood for mediation, not resistance, on that fractious cultural field. Resistance plays into Mies's embrace of photographic presentations, but it was society's resistance to him, not the other way around. His works were hardly images of accusatory negation like those that were fostered by Weimar's 'true' avant-garde.

Another reason to probe this change in presentation mode is to better understand how Mies wished his work to be publicly viewed. All of the unbuilt proposals in these two ideational phases were intentionally and elaborately prepared for exhibition, competition, or publication formats. Since these projects were speculative (either with no client in sight or else intended for submission to juries), their presentations were not for Mies tentative indicators of built realities to come but likely were to be these projects' final records.[7] In such cases, Mies would not approach his representational choices casually; a shift in mode likely harbors meaning. Yet another reason to probe this shift is simply that photocollage's role anywhere in Mies's *oeuvre* has received little comment, a rather surprising lacuna given the medium's prevalence throughout his life.[8] The questions of precisely when he began to use this technique, of how he developed and employed it, and of why he may have done so are rarely asked systemically.[9] One may as well begin by probing his most contextually loaded use of the medium, during Weimar.[10]

MIES AND PHOTOGRAPHY

Photocollage was but one facet of Mies's lifelong fascination with photography in all its manifestations and degrees of manipulation. Compelling reasons emerged early for him to consider photographs — especially job 'glossies' — seriously. The ephemeral nature of so many of Mies's first modernist buildings left his Weimar reputation wholly indebted to select prints, which rapidly became the endlessly reproduced surrogates for his lost works. As Beatriz Colomina, among others, has noted: "The work of Mies became known almost exclusively through photography and the printed media."[11] While certainly not a publication phenomenon like Le Corbusier,[12] Mies did help fund and edit the short-lived journal, *G*, which liberally illustrated his Weimar works.[13] Further, Mies understood the benefits of photo tampering; he (or an assistant) was expert at hand painting and, later, airbrush. Mies liberally retouched

numerous photos throughout his career as a way of altering objectionable contextual elements and even of altering his own compositions.[14] Photography also became critical to Mies's view of pedagogy. Soon after assuming the Bauhaus Directorate, Mies raised photography at the school to the status of an autonomous curricular discipline independent of the advertising department, and dramatically enhanced the position of the subject's teacher there, Walter Peterhans, a photographer whose work Mies admired so deeply as to later bring Peterhans along with him to IIT.[15] Using collage to extend photography into his architectural design and representation processes was natural for Mies given his keen interests in the field. This was the man who, after all, had himself immortalized late in life by sitting for Karsh.[16]

Photocollages appeared throughout Mies's career — albeit at different intensities.[17] He used the medium before, between, and after his two clusters of unbuilt proposals of the 1920's.[18] His earliest known effort appeared in the first public competition the young architect entered: the 1910 Bismarck Monument.[19] In addition to several immense charcoal renderings, Mies made two photocollages that emphasized the dramatic siting of his stolidly monumental, *Schinkelschule* proposal.[20] This project's historicist 'Romantic Classicism' immediately belies any supposition that Mies's breakthrough to technological modernism in the early 1920's provoked his embrace of the technically 'modern' medium of photocollage. While it is unknown whether Mies actually submitted these photocollages to the competition jury, they are large and astonishingly accomplished, showing that at the tender age of twenty-four Mies had already attained an aggressive command of this fairly new and challenging representational medium.[21] Already perfected was the basic procedure he would follow throughout Weimar: within a huge print of the context taken from an attainable, realistic position, he would excise (or direct to have left blank) a zone into which his own building would be hand drawn.[22] Factual (photographic) reality thus wholly surrounded and encapsulated his projects. When the Weimar Republic collapsed under Nazi pressure and Mies retreated from the outside world into his hermetic 'Court House' phase, he briefly inverted rather than abandoned this basic procedure. Collage totems of factual reality (statues, exotic veneers) were now themselves encapsulated and surrounded by a *drawn* matrix (his walled quadrants). After his arrival in America, Mies's hand-drafted, isolating 'context' opened to reveal glimpses once more of a photocollage exterior world. Though tightly framed at first, these photographic zones gradually migrated outward toward the periphery of his images, and slowly surrounded his architecture again.

Photocollage served Mies for fifty years after his Bismarck beginning, through many variations in architectural manner and outlook. In the final major commission of his career, the Berlin *Neue Nationalgalerie* of 1962-67, we find him studying the interior marble and wood finishes through this medium.[23] The intervening half-century witnessed upward of 80 photocollages, counting his studies and finished pieces.[24]

THE 'FIVE PROJECTS' PHASE

The initial group of ideational, unbuilt projects contained three office proposals (the first Friedrichstrasse Competition Project, Glass Skyscraper Project, and Concrete Office Building) and two villas (the Concrete and Brick Country Houses).[25] Mies did make several photocollages of the first Friedrichstrasse project — and these will duly be addressed at length; yet Mies likely created these as preparatory studio underlays for conventionally rendered, presentation perspectives (his movement toward photocollage as his primary, public medium had to wait 7 more years). What most intrigues me about the public exhibit pieces Mies put forward for the 'five projects' group is that despite their unquestionably revolutionary *architectural* means, there was nothing very revolutionary about their specific *representational* means.[26] The images which Mies chose to present for public consumption were thoroughly traditional methods of depiction, methods that had in fact been largely vetted during the Renaissance.[27] Of course the aesthetic and technical futurology of the projects themselves makes it difficult to focus on their representational systems alone. To suggest that such overwhelmingly prescient visions are conventional in any aspect seems like special pleading around their margins. But plead I will: to detect a dogged margin of convention in Mies's work, in whatever manner he may have expressed it, is critical to understanding his career.

The many rendered presentation perspectives Mies made of the 'five projects' were particularly customary in conception. Though breathtaking as sheer craft, these renderings' heavy charcoal textures, textbook shade-and-shadow conventions, pedestrian eye-level viewpoints, and general attentiveness to context (in the urban proposals) were conservative for the times. Leaving aside for the moment the progressive experiments others were contemporaneously making in photography, Mies's efforts were far from novel even on the level of hand drawing. Berlin, in addition to having close links to the Bauhaus, was the geographical intersection point during the early 20's for *de Stijl* and Russian Constructivism,[28] each of which conceived *drawn* space through extremely novel visualizations. Perspective rendering of any sort, when compared with Theo van Doesberg or El Lissitzky's contemporaneous explorations of axonometry's seditiously generative process implications, was a tame 3D methodology.[29] And even among the modernists remaining conversant with perspective, Mies was hardly forward-looking. When Melnikov, for example, used perspective, he often undermined its literalism by exploiting a non-contextual portrayal, a de Chirico-like distortion of construction, and a high-level vantage — a viewing position that provoked a more abstract, object-like presentation and a more vertiginous plunge toward the composition.[30] Compared to this, Mies's renderings are staunchly realist.[31] The most arresting aspect of Mies's perspectives was, in fact, their sheer scale. His Friedrichstrasse perspective was nearly six feet high; his Concrete Office rendering nearly *ten* feet long.[32] Such immersing gigantism, paired with Mies's obvious technical virtuosity in charcoal media, overwhelms the viewer's reaction, cloaking the cautiousness of Mies's representational choice. Instead of asking the systemic question of "why so traditional a perspective of so revolutionary a work?," we are first tempted to ask "why so big?" The scale of these perspec-

tives exposes Mies's pride in his masterful yet wholly conventional graphic technique; perhaps they were generated solely out of his desire to vaunt his obvious *Schinkelschule* drawing skill. The scale also establishes beyond question their public character; these could hardly be intended for anywhere other than a substantial gallery space.[33]

Much the same traditionalism pervades Mies's models of the 'five projects.'[34] The most unusual and often reproduced of these — the Glass Skyscraper maquette — admittedly experimented with the new material of Plexiglas. But despite this, the overall impression remains conventional as a representation. This transparent phoenix was affixed to a huge base, was encircled by contextualizing chunks of traditional city fabric, and was typically photographed rather factually in its entirety from standard, pedestrian, street-level positions.[35] Borrowed background trees added to the projective realism. Again, the method of representation is serviceable but less innovative than the architecture itself. Contemporaneous *de Stijl* or Constructivist architects, in contrast, sought wholly new categories of model-making expression. The highly isotropic character of their compositions was enhanced by their displaying of their models without any recognizably grounded context — teetering on stools, affixed to walls, or even suspended freely in mid-air.[36] They exploited all manner of sectional models, serial models (those that showed processes of transformation), and kinetic models (those that opened to expose the interpenetration of masses or the relationships of interior and exterior).[37] And when it came to photographing architectural models, the Russian Constructivists had a taste for dramatically fragmentary or tilted views, and also montages of spectral, multiple exposures implying motion.[38] None of these devices attracted Mies's curiosity.

With the orthographics of his 'five projects,' Mies did move farther from convention. His Brick Country House plan broke new ground in drawing methodology with walls running off three sides of the page — a justly celebrated graphical expression of these walls' theoretically infinite outward extension.[39] Here, architectural and drawn innovations coincide. Further, his rendered elevations of the first Friedrichstrasse project achieve a stark simplicity, drastically muting the context and allowing the mass's bluntly rectangular profile to collapse 3D space. These are the most abstractly progressive images within this first group of ideational projects.[40] Still, Mies's contemporaries went farther. *De Stijl* and Constructivism's jointed, fold-down, multi-view orthographics and combination orthographic/axonometric views are revolutionary reconfigurations of the architectural process on the graphic page.[41] While Mies was aware of these developments (both van Doesburg and El Lissitzky were published in *G*), he had no use for such novelties.

This entire assessment is not meant as criticism of Mies; to his credit, novelty was never his *sole* goal (a point I will reiterate when reviewing his later public deployment of the more outwardly novel method of photocollage in the 'skin study' projects). This assessment is only meant to highlight a one-hundred-year divide that is never acknowledged in discussions of the 'five projects.' Mies, especially with his enormous perspectives, depicts some of the most powerful architectural techniques of the dawning *20th*-century through some of the most powerful rendering techniques of the dawning *19th*-century (i.e.: Gilly, Weinbrenner, Schinkel, or von Klenze).[42] Mies's architecture and representations are equally skilled, yet Janus-faced. Only a master could fuse such fervently forward and backward glances into *unified* images — glances that together could wring the neck of a lesser architect.

Before moving on to relate these conventional presentations of Mies's to his public deployment of photocollage in the 'skin study' competition projects, the several photocollage studies he *did* make in this first cluster warrant careful attention. Three are known, all of Friedrichstrasse (two are lost, and today are reproduced only from negatives). Mies's making of these reminds us that he had established his capability in photocollage a decade earlier during the Bismarck Competition and certainly could have (if he wished) used photocollage extensively and publicly across *all* of the 'five projects.' How these three photocollages relate to the huge, extant Friedrichstrasse charcoal perspective has never been explored.

The Friedrichstrasse competition brief directed each contestant to prepare two "freehand" perspective views from prescribed positions.[43] It is my contention that Mies's photocollages were preparatory steps toward producing these required views. The two lost photocollages were likely of relatively small scale and were of exactly the same proportions.[44] These two show the building from diametrically-opposed directions looking north and south along the busy Friedrichstrasse Boulevard. They seem like early trial runs for a planned, pendant pairing of views to satisfy the competition requirement. Both remain sketchy in character and both indicate the building at its penultimate phase of design, immediately prior to Mies's final decision to remove certain reentrant facets at the acute corners of his glass skin.[45] The third, extant photocollage is a huge enlargement of the previously-used, south-facing photo. Mies cropped the south photo's proportions slightly from the right side and interjected a much more developed drawing of his building, now beginning to show the floor slabs, the glass skin's reflectance, and the simplified corner facets that all ultimately appear in his charcoal presentation rendering. No doubt this third photocollage functioned as either a direct underlay or as some other type of transfer mechanism for making his south-facing, 'final,' hand rendering. After taking into account cropping on the bottom and further cropping on the right, this third photocollage print's immense size (200 cm in height) exactly matches that of the final rendering, and every form between the two precisely corresponds.[46] In the literature it has gone unrecognized that Mies constructed his canonical Friedrichstrasse rendering not from scratch but somehow directly or substantially off a photocollage.[47]

Whether or not these last steps were repeated to create another (now entirely lost) pendant hand rendering of Mies's project looking north along the Boulevard is anyone's guess. While the competition brief requested a second view, I doubt it was actually realized in 'final' (non-collage) form since it likely would have appeared somewhere in the project's contemporaneous publicity. In any event, the point is that while photocollage was important to Mies's process at Friedrichstrasse, he did not judge it suitable for the jury room, gallery wall or publication. Photocollage was a legitimate *tool*, not

a legitimate *result*. We could, of course, assert that his actions only reflect this particular competition's brief, which required "freehand" perspectives. But surely this was not an impediment. Photocollage can — and in Mies's case *did* — include substantial components of literal, freehand drawing. Also, as noted above, Mies made 'final' hand renderings of other proposals among the 'five projects.' In these other projects, freed of any known competition constraints, he could have presumably put forward huge photocollages as 'end results' to his hearts content, yet he did not. (I suspect that he *did* make a gigantic photocollage underlay of his Concrete Office Building, but then redrew it for exhibition purposes exactly as he had done at Friedrichstrasse. The abbreviated, somewhat ghostly, 'non-constructed' feeling of the contexts in the two projects' renderings are identical. There is no reason to assume any disparity of process between them.)[48] Mies, circa 1921-24, wanted 'traditional' perspectives for hanging, not photocollages.

GOING PUBLIC: A PHOTOCOLLAGE QUARTET

Mies's turnabout on this issue becomes understandable when placed within two contexts: the reception his 'five projects' received and the collateral developments in photo orchestration in Berlin. Media attention and several substantial built commissions soon followed Mies's 'five projects,' but Weimar's hyperinflationary economy and the era's core conservatism (despite its fractiously effervescent surface) insured that his built works in the early to mid-20's were less adventurous than his visionary schemes.[49] The aesthetic/technical bravura of the 'five projects' attracted no immediate developers, only publishers.[50] The jury of mostly businessmen for the first Friedrichstrasse Competition rejected his proposal without even an honorable mention (as Mies recalled late in life, the jury "pushed my design into a dark corner, probably because they thought it was a joke").[51] Issues of "functional requirements, the environment, and questions of town planning" were raised against his scheme — this last item likely a reference to the building's total lack of setbacks that could relate it sensitively to the surrounding urban context.[52] Image also played a role: one commentator on the competition complained that Mies's building could only function as "a warehouse."[53] Despite its realist perspectival representation, his proposal was not viewed as *believable* in central, bourgeois Berlin. Mies could take consolation in the fact that the villas from the 'five projects' held promise of producing some important domestically-scaled progeny (Barcelona and Tugendhat were both on the horizon as Mies began his photocollage 'skin study' presentations), and his Weissenhof apartment block was a large, domestic success on a peripheral site in a provincial city. Yet no chance at a major, signature, business building or cultural institution in metropolitan Berlin had developed. Poelzig and Mendelsohn, in contrast, each already had a major theater to their names: the Großes Schauspielhaus (1919) and Woga Complex (1926-28) respectively. Bourgeois Berlin had so far ignored Mies.

Another contextual issue that surrounds Mies's public deployment of photocollage was the gaining prevalence of photo orchestration in Berlin. Mies may have been startlingly prescient with his 1910 Bismarck Competition efforts, but no longer. If Weimar culture was a receptor of many of *de Stijl* and Constructivism's new representational systems, it was a generator as regards things photographic. While the Bauhaus itself was initially less active than one would have anticipated in photography (though even it progressed rapidly after 1923/24 with the arrival of László Moholoy-Nagy),[54] there was no lack of other loci for photo activity in the Weimar Republic. Leitz in Wetzlar, after all, introduced the Leica in 1925.[55] As early as 1915, the Berlin Dadaists had led the way toward the fragmentation, manipulation, and recombination of photographic imagery, and by the time Mies went public with photocollage in 1928/29, their chaotic, explosive and provocative uses of the medium were omnipresent in postcards, book covers, periodicals, gallery exhibits, and the popular press.[56] Figures in Berlin such as Hannah Höch, Raoul Hausmann, George Grosz, and John Heartfield, as well as Max Ernst in Cologne and Kurt Schwitters in Hanover, prominently appropriated and then transformed photography's realism toward their own ends.[57] Mies was fully aware of the new horizon for photography; *G*, for instance, published John Heartfield and Raoul Hausmann.[58] Here came a novelty Mies knew and respected. In such a context, even someone as dedicated to charcoal as Mies would have to acknowledge that huge, rendered, hand perspectives might have become *passé*.

During 1928-29, four virtually contemporaneous competitions took place: three of them in central Berlin (the Adam Building, the Alexanderplatz reconfiguration, and the second competition opportunity for the original Friedrichstrasse site) and one in downtown Stuttgart (the Stuttgart Bank Building). Mies produced his second cluster of unrealized works. Instead of presenting immense hand perspectives, he now spoke directly through large photocollages.[59] In these Mies still carefully hand draws his own structure, but gone entirely is any drawn expression of the surroundings. His representational city fabrics take advantage of the "special relationship to reality" that only photographic methodologies can offer.[60]

An irony underlies Mies's public deployment of the more technically 'modern' medium of photocollage for this cluster of 'skin study' projects. These four proposals prefigured the more blocky, prismatic massing strategies of his corporate American works and are widely regarded as being less experimental and less compelling in terms of form than the earlier 'five projects.'[61] Also, in comparison to the earlier group, this second cluster less fervently celebrates or exposes modern technology. Mies now drastically curtails the volumetric transparency of his glass skin renditions, hiding the underlying structural expression and its method of generating the mass (in contrast to, for example, the transparent exposure of tectonics in the Concrete Office Building). At the very same moment that his public representational mode decisively moves forward 100 years, his architectural conceptions — seen through some eyes — pull back from aggressive originality and embrace more 'conservative' strategies. One certainly cannot ascribe the arrival of a more heightened technical modernity in representation here to any new needs fostered by this architecture. Clearly a transformation had occurred in how Mies wanted his work *perceived* by juries and the public.[62]

Not only did Mies change the public voice for this second group, but also at the same time he reworked the imagery of a scheme from the previous 'five projects' group — transforming it into photocollage. In 1928, he recast his curvilinear Glass Skyscraper project of 1922, presenting the same structure now as realistically incised — like his new photomontage projects — into a ground-level photograph. No longer did it look like an obvious view of a maquette resting on a base. Gone are the surrounding plaster contextual pieces and borrowed background trees. I suspect (based upon the specifics of the photograph he used here) that this rework was his first step in proposing the Glass Skyscraper as his new entry for the second Friedrichstrasse Competition.[63] If so, he subsequently decided against pursuing this and generated a wholly new scheme — one that suggestively possesses the only predominantly curved massing of the four 'skin study' projects. In any event, such a representational recasting of an earlier idea suggests how decisively by 1928-29 Mies desired his speculative proposals to be seen through the medium of photocollage.

Mies's technical virtuosity in the assembled set of 1928/29 photocollages is unmatched. Particularly astounding is his effortless sliding of a rendered volume in his Alexanderplatz scheme behind an existing lamppost supporting a silhouetted ladder in the ground-level site photograph. A magnifying glass examination of the surviving negative gives no clue as to how he could have achieved this *tour de force*. Nearly as impressive is his retention of needle-thin streetcar electrical wands in front of his rendered building in one of his Stuttgart Bank photocollages. He preserves traffic bollards and a hanging street light in front of his Adam Building rendering. Mies's weaving of drawn and photo imagery is compellingly *believable*. Every line in his inserted volumes conforms precisely to the perspectival cant of the existing urban fabric. Today's digital media may make this into child's play, but eighty years ago the believability of Mies's efforts was a rare achievement.

Soon after he designed them, Mies photocollages of his 'skin study' proposals were being widely published and avidly debated in print.[64] Frustratingly, though, the heightened believability of his photocollage images did not persuade the bourgeoisie to grant him these commissions. His Alexanderplatz entry, in fact, placed last out of the six participants.[65] The importance of these schemes lay in the future. Mies's projects of this second cluster were crucial for his American aesthetic and for his equally skillful efforts with photocollage in Chicago. The four 'skin study' schemes were prominently featured in Johnson's 1947 monograph on Mies, three of them through their photocollages alone. Two photocollages, as well as a summary plan and a shot of a preliminary model represented the fourth scheme, for the Alexanderplatz. Thus was America introduced after the war to Mies's late-Weimar proclivities in large scale office block planning: largely through photocollage.[66]

PHOTOCOLLAGE VS. PHOTOMONTAGE

Precisely the *believability* of Mies's 'skin study' photocollages is what makes me call them collages, not montages. Mies's fastidiousness in weaving photographic context and drawn proposal together in these images (a careful warp and woof composed of the existing conditions and his futuristic proposals) distances his efforts from contemporaneous *Weimar-stimmung* developments.

Since its popularization at the beginning of the 20th-Century, the term 'montage' has often been applied to artworks (and of course films) that employ purposefully fragmentary and jarring compositional strategies challenging the very concept of artistic unity. For Matthew Teitelbaum, for example:

> *"Montage offers a kaleidoscopic expanded vision which, by collapsing many views into one, suggests an experience of unfolding time. In effect, montage replaces the image of a continuous life glimpsed through a window frame — the heritage of the fine arts since the Renaissance — with an image, or set of reassembled images, that reflect a fast-paced, multifaceted reality .. .. "*[67]

In the urban realm, this immediately calls to mind examples such as the atomized compression of the cityscape in Paul Citroën's *Metropolis* photomontages of 1923 or the colliding juxtapositions of old and new in Malevitch's photomontage *Project for a Suprematist Skyscraper for New York City* of 1926.[68]

Even more specifically, the term 'montage' began in the 1920's to acquire (and has increasingly continued to acquire today) a socio-politically negational cast. Montage, in these historical and contemporary views, creates the fractured character of the 'truly' avant-gardiste artwork, which seeks to critique and expose (in the Dadaist/Marxian mode) the bourgeoisie's ideologically driven use of art as superstructure — the use of art to make a deceitful portrayal of life as 'holistic' in the modern metropolis of production. Peter Bürger's seminal 1974 study, *Theory of the Avant-Garde*, is the epitome of these precise, definitional analyses. Montage, for Bürger, is the *essential* avant-gardiste methodology, presupposing a "fragmentation of reality" whereby "the parts emancipate themselves from a superordinate whole." Bürger sharply differentiates "organic" (holistic, bourgeois) artworks from "nonorganic" (avant-gardiste, Marxian) images. He details how montage fosters overwhelming independence and autonomy among the parts. This aggregated appearance reveals the artwork itself to be an "artificial construct" suited to exposing the artificial character of the ideologically constructed society that it seeks to critique. Through montage the avant-garde artwork "breaks with the appearance of totality."[69] Following upon Walter Benjamin, Bürger links montage to allegorical practices — the casting together of melancholy, fragmentary "runes," which through their very basis in reality expose how fragmentary contemporary reality has become.[70] Bürger, like many before and after him, valorizes Weimar era Dadaist photomontages (particularly those of John Heartfield) as the apogee of this critical practice. As many authors have noted, for Weimar's socio-political artists like Heartfield, the "reality" inherent in photographic imagery was essential to their dissident goals. Photos, being inherently techno-mechanical, were subversively appropriate components in their attack on the technological modes of production. Further, photography's "special relationship to reality" allowed their works to move potently out into the class struggle of daily life, becoming

operative in ways that painting's language of abstraction never could.[71] Thus, in K. Michael Hays's words: "The medium of photomontage exactly suffices dada's destructive, negational task."[72] Not that all these well-meaning efforts got very far.[73] Paul Mann, in his scathing exposé on such avant-gardiste methods and the contemporary vaunting of them by critical theory, details how this kind of "strapped idealism of resistance" ultimately and ironically makes one realize that "every resistance is only further production."[74]

If views such as Bürger's summarize photo*montage* at its most precise in the Weimar era, then I am well justified in calling Mies's efforts in his 'skin study' projects photo*collage*, for they share none of these 'truly' avant-gardiste, socio-political pretenses or advanced visual effects. Again, similar to his Janus-faced renderings, Mies maintains a backward glance even as he steps forward into this more technologically modern medium. Far from allowing his inclusions to fragment the image, his photographic city views remain cohesive. No immediate "decipherment" need be made to allow entry into his images; Mies avoids the montagist's "conscious alteration of the obvious first sense of a photograph."[75] Readability — what Bürger would derisively dismiss as "a living picture of the totality"— remains absolute for Mies.[76] While Mies's architectural volumes unleash a stark abstraction into the city, this newness is represented *within* a context, not at the *expense* of a context. Toward that goal, Mies's representations carefully avoid collisions, distorted vantages, and fragmentation of the overall 'wholeness' of the image. These photocollages portray his projects not as melancholy critiques of the prevailing order but as viable possibilities within that order.

Admittedly everyone does not read Mies this way. K. Michael Hays, for example, interprets Mies's Alexanderplatz scheme precisely through the lens of Weimar avant-gardiste montage.[77] Hays suggests an analogy between a 1929 'truly' avant-gardiste image by Max Ernst and Mies's Alexanderplatz collage overview (and also extends this comparison to Mies's quite similar, decade-later overview of the IIT Campus).[78] Both Ernst and Mies, according to Hays, seek with their spliced constructions to create a "laconic display of two incommensurable experiences interlocked across the surface of the work."[79] Hay's use of the word "incommensurable" invites challenge. The word is appropriate to the Ernst image, where unity is indeed purposefully forestalled through Ernst's raw juxtaposition of alternate worlds. Ernst's washerwomen below and wrestling giants above remain wholly uninformed of the others' existence. This image reminds one of Theodor Adorno's Marxian definition of montage: "The principle of montage was supposed to shock people into realizing just how dubious any organic unity was."[80] Consistent with this goal, Ernst's "incommensurable" halves merely abut, their schism critiquing the very goal of unity in the modern bourgeois metropolis. But photocollage for Mies hardly serves this same goal. Believability, not schism, is his aim. While the repetitive and abstractly prismatic quality of Mies's blocks certainly brings something new to the metropolis — the "implacable silence" noted by Hays,[81] Mies, as detailed above, graphically mediates between this abstract quietude and the quotidian preexistence of the surrounding city. Bürger, following upon Adorno, would call such mediation a "semblance of reconciliation" — a handshake with the bourgeoisie.[82]

Not only is such reconciliation operative in the realist cast of Mies's graphic technique, but — if one looks closely — echoes of reconciliation are found in Mies's actual urbanism in the 'skin study' proposals. It is hard to agree with Hays when he writes that Mies's Alexanderplatz scheme "is a radical critique . . . of the established spatial order of the city . . .," and adds that ". . . the relentless sameness of [Mies's] units and their undifferentiated order tends to deny the possibility of attaching significance to the placement or arrangement of the forms."[83] To say this we must ignore portions of Mies's scheme. True, Mies makes no streetwall urbanism, but his starkly blocky forms *are* placed with urban significance. It is not just that Mies's volumes leave uninterrupted the existing street patterns or tram lines, or that they always respect existing view corridors into and through the site. These qualities are also found in the contemporaneous Berlin projects of Ludwig Hilberseimer, which can with more justification be described (as Hays elsewhere does)[84] as negationally avant-gardiste critiques of the urban order. It is rather that Mies preserves — however faintly — preexisting hierarchical patterns of city space. For example, not only does the existing traffic circle survive its urban reconfiguration in Mies's Alexanderplatz scheme unhampered in any way, but Mies stops his militarily repetitive blocks short of it and pivots a higher block outward at 90 degrees to acknowledge the presence and importance of this central space. Further, he uses an absolutely symmetrical 'set piece' (composed of a major volume flanked by lower wings) to address and receive the major entry avenue into plaza from the direction of the old city's center. These are precisely the kinds of "formal operations" or "representational devices" which Hays feels are wholly lacking in Mies's scheme (and that indeed *are* wholly lacking in Hilberseimer's work).[85] These spatial 'reconciliations' may be somewhat begrudging gestures by Mies compared to the nearly beaux-arts, curvilinear reinforcement that other competition entrants gave to the Alexanderplatz's central urban space, but they are nonetheless gestures Mies did elect to make.[86]

Reconciliation is counter to the 'true' motives of avant-gardiste montage, either as graphical image or as architectural action in built space.[87] Earlier I mentioned how some Modernists like Melnikov subvert the 'literalism' of perspective by adopting a high view rather than a pedestrian view. The fact that Mies elected to make an 'overview' photocollage of the Alexanderplatz has, I think, a very different motive. Mies used the overview here specifically because it could best illustrate the way his scheme, while radical in some respects, broadly conformed to the existing urban hierarchy. Perhaps Mies was still smarting from comments about how he had ignored the urban context in the first Friedrichstrasse Competition. He wanted to stress his considerable efforts at urban reconciliation this time.

Similar subtle gestures of urban reconciliation exist in other of Mies's 'skin study' projects.[88] And after Mies immigrated to America, this type of gesture only strengthens. Reconciliation is abundantly present in the American photocollage by Mies (the IIT aerial view) that Hays also compares to Ernst's 'truly' avant-gardiste example.

In this IIT view, the total conformance to Chicago's preexisting rectangular street grid, the way the street axes pass through the campus, and especially the paired symmetrical blocks flanking the street vistas all weave his scheme to the existing urbanism. By later in Mies's American career these gestures of reconciliation will become a major emphasis of his work, as Seagram's axial alignment across Park Avenue with the New York Racquet Club amply shows. To a staunch aficionado of the 'true' role of the avant-garde, such flirtation with gestures toward "an organic whole" is an anathema, a sell-out to the metropolitan bourgeoisie's ideological/superstructural deceit.

RESISTANCE AND PHOTOGRAPHIC REALITY

While both Mies and the Dadaist/Constructivist practitioners of montage sought out photography's "special relationship to reality" and turned it to their own ends between the wars, those ends differed substantially. For Mies and the montagists, photography's enhanced mimetic potential offered immediacy, and thus potency. As Lissitzky remarked, "No kind of representation is as completely comprehensible to all people as photography."[89] Both Mies and the montagists employed photography's realism to *convince* the public, but differed in what they wished to convince the public of. For the montagists, the realism of the fragments within their compositions accusingly sought to rivet, by analogy, the public's attention upon the fragmentation of surrounding life — the distance still to be traveled between the contemporaneous metropolis and some (ever receding, Marxian) utopia. Mies had no utopian leanings. For Mies, photography 's realism yielded enhanced believability instead of socio-political critique. Rather than focus upon the need to reconfigure society away from an irredeemably splintered (Capitalist) reality, Mies sought through collage to make his 'skin-study' proposals as believable as possible within the existing order. His modernist prisms were not utopist yearnings revealing and expanding the cracks within a shattered and flawed reality, but rather were a foreshadowing of the gradual process of transformation that confronts any reality, regardless of whatever socio-political system holds sway.

Viewed through this intent, Mies's embrace of photocollage in these four competition projects is only a furthering of the staunchly realist mode of his hand-rendered, perspectival images of earlier in the decade — images which already had sought to place his projects believably, even beseechingly, on site. Mies, for whom politics meant nothing, wished more than anything simply to build, for anyone, anywhere, anytime.[90] It is hard to feel that his embrace of photography's enhanced realism in the 'skin-study' proposals was anything other than a further attempt to persuade, despite the resistance his first cluster of technologically advanced, ideational projects had generated. If at the time of his canonical 'five projects' Mies had felt *Schinkelshule* realism might carry the day and grant him a signature commission, by the time of his 'skin-study' group he was ready instead to give photography a try. Perhaps he felt juries would more readily perceive his schemes as realizable facts, not fictions, if seen set amidst the visibly factual reality of the quotidian cityscape. Or perhaps he felt that portraying the existing city through photography's technological modernity would make the technological modernity of his works seem less jarring — more palatable.

Seen this way, both Mies and the Weimar montagists' uses of photography were spawned by resistance — Mies's beseechingly so as a response to a conservative society's skittish reaction to his work, and the montagists' accusingly so as a response to a society they wanted to expose and condemn. This reading assumes, of course, that Mies still remained fundamentally an optimist throughout late-Weimar times, in contrast to the Dadaists' incessant nihilism. There is another interpretation that should be weighed, though — one that would judge Mies's photocollages as culturally pessimistic. Perhaps he knew full well as he initiated his second cluster that such steel-and-glass high-rises would never stand a chance of realization in the context of late-Weimar. His shift to photocollage in this rationale would be a way of recording for posterity (through the most realistic and exacting of record-keeping methods) his progressive vision of what could have been — as part of 1920's bourgeois society, instead of in an utopian future. Even if so, this still leaves Mies distant from the montagists. The montagists rejected contemporaneous society through their works; Mies, if he indeed was acting pessimistically, made works that morosely recorded for posterity Weimar society's rejection of him. The flows of the resistance are asymmetric.

Of these two readings of Mies (optimist/pessimist), I suspect that optimism — even if in retrospect rather naïve — was what drove him. While several of the 'skin-study' projects were left schematic, his second Friedrichstrasse proposal was planned out to the last elevator bank, ready to commence construction documents if only his photocollage could persuade. He even sketched the furniture layouts.[91] After the Nazi seizure of power, and after articles with titles such as "Flat Roofs, Flat Heads" began to appear in building journals,[92] Mies still actively sought work through competitions (the Reichsbank of 1933, for example). He viewed his work as part of an ongoing dynamic of transformation independent of daily, or larger, societal vicissitudes. If success was not immediately forthcoming, then more exacting persuasion, not pessimism, was in order. America, ultimately, an ocean away, would prove his faith right.

Turning over even the most minute specifics within Mies's *oeuvre* — such as the conditions surrounding his Weimar use of photocollage — lays bare again and again his most quietly momentous theme: a willingness to be a part of culture's continuous flow. No matter how epochal the moment might seem, *Geschichte* tempers his grasps at radicalism. The conservatism of his *Schinkelshule* perspectives and the urban realism of his later photocollages are but two exposures of this quintessentially Miesian substrate. Kenneth Frampton, to cite another exposure, has unearthed and tracked a persistent blend of the retrospective and prospective in Mies's tectonic sensibility.[93] Colin Rowe notes yet another Miesian tensing of modernity with history when discussing how Mies's compositions "equilibrate both an outward pull and a centralizing moment."[94] These Janus-faced postures make Mies, that 'avant-gardiste bourgeois,' difficult to place in the sadly "polarized field" of discourse

frequented by recent critical theorists.[95] Mies's refusal to traffic in polarities is what will insure his continued significance (and lesson) once this strain of contemporary criticism abates.

NOTES:

[1]Quote from: Philip Johnson, *Mies van der Rohe* (New York: The Museum of Modern Art, 1978), pp. 21 & 34. For further remarks on the importance of the first group for Mies's career, see: Wolf Tegethoff, *Mies van der Rohe. The Villas and Country Houses* (New York: The Museum of Modern Art, 1985), pp. 15-18. For the importance of the second group, see: Franz Schulze, *Mies van der Rohe. A Critical Biography* (Chicago: The University of Chicago Press, 1985), pp. 146-147.

[2]My characterization of this second group as 'skin study' projects comes from: Frank Russell, ed., *Mies van der Rohe. European Works* (New York: Academy Editions, 1986), p. 46. The second Friedrichstrasse Competition project is, for unknown reasons, left out of this book, but obviously belongs with the other three 'skin study' projects.

[3]That this disparity of presentation method reads so strongly today could, of course, simply represent the accidents of survival. The majority of what remains for scholarly study of these two clusters are precisely their assembled 'public' imageries — their various presentation devices. Even so, the juxtaposition has merit since it is a comparison of apples with apples: the public face Mies presented in one phase with the public face of another.

[4]In the literature relating to 'cut-and-paste' photographic works in the Weimar era, a plethora of alternate names is used, for example: papier collé, *Klebebild. Fotoklebebild. Wirklichkeitsausschnitt.* photocollage, and photomontage. See Christopher Phillips, "Introduction," Matthew Teitelbaum, ed., *Montage and Modern Life. 1919-1942* (Cambridge: MIT Press, 1992), p. 26.

[5]Paul Mann, *The Theory-Death of the Avant-Garde* (Bloomington: Indiana University Press, 1991), p. 18.

[6]On Heartfield's political sensibilities, see: Peter Selz, "John Heartfield," *The Massachusetts Review* (IV:2, Winter, 1963); and Joanna Drew, ed., *John Heartfield. Photomontages* (London: The Arts Council of Great Britain, 1969), p. 11.

[7]It should be noted that Tegethoff has suggested that the Concrete and Brick Country Houses may have had Mies himself as a client [see: Wolf Tegethoff, "From Obscurity to Maturity: Mies van der Rohe's Breakthrough to Modernism," Franz Schulze, ed., *Mies van der Rohe. Critical Essays* (New York: The Museum of Modern Art, 1989), pp. 52-54]. Even so, the projects remain schematically theoretical.

[8]Most general studies about architectural representational methods merely note that Mies used photocollage. See: David Gebhard and Deborah Nevins, *200 Years of American Architectural Drawing* (New York: Watson-Guptill, 1977), p. 215; and Deborah Nevins and Robert A. M. Stern, *The Architect's Eye. American Architectural Drawings from 1799-1978* (New York: Pantheon Books, 1979), p. 148.

[9]The most thorough study to date of the *residential* photocollages is: Tegethoff, *Villas . . .* .. *op. cit.* Interesting remarks on the role of photocollage in Mies's American career are found in: Joseph Masheck. *Building-Art. Modern Architecture Under Cultural Construction* (Cambridge: Cambridge University Press, 1993), pp. 101-105.

[10]This essay forms the first third of an ongoing, more comprehensive, career-length study of Mies's photocollages.

[11]Beatriz Colomina, "Mies Not," Detlef Mertins, ed., *The Presence of Mies* (New York: Princeton Architectural Press, 1994), p. 213.

[12]For a review of Le Corbusier's pervasive efforts to achieve publicity, see: Beatriz Colomina, *Privacy and Publicity. Modern Architecture and the Mass Media* (Cambridge: MIT Press, 1994).

[13]Mies also was active in Werkbund poster design. See: Fritz Neumeyer, *The Artless Word. Mies van der Rohe on the Building Art* (Cambridge: MIT Press, 1991), pp. 14-19.

[14]Such examples are a legion. Mies (or his photographic assistants) removed an awkwardly visible domed building in his most-published photo of the Glass Skyscraper project, and even eliminated the background trees on some prints [Tegethoff, "From Obscurity . . .," *op. cit.*, p. 43]. In a view of the Barcelona Pavilion, he edited a turret projecting above his roofline from an adjacent building [compare photos in: Johnson, *op. cit.*, p. 69; and Ignasi de Solà-Morales, Cristian Cirici, and Fernando Ramos, *Mies van der Rohe. Barcelona Pavilion* (Barcelona: Gustavo Gilli, 1993), p. 21], and purportedly removed shadows from the row of classical columns in front of the Pavilion in another view [see: Jose Quetglas, "Fear of Glass: The Barcelona Pavilion," Joan Ockman, ed., *Revisions 2. Architectureproduction* (New York: Princeton Architectural Press, 1988), p. 148]. In his National Theater project for Mannheim, he went as far as to remove the flyloft of his own building in some reproductions [for an example of this, see the exhibition photograph in: Werner Blaser, *Mies van der Rohe. Less is More* (New York: Waser Verlag Zürich, 1986), p. 111].

[15]Hans M. Wingler, *The Bauhaus* (Cambridge: MIT Press, 1969), p. 182; Howard Dearstyne, *Inside the Bauhaus* (New York: Rizzoli, 1986), p. 216-217; and Marty Bax, *Bauhaus Lecture Notes. 1930-1933* (Amsterdam: Architectura & Natura Press, 1991), p. 57. For numerous examples of Peterhans's own work and of his students' work, see: Katherine C. Ware, "Photography at the Bauhaus," Jeannine Fiedler and Peter Feierabend, ed., *Bauhaus* (Cologne: Könemann, 1999), pp. 520-531.

[16]Schulze, *Biography . . .* . *op. cit.*, Frontispiece.

[17]One could fairly well convey the broad outlines of Mies's *oeuvre* using only photocollages. The only phase that would truly suffer in such a 'photocollage' version of his development would be his period of early 'Mark Brandenburg' style villas in Berlin and Potsdam. No photocollages exist of these half-dozen residential works.

[18]The one instance of a photomontage made between these two phases was from a virtually unknown project, discussed only once in the Miesian literature. In 1924, Mies executed a project for a 'Traffic Control Tower' in tandem with Heinrich Kosina. Given the collaborative nature of this commission, Mies's precise responsibility for the result cannot be known. A small bronze model was made of the tower, and photographed both in isolation and in a photocollage setting of the street intersection. For documentation, see: Russell, *op. cit.*, pp. 17& 42.

[19]Schulze notes that this project shows that "Mies was employing collage more than a decade before his well-known use of the technique in the early 1920's." Schulze, *Biography . . .* .. *op. cit.*, p. 51.

[20]For a discussion of Schinkel's general influence upon this project, see: Schulze, *Biography . . .* .. *op. cit.*, p. 51. For commentary and illustrations of the Bismarck collages, see: Arthur Drexler, *An Illustrated Catalogue of the Mies van der Rohe Drawings in the Museum of Modern Art* (New York: Garland, 1986), vol. 1, pp. 2-5. These photocollages are virtually never reproduced in studies of Mies. Two rare instances would be: Francesco Dal Co, "Excellence: The Culture of Mies as seen in his Notes and Books," John Zukowsky, ed., *Mies Reconsidered* (New York: Rizzoli, 1986), p. 73; and Arthur Drexler, *Ludwig Mies van der Rohe* (New York: Braziller, 1960), p. 13.

[21]Arthur Drexler [Drexler, *An Illustrated . . .* .. *op. cit.*, vol. 1, p. 2] speculates that the reason some imagery of this project survived for later inclusion into the MOMA archive is that the extant drawings were not sent to the jury. If so, odds would be that the one extant photocollage (the one depicting the building nearby from the hillside) never was sent. The fact that it is incomplete reinforces this notion. In contrast the second photocollage (depicting the proposal distantly, from river level) was finished, no longer exists, and may likely have been submitted to the jury along with several other purely hand-drawn images of the project. The extant view measures 30" x 40" (mounted).

[22]Tegethoff notes that Mies's assistant Werner Graeff wrote: ". . . Mies preferred to have photos made that showed the anticipated site from various positions . . . [H]e ordered huge enlargements of them, of which those parts had to be left blank which he intended to draw by using the same perspective. Even in the photographs, many of his early projects were thus placed in their proper neighborhood." Tegethoff, "From Obscurity . . .," *op. cit.*, pp. 44-45.

[23]For an illustration of this collage, see: Franz Schulze, *Mies van der Rohe: Interior Spaces* (Chicago: The Arts Club of Chicago, 1982), p. 39.

[24]Establishing an absolute number here is futile given the existence of many collages in which Mies likely played no role other than as an inspiration: Mies's assistants and students made dozens of collages paralleling his work, especially during his court house phase immediately after his emigration to America. The estimate of over 80 is based on a thorough review of the Miesian literature and the MOMA Archive.

[25]These five projects have been strongly linked in a group ever since Philip Johnson's valorization of them in the first published monograph on Mies in 1947 [Johnson, *op. cit.*. pp. 22-34]. Perhaps because these projects remained unrealized they formed no part of Johnson and Hitchcock's 1932 MOMA exhibition and book on the *International Style*.

[26]David Spaeth makes a very different reading, writing of these projects that: "In their originality and sensitivity to line, texture and value, Mies's drawings are like the buildings they represent. No disparity exists between the *idea* of the building and the *technique* used to represent it." David Spaeth, *Mies van der Rohe* (New York: Rizzoli, 1985), p. 35.

[27]For the most comprehensive overview of Renaissance techniques in representation, see: Henry A. Millon, *The Renaissance from Brunelleschi to Michelangelo. The Representation of Architecture* (New York: Rizzoli, 1994).

[28]Tegethoff, *Villas . . .*. *op. cit.*. p. 38.

[29]See, for example: Yve-Alain Bois, "Axonometry, or Lissitzky's Mathematical Paradigm," Jan Debbaut, ed., *El Lissitzky. 1890-1941. Architect. Painter. Photographer. Typographer* (Eindhoven: Municipal Van Abbemuseum, 1990), pp. 27-33. For illustrations of additional axonometrics used as process drawings, see: Selim O. Khan-Magomedov, *Pioneers of Soviet Architecture* (New York: Rizzoli, 1987), pp. 249 & 254. As regards Mies and axonometric projections, according to Ludwig Glaeser, axo's "were never regarded by Mies as adequate to represent his architecture." Ludwig Glaeser, *Ludwig Mies van der Rohe. Drawings in the Collection of the Museum of Modern Art* (New York: The Museum of Modern Art, 1969), Introduction, unpaginated.

[30]For examples, see: S. Frederick Starr, *Melnikov. Solo Architect in a Mass Society* (Princeton: Princeton University Press, 1978), pp. 76, 141 & 177.

[31]I use the word realist here in its most direct, representational sense — in the manner of: "to give a truthful, objective and impartial representation of the real world based on a meticulous observation of contemporary life" [Linda Nicholson, *Realism* (London: Penguin Books, 1971), p. 13]. For a discussion of Weimar perspectives on realism in general, see: Peter G. Rowe, *Civic Realism* (Cambridge: MIT Press, 1997), pp. 89-92.

[32]The Friedrichstrasse Rendering was 68-1/4 inches high by 48 inches wide; the Concrete Office Building Rendering, 54-1/2 by 113-3/4.

[33]Glaeser offers this explanation for these drawings' size, and discusses their exhibition history [Glaeser, *op. cit.*. Introduction, unpaginated].

[34]No models survive from the 'five projects.' Two other models in addition to the model of the Glass Skyscraper existed. One was of the Concrete County House, known from two photographs showing the building factually in its entirety from a slightly elevated perspective. This model, like the Glass Skyscraper example, rests on a large base, clearly contextualizing it as regards to its relationship with the ground plane. There is little that is innovative about its treatment as a representation or about the method of photographing it. The other model that existed from the 'five projects' was of the Concrete Office Building. It is visible in a single photograph, showing a portion of the model while sitting in an exhibit adjacent to (and apparently built to the same scale as) the model of the Glass Skyscraper. Like the Glass Skyscraper model, this Concrete Office Building model contains transparent material — likely Plexiglas. Beyond this, there is no innovation in representation methods here. The large base of the Glass Skyscraper's model can be seen in this photograph overhanging the stand on which it sits. For a reproduction, see: Dietrich Neumann, "Three Early Projects by Mies van der Rohe," *Perspecta 27* (New York: Rizzoli, 1992), p. 85.

[35]A rare exception here would be one photograph of the Glass Skyscraper model, published only on a single occasion, which does show the model from a more close-up, fragmentary perspective, which emphasizes its height. See: Neumeyer, *op. cit.*. p. 4. Mies always wished to see his buildings in their context. As Tegethoff notes, Mies's assistant Werner Graeff wrote: "Mies made a point of having the adjacent structures . . . scaled down to the model and placed next to it for investigation and for shooting pictures. At the time, he had them molded by a sculptor from contemporary Berlin streets. His [Mies's] comment was as follows: 'I want to know what my buildings really look like on the vacant lot in question, however hideous their vicinity may be. Others usually indicate the surroundings in heavily adjusted shapes.'" [Tegethoff, "*From Obscurity . . .*," *op. cit.*. pp. 44-45.]

[36]As shown by El Lissitzky's *Proun Space* installation of 1923 [Nancy J. Troy, *The De Stijl Environment* (Cambridge: MIT Press, 1983), p. 125]; or by numerous other photos of *de Stijl* models [Carsten-Peter Warncke, *De Stijl. 1917-1931* (Cologne: Taschen, 1991), p. 163].

[37]For example, student exercises in serial modeling at VKhUTEMAS [Christina Lodder, *Russian Constructivism* (New Haven: Yale University Press, 1983), p. 129]; or Malevitch's operable model of his own house [Starr, *op. cit.*. p. 120].

[38]For examples, see: Khan-Magomedov, *op. cit.*. pp. 305 & 417; and Debbaut, *op. cit.*. pp. 61 & 192.

[39]Tegethoff, *Villas . . .*. *op. cit.*. p. 50.

[40]Drexler refers to the orthographic elevations of Friedrichstrasse as "surprisingly abstract" and "almost entirely unintelligible." Drexler, *An Illustrated . . . . op. cit.*. vol. 1, p. 46. One should note, though, that substantial components of the surrounding context are shown in Mies's elevation of the Glass Skyscraper project. Also, in another elevation variant of Friedrichstrasse (one which has, perplexingly, different proportions as a mass) context is shown. This was published as the title page of *G.* no. 3 (June 1924) [for illustration, see: Neumeyer, *op. cit.*. p. 16].

[41]Debbaut, *op. cit.*. pp. 22, 130 &182.

[42]Comparisons with Schinkel are the strongest, even down to the level of how Mies composed particular perspective views. Schinkel loved to turn one face of a mass more broadly toward the viewer, and then have space plunge precipitously into the deep distance along the second, much more radically foreshortened face [see, for example, his plates *Entwurf für ein Gebäude der Singacademie in Berlin* and *Perspectivische Ansicht der Seitenfacade des Neuen Schauspielhauses*]. This is precisely Mies's approach in the Friedrichstrasse & Concrete Office Building renderings.

[43]Tegethoff, "From Obscurity . . .," *op. cit.*. p. 38. Tegethoff's is the only substantial attempt to relate the materials Mies produced for this project. I doubt Tegethoff's assertion that the rough perspective drawing in the MOMA Archive represents Mies's initial attempt at the second required competition view in perspective. The photocollages indicate the two much more different views in rendered perspective that I suspect Mies intended to make (and only one of which now survives or was ever made).

[44]Though of course their exact size can never be known for sure, the size of the strokes Mies used to indicate his building in each suggests a similar scale. For illustrations of these two, side-by-side, see: Russell, *op. cit.*. p. 38. The fact that these two collages are lost (when so much else of the final scheme and presentation survives) further suggests that they were preliminary and not intended as part of the final scheme.

[45]Both of these photocollages show an identical extra recession in the glass skin immediately before it reaches its sharp apex in several of the triangular corners of the site. I suspect that Mies at one point just before the project reached its conclusion considered including this recession on all three lobes of the building to increase the number of reflections and the sense of multiple facets. In the end it was retained only on one lobe and even then in a slightly different geometry than that shown in these two photocollages (it was much more blunted and obtuse in form). The largely triangular Friedrichstrasse site had one slightly broader though awkwardly truncated corner (pointing North toward the Spree and away from the Friedrichstrasse Station), and this is where a recession akin to that shown in these photocollages was indeed ultimately shown in the final plan. Ironically, Mies's final charcoal rendering shows the building from this (truncated) corner and does not include the recession at all. In any case, the 'extra' recessions indicate that these two photomontages were done at the same time in the design process and that the design progressed beyond them to some degree. It is doubtful that they were ever viewed as 'final' images. They were 'tests' made by Mies as he began to look forward and consider the form of the final presentation.

[46]An experimental overlapping on the computer at the same scale of this third photocollage and the final rendering has confirmed their precise correspondence (cornice angles and locations, balcony projections, and even the precise geometry of the domed tower atop the structure to the extreme right). The only true difference was one of necessity. Mies removed the indications of the Spree Bridge construction in the foreground, and represented the new bridge as it was to be after the urban reconfiguration.

[47]Whether this third photocollage could have *literally* been an underlay is doubtful given the thickness of the cream paper of the final rendering. "Pinpricks" would of course have been an option, but none are visible on the rendering. There is a strange dark 'clouding' over the photographic print that roughly conforms to the cropped area of the 'final' rendering. Perhaps this stain somehow resulted from a process of transfer.

[48]This, if true, would necessitate that Mies had a real site in mind for the Concrete Office Building. Otherwise, no existing site photographs would have been available for him to make a photocollage from. I similarly suspect that the variants of his Concrete Country House 'hand' rendering were also made by tracing off of, or transferring from, huge photographic prints of the model he made of that project.

[49]For comments in this regard, see: Tegethoff, "From Obscurity . . .," *op. cit.*, pp. 57-65. There were, of course, glimpses of Mies's 'five projects' in his built work of the mid-20's, as in the resemblance of his series of 'Brick Villas' to the Brick Country House. Yet these realized brick houses possess little of the *de Stijl* pin-wheeling form and open, eroding massing of that canonical model. They contain rooms of wholly conventional configuration. In contrast, his Memorial to Rosa Luxemburg and Karl Liebknecht ably reinterprets — though only in exterior configuration — the spatial promise of the Brick Country House. Mies's realized Weissenhofsiedlung housing block comes closest to the revolutionary aesthetic and technical promise of the "five projects," and begins to transcend the relative conservatism of, for example, his Municipal Housing Development on the Afrikanische Strasse.

[50]For a review of the many publications, see: David A. Spaeth, *Ludwig Mies van der Rohe. An Annotated Bibliography and Chronology* (New York: Garland, 1979), pp. 5-12.

[51]Ludwig Mies van der Rohe, "Mies Speaks. 'I Do Not Design Buildings. I Develop Buildings.'" *Architectural Review* (144: p. 451-452 December, 1968).

[52]Drexler, *An Illustrated . . . op. cit.*, vol. 1, p. 46. As Schulze notes, "Most of the other 145 submissions proposed solutions in which a main tower was set back from flanking wings or stepped back from low-rise elements." See: Schulze, *Biography . . . op. cit.*, p. 96.

[53]Max Berg, "Hochhäuser im Stadtbild," *Wasmuths Monatshefte für Baukunst* 6 (1921/22): 101-20.

[54]Katherine C. Ware, "Photography at the Bauhaus," Fiedler, *op. cit.*, p. 506; and Eleanor M. Hight, *Moholy-Nagy: Photography and Film in Weimar Germany* (Wellessley: Wellesley College Museum, 1985), p. 138.

[55]Katherine C. Ware, "Photography at the Bauhaus," Fiedler, *op. cit.*, p. 506.

[56]Dawn Ades, *Photomontage* (London: Thames and Hudson, 1986), p. 19.

[57]For an overview of the period with a focus on Schwitters, see: Dorothea Dietrich, *The Collages of Kurt Schwitters. Tradition and Innovation* (Cambridge: Cambridge University Press, 1993), pp. 20-46. For Hannah Höch's political leanings, see: Maria Makela, "By Design: The Early Work of Hannah Höch in Context," Maria Makela and Peter Boswell, organizers, *The Photomontages of Hannah Höch* (Minneapolis: Walker Art Center, 1996), p. 60.

[58]Neumeyer, *op. cit.*, p. 18.

[59]Again, though the originals are mostly lost, the stroking Mies used on these photocollages indicates huge size. The surviving example (mounted on wood) of his Stuttgart Bank Building measures nearly 3 x 4 1/2 feet [Zukowsky, *op. cit.*, p. 116]. Mies made a small, likely preliminary model of his Alexanderplatz proposal that was inaccurate in some of the massing indications compared with the final scheme [for illustration, see: Tilmann Buddensieg, *Berlin 1900-1933. Architecture and Design* (New York: The Cooper-Hewitt Museum, 1987), p. 75]. A model of the Stuttgart Bank scheme showing a proposal for some advertising on the facade was also made [see: Schulze, *Biography . . . op. cit.*, p. 149]. While the improbability of survival must especially be taken into account with models, models still were clearly not Mies's main presentation mode in these four projects. The orthographics of these schemes also were totally perfunctory in character and barely describe the overall character of the schemes.

[60]Ades, *op. cit.*, p. 15.

[61]Schulze notes that the four works "are not among his most compelling or original efforts" [Schulze, *Biography . . . op. cit.*, p. 146].

[62]One of the four 'skin study' competition projects — the Stuttgart Bank Building — apparently required all competitors to make contextual photocollages of their schemes, and provided negatives. Many photocollages by the hands of other architects (all of various sizes from the same negatives) that directly parallel Mies's representational efforts in this competition still exist. It could be claimed, then, that this requirement 'reacquainted' Mies with his earlier tries and then forced him to bring photocollage into the public realm, where the method then rapidly flourished for him. But we cannot be sure that the Stuttgart Bank Competition came first out of the four 'skin study' schemes (more likely it was second). The requirement that everyone work in photocollage in such a competition does show, however, how prevalent the new medium was becoming in Weimar Germany by the late 20's. For examples from the competition, see: Zukowsky, *op. cit.*, pp. 114-116. The precise dating and order of these four 'skin study' competition projects has led to considerable confusion in the Miesian literature, and questions still remain [Schulze, *Biography . . . op. cit.*, p. 147; and Arthur Drexler, *An Illustrated . . . op. cit.*, vol. 2, p. 212]. Mies was in written contact with the clients of the Adam Building by early July of 1928, though this of course does not establish that the photocollage of that project was in process by then [Schulze, *Biography . . . op. cit.*, p. 147]. The Stuttgart Bank and Office Building Competition ran from late August to December of 1928 [Zukowsky, *op. cit.*, p. 114]. The Alexanderplatz Competition was apparently launched in February of 1929 [Vittorio Magnago Lampugnani, "Modernism and the Metropolis: Plans for Central Berlin 1910-41," Josef Paul Kleihues and Christina Rathgeber, eds., *Berlin-New York. Like and Unlike* (New York: Rizzoli, 1993), p. 258]. Mies's project, however, was published in February of 1929 in *Das Neue Berlin* 4 (1929), p. 41; and Ludwig Hilberseimer was already vigorously defending Mies's completed project even earlier in 1929 in *Das Neue Berlin* 2 (1929), pp. 39-41. Both these publications suggest that the competition was initiated earlier. The second Friedrichstrasse Competition dates from 1929 [Drexler, *An Illustrated . . . op. cit.*, vol. 2, p. 540].

[63]The original site for the Glass Skyscraper project of 1922, the precise property profiles of which are visible in Mies's tentatively drafted plans, has been a matter of speculation for years [see: Tegethoff, *Villas . . . op. cit.*, p. 17, note #9; Schulze, *Biography . . . op. cit.*, p. 100]. It was likely in Berlin, though attempts to locate an actual site configuration matching these profiles have so far been unsuccessful [Tegethoff, "From Obscurity. . . ," *op. cit.*, p. 44]. Some assume it to have been an imaginary site [Russell, *op. cit.*, p. 40], yet the specificity and constancy of the drafted site profiles throughout the several sketch plans make this unlikely. The site for the first version of the curvilinear project, if indeed real, was clearly not the Friedrichstrasse site since the profiles that Mies shows bear no relation to that actual competition's site. Tentatively, I suggest that the 1928 rework of the Glass Skyscraper project relocated the proposal, through photomontage, on the Friedrichstrasse site instead of its original site. This argument rests on specific contextual conditions faintly visible in the exceedingly grainy photomontage of 1928. Visible in the clearest recent reproduction of this later image [Mertins, *op. cit.*, p. 57] is a large horizontally striated mass passing behind the skyscraper which is highly reminiscent of the low, multi-roofed volume of the Friedrichstrasse train station. The raised train-bridge of the existing station crossing over the street to the extreme left-hand side of the image is also visible. Further, the low, apparently rounded volume standing in front of the skyscraper (crowned with the advertising sign "Haller Revue") likely is a portion of the amusement park that occupied the Friedrichstrasse site at the time of the competition, which possessed several volumes of this type at its front corner [for an aerial photograph of the site, see: Tegethoff, "From Obscurity. . . ," *op. cit.*, p. 38]. The foreground of Mies's 1928 image also suggests a bridge, a feature consistent with the Friedrichstrasse site when seen from this side. All this is not to suggest that Mies originally, in 1922, intended the Glass Skyscraper project for the Friedrichstrasse site; rather I suspect he simply appropriated one of that competition's remaining photos for use in this reworking. By 1929, of course, he was busily engaged once again on the Friedrichstrasse site in preparing his second competition project. Since the rationale for the 1928 dating of the rework of the Glass Skyscraper project is not stated explicitly anywhere in the Miesian literature [for example, see: Sandra Honey, "Mies in Germany," Russell, *op. cit.*, p. 22], its accuracy is unknown. Perhaps this rework actually represents Mies's first thoughts on the second competition for the Friedrichstrasse site, which would require re-dating the rework to 1929.

[64]See, for example: Ludwig Hilberseimer, "Eine Würdigung des Projektes Mies van der Rohe für die Umbauung des Alexanderplatzes," *Das Neue Berlin* (Vol. 2: pp. 39-41, 1929); Wilhelm Lotz, "Wettbewerb für ein Bürohaus am Hindenburgplatz in Stuttgart," *Die Form* (Vol. 6: pp. 151-153, March 15th, 1929); and "Mies van der Rohe: Wettbewerbsentwurf für ein Verwaltungsgebäude in Stuttgart," *Das Kunstblatt* (Vol. 13: pp. 190-191, June 1929).

[65]Schulze, *Biography . . . op. cit.*, p. 148.

[66]For the 1933 Reichsbank Competition, a contest begun after the Nazis had come to power, Mies did not make any photocollages, but instead used hand perspectives again. These, too, were also prominently featured in Johnson's book.

[67]Matthew Teitelbaum, "Preface," Teitelbaum, *op. cit.*. p. 8.

[68]Illustrations in: Ades, *op. cit.*. pp. 98 & 104.

[69]Peter Bürger, *Theory of the Avant-Garde*, Michael Shaw, trans. (Minneapolis: University of Minnesota Press, 1984), pp. 73-81. While Bürger, differing from Adorno, rightly points out that montage was used by art movements without express political intent (by the Italian Futurists, for example), the overall character of Bürger's emphasis on the avant-garde's attack on art "as an institution" makes Bürger's fundamentally political understanding of montage stridently apparent. Paul Mann critiques this claim for montage's ability to project an image of society's chaos by ironically noting that: "The collocation of fragments produces a coherent picture of fragmentation." Art's own aesthetic mediation specifically undercuts the montagists' basic goal. Mann, *op. cit.*. p. 105.

[70]Bürger, *op. cit.*. pp. 68-69.

[71]Ades, *op. cit.*. pp. 13-15.

[72]K. Michael Hays, *Modernism and the Posthumanist Subject. The Architecture of Hannes Meyer and Ludwig Hilberseimer* (Cambridge: MIT Press, 1992), p. 170. For Hays's views on Bürger, see: pp. 122-124.

[73]Even amongst the montagists (especially in the Soviet Union), an ongoing debate constantly erupted about whether montage effects (i.e.: fragmentation) or realism (i.e.: non-fragmentation as seen as a means of achieving direct communication with the general public) would best accomplish their goals [Margarita Tupitsyn, "From the Politics of Montage to the Montage of Politics, Soviet Practice 1919 Through 1937," Teitelbaum, *op. cit.*. pp. 83-127].

[74]Mann, *op. cit.*. p. 19. For a further critique of Bürger's approach, see: Jeffrey Weiss, *The Popular Culture of Modern Art. Picasso. Duchamp. and Avant-Gardism* (New Haven: Yale University Press, 1994), p. xvi.

[75]Christopher Phillips, "Introduction," Matthew Teitelbaum, *op. cit.*. p. 28.

[76]Peter Bürger, *op. cit.*. p. 70.

[77]K. Michael Hays, "Critical Architecture, Between Culture and Form," *Perspecta 21*(Cambridge: MIT Press, 1984), p. 26.

[78]For further comments by Hays on Weimar photomontage, see: K. Michael Hays, "Photomontage and Its Audiences, Berlin circa 1922," *Harvard Architecture Review 6* (1987), pp. 18-31. For a critique of Hays's work on photocollage, see: Christian Hubert, "In Response to Michael Hays: Pre-Scripts for Post-Moderns?," Ockman, *op. cit.*. pp. 217-222.

[79]Hays, "Critical . . .," *op. cit.*. p. 26.

[80]Theodor Adorno, *Aesthetic Theory*, trans. C. Lenhart, (London: Routledge, 1984), p. 223.

[81]Hays notes: "Mies's achievement was to open up a clearing of implacable silence in the chaos of the nervous metropolis." Hays, "Critical . . .," *op. cit.*. p. 22.

[82]Bürger, *op. cit.*. p. 78.

[83]Hays immediately adds: "But the repudiation [by Mies] of a priori formal logic as the primary locus of meaning is precisely what is at issue . . ." [Hays, "Critical . . .," *op. cit.*. pp. 21-22]. Several years later, Hays seems to retreat from this view of Mies's late-Weimar works, reserving these views only for Mies's 'five projects' skyscraper works of the early 20's, where these views have (in my opinion) greater applicability [see: Hays, *Modernism . . . , op. cit.*. note #9, p. 315].

[84]Hays. *Modernism . . . . op. cit.*. pp. 172-178.

[85]Hays, "Critical . . .," *op. cit.*. p. 21. Hilberseimer's 'Friedrichstadt District' proposal of 1928 lets the historical pattern of street access and views permeate the project (as did Mies at the Alexanderplatz), but wholly ignores any aspects of the urban spatial hierarchy. For example, the raw, extruded ends of Hilberseimer's unrelentingly and mechanistically repetitive blocks come up against Berlin's major avenue, Unter den Linden, as if it were a mere side street. The scheme runs past the side of one of the city's major cultural plazas, the Gendarmenmarkt, ignoring all its axes. This is truly, in Richard Pommer's words, "destructive of the mesh of the city" [for illustration and commentary, see: Richard Pommer, "'More a Necropolis than a Metropolis,' Ludwig Hilberseimer's Highrise City and Modern City Planning," Richard Pommer, David Spaeth, and Kevin Harrington, *In the Shadow of Mies: Ludwig Hilberseimer. Architect. Educator. and Urban Planner* (Chicago: The Art Institute of Chicago, 1988), p. 37]. This attitude of Hilberseimer's is distinct from Mies's.

[86]For a selection of other examples from the competition, see: Kleihues, *op. cit.*. p. 259; and Pommer. *op. cit.*. p 36.

[87]Hays himself makes this point (using the word "conciliation") in his criticism of El Lissitzky's montages. See: Hays, "Photomontage and . . .," *op. cit.*. pp. 25-29.

[88]For example, in his Adam Proposal, Mies raises a portion of the mass one level at the street corner of the site. While hardly a round turret, this has no other purpose than as a mediating gesture to the conventional typology of handling street corners in dense urban settings. See: Drexler, *An Illustrated . . .. op. cit.*. vol. 1, p. XXIV. Also in his Adam Proposal, Mies carefully brackets his round-cornered glass volume at the site's two partywall conditions through the use of setbacks and wing walls. This is a conventional approach to bringing an object-like mass onto a tight city site. See: Drexler, *An Illustrated . . .. op. cit.*. vol. 1, p. 213. This prefigures Mies's use of reentrant volumes and lower masses at the rear of Seagram to 'situate' his object-like form (with its four identical corners) adjacent to the lower buildings behind it. Mies's second Friedrichstrasse Project's curving, triangular form obviously derives from an act of 'idealizing' the general site configuration — hardly a gesture of urban negation.

[89]Quoted in Ades, *op. cit.*. p. 63.

[90]For Mies's persistent flirtations with the Nazis, see: Elaine S. Hochman, *Architects of Fortune. Mies van der Rohe and the Third Reich* (New York: Weidenfeld and Nicholson, 1989).

[91]Drexler, *An Illustrated . . .. op. cit.*. vol. 2, pp. 540-551.

[92]Barbara Miller Lane, *Architecture and Politics in Germany. 1918-1945* (Cambridge: Harvard University Press, 1968), p. 135.

[93]Kenneth Frampton, "Modernism and Tradition in the Work of Mies van der Rohe, 1920-1968," Zukowsky, *op. cit.*. pp. 35-53.

[94]Colin Rowe, "Neo-'Classicism' and Modern Architecture II," *The Mathematics of the Ideal Villa and Other Essays* (Cambridge: MIT Press, 1976), p. 150.

[95]Mann. *op. cit.*. p. 18.

Poême de Murs—
The Color Concept of the House La Roche

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"I ordered "a frame for my collection". Instead, you delivered a "poem of walls". Who of us two made the bigger mistake?" (1)

INTRODUCTION

Together with his friend and artist Amedée Ozenfant - seen here with Le Corbusier climbing the Eiffel Tower in 1923 - Le Corbusier developed a purist language of forms and colors in painting during the early twenties. All his publications before 1923 are focused on painting, which can be seen as a hint that he considered himself at that time more a painter than architect. Interestingly, except for the article "Le purisme" published together with Ozenfant in *L' Esprit Nouveau* of 1921, there is no hint of any discussion concerning color. Even his famous book *Towards a New Architecture*, published in 1923 contains no discussion of color, although an entire chapter is devoted to the treatment of building surfaces, light and geometric proportion. Le Corbusier's movement towards a polychrome architecture occurs through painting. Thus, he said of himself, he became an architect "through the eye of needle of painting". Except for some early but not yet fully developed attempts of polychrome architecture, he began his transfer of color from painting into architecture in the double-family house La Roche/Jeanneret in Paris-Auteuil, designed in 1923/24.

Traveling through Greece in 1911 on his voyage to the orient, Le Corbusier experienced and intensified the force of the pure volumes of the Acropolis. In his excited and emphatic manner he wrote in his travelogue: "I write with my eyes having seen the Acropolis, thus making me happy. Oh Light! Marbles! Monochromy!" The omission of both useless decoration and the *bazaar of the historical styles*, became the premise for his purist creativity. Based on this he developed his first white modern buildings. His manifesto of the law of whitewash - *La loi du lait de chaux* (2)- determined the early period of his architectural creativity and had a sense of honesty and absolute. After the publication of "Le Purisme" (3), which discussed the use of color in purist painting, we observe a new concern with color in his buildings. It is proven that he already applied a rich polychromy in 1922 to the interior spaces of Amedée Ozenfant's studio in Paris-Auteuil. Similar to the house La Roche / Jeanneret, the color palette is limited to English green, Sienna red, umbra, ultra-marine, and rose (4). These colors are also to be found in his paintings of the same period. The final transition to *architectural polychromy* is seen when he finished the house La Roche / Jeanneret in 1925 in Paris-Auteuil. "Entièrement la maison serait un pot de crème", completely white the house would be a cremepot, shows his new attitude towards polychrome architecture. This is the beginning of the new exploration of polychrome architecture, which he will use and develop during the rest of his life.

On the back of his own wedding invitation Le Corbusier registers in 1938 the three points of a p*olychromie architecturale*,(5) describing these during a lecture about "Les relations entre architecture et peinture" (The relation between architecture and painting) as follows:

les vertus	**the goals**
1. Camouflage	1. Camouflage
2. Créer tonifiant et ambiance	2. Create colored space and ambiance
3. Créer espace	3. Create space

These goals are very similar to the color and form language of his early purist work, creating spatial camouflage through literal and phenomenal transparency by locating a color in the different layers of a painting and relating it to the different shapes of the objects. Later, the same strategy becomes visible in his built work. His purist paintings show the typical layering of space. Color with its spatial and associative qualities mediates between fore- middle- and background, while dissolving the relation of the *objets types* to its plane of reference. Here, these paintings reveal the first time the idea of a continuos space being transformed three-dimensionally at the house La Roche / Jeanneret in an inhabitable purist *nature morte*. Color becomes equivalent to form as means of design, serving to modify and balance the space, while simultaneously articulating volumes to reinforce the design idea. In this connection it becomes obvious that Le Corbusier hovers between the two poles of dissolution of space through camouflage and creation of space. This dialectical relationship caused by color creates a pulsating space full of tension and ambiance, which became typical for the purist phase of Le Corbusier during the early twenties.

THE COLORS

Corbusiers' selection of colors cannot be described as the result of an objective analysis. They are not comparable to already existing color palettes, which are based on scientific research such as the color palette of the same time developed by Wilhelm Oswald. Instead his selection follows only subjective criteria. The spatial impact of the specific color and its constructive quality becomes critical for both painting and architecture. All colors belong to one strictly restricted family called *la grande gamme* described by Ozenfant and Le Corbusier in their article "Le Purisme" as follows:

> *"One can determine a hierarchically ordered large series of colors (grande gamme) consisting of yellow-ochre, red, brown, white, black, ultra-marine and their mixed colors. This series is a strong, stable series forming one unit, since the colors are, concerning their individual characters, related. With that, these colors have constructive qualities. These colors have been used during all important epochs. These are the colors of those who want to paint volumes and therefore need stable colors." (6)*

Le Corbusier created his early color palette of the twenties by using only natural color pigments, mixing those pigments with glue-water or oil, which reduced the number of colors he could mix, restricting his work to a very limited color family. This made him independent of preexisting color palettes and industrial color-production. Without any scientific research he developed a natural color-normalization and dispensed with scales and scores. Consequently we can speak of primeval colors, that have definable and constant effects on the human through centenary usage.

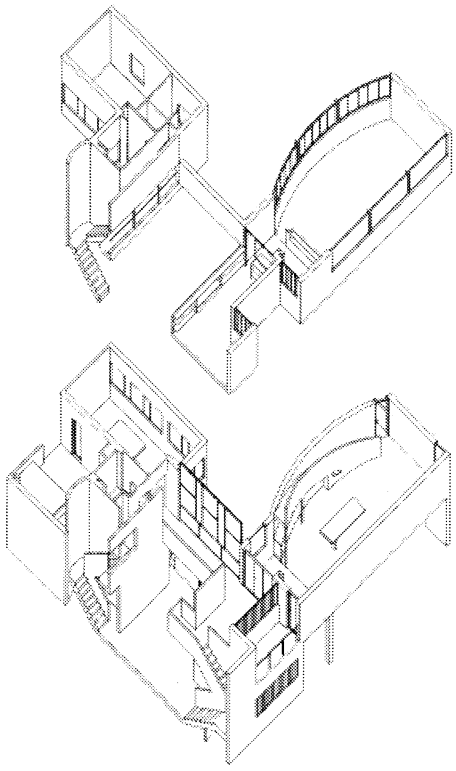

Fig.1. House La Roche

THE HOUSE LA ROCHE/JEANNERET

About 1922 / 23 he began the design of the house La Roche / Jeanneret, in Paris at the Square du Docteur Blanche in Paris Auteuil, a double family house designed for the banker and art collector Raoul La Roche and Le Corbusiers' Cousin Albert Jeanneret and wife Lotti Raaf. It can be considered a key-work in many regards. The house La Roche, which turns into the built manifesto of the *L'Esprit Nouveau*, demonstrates not only for the first time his five points of architecture, as well as the incorporated architectural promenade, but also the "first attempts of an architectural polychromy" (7). In this connection it should be said, that Le Corbusier had been confronted during the work on the Villa La Roche/Jeanneret with the work of the group de Stijl at the galerie L' Effort Moderne in Paris during fall 1923, where for the first time van Doesburg and van Eesteren presented their polychrome counter-constructions and maison particulière. Both projects pointed the way to neoplastic architecture and can be considered as a new and revolutionizing approach to color as an important means of space-design. Bruno Reichlin points out in his article "Le Corbusier versus de Stijl" (8), how Le Corbusier changes the spatial disposition of the white entry hall after the de Stijl exhibition. Walls and openings are no longer considered as necessary spatial boundaries in a traditional sense, but go through a process of transformation towards a new spatial transparency. Consequently the color scheme for the interior spaces had to be seen in a new context.

COLOR CONCEPTS OF THE HOUSE LA ROCHE

The object of the investigation is the color scheme of the house La Roche, which can be seen today by the visitor. It is the product of a series of transformations since the beginning of the construction of the house La Roche/Jeanneret in 1924. According to Jaques Sbriglio, today's color scheme, at least the one of the gallery is based on the renovation of 1928 (9). Since documentation of a color scheme of 1925 is missing, the original color scheme can no more be reconstructed. The bill for the paint work of March 12, 1925 (10) proves a color scheme based on a purist color palette. However, the spatial disposition of the colors is unknown. We know that Le Corbusier has been working on a three-dimensional translation of his *polychromie architecturale* into the built purist sculpture. We also know, that the polychromy of the house La Roche can not be considered to be the very first attempts of a new architectural polychromy, as he claims in his *Oeuvre Complete*. Both, the atelier Ozenfant and the villa Berques of 1922 had a vibrant polychromy of their interior spaces. Neither Siegfried Giedion, who visited the house before the renovation in 1928 and who published in the *Kunstblatt* in 1926 an article titled "Das neue Haus" (11), nor Stehen Eiler Rasmussen mention the color scheme. This is even more surprising, since the newly invented polychromy of the houses of the de Stijl group and other pioneers in polychrome architecture are discussed in the architectural press. This allows us to question whether the house La Roche faced, with the renovation of 1928, which was executed and supervised by Le Corbusier, a much more significant change regarding the polychromy of the interior.

Because of thermal problems, the house La Roche went under another renovation in 1936, where consequentially the walls of the gallery were covered with Isorel-sheets, which altered significantly the spatial impression (12). Originally Le Corbusier thought to change the color of the exterior walls to a light gray, but this was not executed. A note about changes of the color scheme in Corbusiers' notebook of May 21, 1954 (13) proves that even almost 30 years after the construction Le Corbusier was still involved in the architectural polychromy of the house La Roche. This could be because the house La Roche represents for Corbusier the turning point towards an integration of color in architecture as an integral part of the space design.

COLOR AND SPATIAL DEFINITION

The house La Roche/Jeanneret could be best described by naming opposing pairs, which by playing off against each other determine the character of the house: unity versus camouflage, monochromy versus polychromy, volume versus plane, modern space versus traditional space, emptiness versus spatial density. The ambiguous relationship of these factors determines essentially the spatial perception. At that point the question rises, which role is assigned to color in the spatial play?

Exterior:

"The interior makes itself at home and bumps into the exterior, which then takes different forms" (14), a description of the contours of the house La Roche/Jeanneret by Le Corbusier in his book *Precisions* of 1929. Different than most of the other houses of the purist phase built by Le Corbusier, which are based on clearly defined cubes, the house La Roche/Jeanneret consists of multiple, but linked volumes. Their position and their formal language can be understood as a logical reaction to the found conditions of the site as well as a response of the interior spaces. The monochrome walls of the exterior are continued into the entry hall of the La Roche house, creating what Le Corbusier calls *l'unité* - a spatial unity of the different volumes. This evokes a three-dimensional impression of a monolithic volume, created on the one hand through a sharp-edged flow of the lines of horizontal and vertical planes and on the other hand through the monochrome use of the color white on all exterior surfaces. The exterior of the building seems to become the built manifesto of the "Loi du ripolin" (The Law of Whitewash), published in 1925 by Le Corbusier as a part of his book *L'art décoratif d'aujourd'hui*. It is not the color that becomes crucial, but is the monochrome use of the color white which becomes the focus of attention when it comes to the question of how to paint the exterior walls of the house la Roche/Jeanneret. In 1936 Le Corbusier takes even into consideration to paint the exterior walls in a light gray – probably because of practical reasons – but it is the monochromy of the walls which still remains important, since only the "monochromy allows an exact evaluation of volumes of an object" (15). The color white – in the figurative sense the *lait de chaux* (whitewash) – enhances and causes the "masterly, correct and magnificent play of masses brought together in light."(16).

Interior:

Accordingly to his demand "The interior space of a house has to be white and to make the white perceptible it has to face a regulated polychromy" the monochromy of the exterior continuos into the heart of the villa, a huge, cubic entry hall, that defines the center of the architectural promenade. All the walls, which are defining the entry hall, are painted white. Sharp edged cut outs relate the volume of the entry hall with the spatial volumes behind the lateral walls. Only on the backside of the lateral walls the polychromy becomes visible. This polychromy is diametrically opposed to the monochromy of the exterior and the entry hall.

Characteristic of the house La Roche are the different possibilities of multiple reading of the spaces and the form. Stehen Eiler Rasmussen precisely explains in his article of 1926 "Le Corbusier – Die kommende Baukunst?" (Le Corbusier – towards a new architecture?) that apparent contradiction of simultaneous perception of form and space using the example of a vase:

> *"The described drawing can be read as an image of a black vase: we can also read to faces, which are looking in opposed directions before a black background. But, it is not possible to see the vase and the two faces at the same time. (...) Simultaneousness of spatial and figural imagination is therefore not possible. Which does not necessarily mean, that one and the same building can not evoke subsequently very well not only figural but also spatial imagination.(...) Let us have a look at the entry hall of the house in Auteuil (House La Roche), built by Le Corbusier and Pierre Jeanneret. We will discover that they are thought neither spatial nor figural. We rather become most aware of lines and planes, which define spaces and volumes." (17)*

The subsequent perception of space and form or positive and negative volumes, creates a spatial tension, which becomes characteristic for the house La Roche. In addition an emphasis is placed on creating two-dimensional planes, rather than volumes. The dissolution of the corner consequently creates the notion of single planes, which "are only connected through their boundaries" (18), to be seen here at a wall or window openings. At the same time wall slabs and openings redefine a spatial volume through a continuous flow of lines, a phenomenon called by Rasmussen in his article "false relations". This oscillation between volume and plane and with that between space and form becomes especially visible at the lateral walls defining the entry hall. The white of the walls emphasizes the three-dimensional effect around the area of the main stairs leading to the second floor, where lateral wall, balcony and stairs create a three-dimensional ensemble. Simultaneously, where window, sill and wall come together, the same lateral wall is defined as a plane. Only the *lait de chaux* – the white wash – brings volume and plane, space and form together to a unity.

Fig.2. Gallery

After the ascetic and pure white of the entry hall, the polychromy of the interior of the gallery wing surprises. From the viewpoint of the observer standing at the entry level, colored railings or doorframes can only be perceived vaguely through cut outs of the lateral walls. Only on the backside of the lateral walls of the entry hall a vibrant polychromy of the interior becomes visible. The wall defining the anteroom to the gallery space on the second floor is painted in a light blue. A thin layer of paint is applied only to the space-facing plane of the wall, dissolving the notion of the wall being a volume and destroying it into its single planes. With this comes the paper-like impression described by Rasmussen: "The walls appear as if they were made out of paper. Their notion of being a volume has been taken away" (19) is intensified. The volume of the wall is not only understood as a plane, but the wall as a whole is dissolved in single planes.

This new kind of spatial definition consisting of horizontal and vertical planes and openings placed against each other, where the opening is no longer understood as part of the wall, but as an individual spatial element, can only be experienced through the means of what Le Corbusier calls the *poychromie reglée*. This becomes clear in the large gallery space: each plane is differentiated through color from the next plane and enters the spatial play as a fully colored unit according to Le Corbusiers' demand: "...il faut que les murs soient des entiers qui entre comme des unités dans l'équation." (20) (The walls must be considered as an integral whole, which enter as units in the play). This is a very opposing statement to van Doesburgs *maison particulière*, where the wall itself becomes subdivided by color. Through the means of color, the spatial volume is subdued in its single planes, however without destroying the volume of the space completely. The same can be seen at the balustrade of the ramp, where, the volume of the ramp is dissolved through different color applications on the vertical and horizontal planes.

> *"Polychromy (two colors, three colors, etc....) destroys the pure form of an object, alters its volume, opposes an exact evaluation of this volume and, by reciprocity, allows one to appreciate in one volume only what one wishes to show: house, interior, object, it is the same story." (21)*

Based on his observation of the "specific virtues of color - Blue creates space. (...) Red fixes the presence of the wall." (22) Le Corbusier articulates and modulates the space. Accordingly, the light gray described as the color of indifference and calmness of the lateral walls and ceiling calms the eye. The red-brown of the ramp and the dark umbra of the chimney fixes those objects in the space. It is the color, which gives the space its final dimension. Between the poles of spatial dissolution and spatial definition color becomes the instrument of spatial perception, the *apporteuse d'espace*. (23) the creator of space, which articulates and modifies the space.

Another phenomenon of *camouflage architecturale* through the use of color can be seen in the gallery, where ramp, balcony and entry zone to the gallery come together. First of all the space defining elements such as walls, ceilings and balustrades are dissolved into planes and connected only by joint flow of the lines. Single objects in the space such as the ramp and the chimney are visually connected through color. Other planes and volumes are juxtaposed or overlapped (table, chimney and fireplace). Since objects may share contours or colors depending on your point of reference in the space, the precise position of the object in the space can not be determined. These "false relations" evoke a constant oscillation between background, middleground and foreground, thus creating a similar effect known from purist and cubist painting:

> *"The oscillation between surface definition and depth definition, between two-dimensional infrastructures and illusionist presentation creates a tension of oppositeness, which extends radically the length of esthetic time." (24)*

With this the plane is used as an abstract figure, comparable to the *objets-types* of the purist paintings by Le Corbusier and Amedée Ozenfant. The gallery wing, the *raison d'être* of the house La Roche, becomes the built manifesto of *L' Esprit Nouveau*. Here, Le Corbusier translates for the first time a method developed initially in purist painting, where daily objects are presented without the use of perspective and relief, with their planes held together and defined only by a contour line, into the three-dimensional space of architecture. The role of color in the three-dimensional space, the *oeuvre plastique*, is similar to it's role in purist painting. Color determines the position of the object in the space / the position of the plane in the painting and allows together with the contour of the object / the plane multiple readings of the two-dimensional painting, irrespective of the three-dimensional space.

COLOR AND SPATIAL SEQUENCE

Continuous space and traditional space are diametrically facing each other, separated by the large volume of the entry hall. On one side we find a series of interrelated spatial volumes, where "numerous spaces (...) communicate directly (...) through knee-high walls and shelves serving as partition walls" (25). On the other side we find the *corps de logis*, the living unit, defined by traditionally closed spatial volumes. Both sides are connected through a bridge, which crosses one side of the entry hall. These integrated spaces become

an integral part of the architectural promenade, which as "a means of the realization of the principle of decelerated perception" (26) let the observer experience, the site with its constantly changing spatial relationships:

> *"Our walls are of a generous eloquence. The relations of their dimensions, their colors create our architectural space. I am no more in the* chambre rose *or in the* chambre bleue. *I promenade through an architectural site, which unfolds under my feet." (27)*

The *polychromie reglée* is developed as an inevitable consequence of a new spatial idea. It no more understands the space as a closed unit but as a continuum of space, which can be experienced through the architectural promenade.

Color mediates between the different spaces. The eye and the memory connect similar hues and adds walls of similar color to a new volume. The perceived spatial volume alters, dependant o the observer's point of reference, as it is limited by walls or expanded by openings or cut outs into adjacent spaces. As a consequence, the perception of space constantly changes. As an example I would like to show you the back of the lateral wall defining the entry hall, which is painted light blue. The light blue applied to the wall, not only extends the spatial volume of the anteroom to the gallery visually, but also expands the spatial volume over the bridge to the door of the dining room, which is painted in the same hue. The rose color of the dining room again evokes the memory of the rose floor of the gallery. In just the same way the dark umbra and brown hues applied to walls and objects on the way up to the library on the third floor are used as a part of the spatial sequence along the architectural promenade. First, walls painted in a dark umbra define the stairwell and the anteroom of the gallery perpendicular to the movement of the visitor. The eye connects to the brown of the ascending ramp and back to the dark umbra of the chimney. A wall painted in dark umbra again then leads into the library. Color becomes the target of the single section of the path which than turns into the architectural promenade and creates, together with the form, the continuous space.

How in this connection can we understand the color of the dining room?

> *"If the four walls are painted the same tone, the form of the room remains intact, very affirmed if the tones "hold the wall" (reds for example) (...). If the ceiling is of the same tone as the wall, the impression is totally modified; from one categorical thing one moves to something very softened, calmed, entrancing: it is like being under a dome. I have closed up the space." (28)*

The color rose applied to ceiling and walls holds the volume of the space together, fixes the presence of the wall and gives the impression of intimacy and security. The closed spatial container becomes the final destination of the promenade after the exiting path through the continuous space of the gallery wing. Just as the idea of the traditional space literally faces the idea of the modern space on the opposite side of the entry hall, the newly developed *polychromie reglee* faces the *chambre rose* as a reminiscence of a disappearing tradition.

COLOR AND SPATIAL *GESTALT*

Color dematerializes the wall. As a thin, last layer applied to only one plane of the wall, color subdues the volume of the wall and takes its volumetric appearance away. Both plaster and color cover the rough concrete and other construction materials to define smooth clearly defined surfaces. Color replaces the ornament. Adolf Loos already stated in 1913 in his article "Ornament and Crime", which Le Corbusier certainly read and published in November 1920 in *L' Esprit Nouveau* (29): "A mesure que la culture se développe, l'ornement disparaît des objets usuels". (The ornament of the daily objects will disappear with the degree of a developing culture.") Accordingly color becomes legitimized only after having clarified, that color is used in an antidecorative sense as a means of spatial articulation.

Next to space modifying and articulating qualities of color, another aspect of space design becomes important: the atmosphere of the space - the *chambre rose* with its calm atmosphere, security and intimacy, the white entry hall as an expression of clarity and emptiness " We like our walls to be white; and empty; or open and pure" (30). The selection of a specific color not only is determined according to the concept of form, but also with regard to the spatial atmosphere.

"Architecture is a function of the light; it is a three-dimensional phenomenon in the light; (...) No architectural sensation without light" (31). Light and guidance through light becomes in more than one way an important means of design. On the one hand it is the light opening, which, in the play of *plein et vide* occupies the corners in the plan or becomes the elongated window between two wall slabs. Thus, creating the dissolution of the corner and a plane-like appearance of the space defining elements. Together with a polychromy, which emphasizes the plane rather than the volume, the spatial volume itself is subdued, a spatial phenomenon which we have seen in the gallery of the house La Roche. On the other side, the light itself contributes to the perception of the *gestalt* of the space. Thus, the color scheme follows the brightness of the wall, which is defined by the position of the wall towards the light:

> *"Color, which tempers walls depending on whether they are in full light or half light, can direct the gaze over spaces complicated by layout and can significantly extend the impression of space: red only preserves its qualities in full light, while blue vibrates in shadow, etc.: the physics of color. The physiology of sensations: red, blue, yellow, etc.... determined sensations. Shadows, half-light, light: the same. Architectural composition can be based on these principles." (32)*

According to this statement from his book *L' art décoratif d'aujourd'hui* of 1925 Le Corbusier chooses a red brown for the

balustrade of the ramp, which is exposed to the south light, whereas the light blue of the lateral wall of the anteroom of the gallery lives in the half-light. Other colors of the warm color range such as the yellow ochre of the front wall in the gallery as well as the rose floor are positioned in the sunlight, which enters the large horizontal window under the ceiling.

After the renovation of 1928 the furniture becomes part of the color scheme. The photo published in *L'Architecture Vivante* in 1930 (33) shows those objects as built-in furniture. A non-movable, luxurious table with a large dark marble slab, which was probably designed by Charlotte Perriand (34), is attached to a V-shaped steel-column on a black tiled base. A gray painted closet with curved doors made from frosted glass has been placed permanently under the ramp. A linear light fixture painted in a light blue replaces the light bulbs across the gallery. Unlike the movable and still traditional furniture, which are seen in the photo published in L'*Architecture Vivante* of autumn 1926, the newly designed furniture becomes a part of the spatial concept. Through their color they become planes and volumes of the space, similar to the built spatial elements such as walls and ceilings, and together they determine the perceived spatial form.

Corbusier employs color as a space-modifying and classifying element, which is opposed to form. The *camouflage architecturale*, created through color, corrects the real space-relations. Color becomes equivalent to form as means of design, serving to modify and balance the space, while simultaneously articulating volumes to reinforce the design idea. Or in Le Corbusiers' own words: "Color creates the space. Let us consider the color to be the creator of space." (35)

REFERENCES

[1]FLC, doc.A3 (506b); Letter of Raoul La Roche to Le Corbusier dated May 24, 1926

[2]Published in: Le Corbusier. L'art décoratif d'aujourd hui. Paris: Cres, 1925

[3]Ozenfant, Amedée and Jeanneret, Charles-Edouard. "Le Purisme", EN 4 (1921)

[4]Rüegg, Arthur. Le Corbusier – Polychromie architecturale: Le Corbusiers Farbenklaviaturen von 1931 und 1959. Basel; Boston; Berlin: Birkhäuser, 1997

[5]Badischer Kunstverein,(ed.). Le Corbusier: Synthèse des arts, Aspekte des Spaetwerks 1945-65. Catalogue of exhibit at Badischer Kunstverein 1986. Berlin: Ernst & Sohn, 1986

[6]See (3)

[7]Le Corbusier. Oeuvre Complète Vol1, p.60

[8]Bois, Yves Alain; Reichlin, Bruno and others, De Stijl et l'architecture en France, Paris; Bruxelles, 1986

[9]Sbriglio, Jaques, Les Villas La Roche-Jeanneret, p. 127, Basel; Boston; Berlin: Birkhäuser, 1997

[10]Printed in: Arthur Rüegg, "Villa La Roche: vers une architecture polychrome" in Le Corbusier und Raoul La Roche. Catalogue of exhibit at Architekturmuseum Basel, Basel: 1987, p.25

[11]Siegfried Giedion."Das neue Haus. Bemerkungen zu Le Corbusiers Haus Laroche in Auteuil." Das Kunstblatt April 1926, p. 153-157

[12]FLC H 1-3 (246)

[13]Carnet H 32 (72), note of May 21, 1954 by Le Corbusier on renovation of house La Roche

[14]Le Corbusier. Feststellungen 1929. Braunschweig; Wiesbaden: 1987, p. 128

[15]Le Corbusier. Polychromie architecturale. (1931?). Document of FLC, p. 123
Published in: Rüegg, Arthur. Le Corbusier – Polychromie architecturale: Le Corbusiers Farbenklaviaturen von 1931 und 1959. Basel; Boston; Berlin: Birkhäuser, 1997

[16]Le Corbusier. Towards a New Architecture. Reprint 1986. Originally published: J. Rodker, 1931.p. 37

[17]Stehen Eiler Rasmussen."Le Corbusier - Die kommende Baukunst?" in Wasmuths Monatshefte für Baukuns 9 (1926), p. 378-393

[18]Idem, p.381

[19]Idem, p.381

[20]Le Corbusier. "Déductions consécutives troublantes". EN 19 (1923)

[21]See (15) op.cit., p. 123

[22]Idem, p.99

[23]Le Corbusier."Pessac". L'Architecture Vivante II (1927), p.30

[24]Robert Slutzky."Après le purisme" in Le Corbusier und Raoul La Roche. op.cit.

[25]See (15). op.cit. p.115

[26]Elisabeth Blum. Le Corbusiers Wege. Braunschweig: 1988, p.33

[27]Le Corbusier "Notes a la suite", p.50

[28]See (15) op. cit., p. 120

[29]Adolf Loos. "Ornement et crime". EN Nov. 1920

[30]See (28) op.cit., p. 51

[31]Idem, p.46

[32]See (9) op.cit., p.124

[33]Photo in L'Architecture Vivante, I (1930)

[34]Compare Timothy Benton. Le Corbusiers Pariser Villen 1920-1930. Stuttgart: DVA 1984 p.70-72

[35]See (23), op.cit., p.30

SPACE, IDENTITY, AND IDEOLOGY

Moderator: Mark Linder, Syracuse University

Apartheid Space and Identity in Post-Apartheid Cape Town:

The Case of the Bo-Kaap

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The Bo-Kaap district spreads out along the northeastern flanks of Signal Hill in the shadow of Cape Town's most significant topographical feature, Table Mountain, and overlooks the city's business district. According to contemporary historical constructions, the district includes four areas — Schotschekloof, Schoonekloof, Stadzicht and the Old Malay Quarter, but none of these names appear on official maps (except Schotschekloof, which is the official name for the entire area).[1] The first three were named after the original farmsteads which were transformed into residential quarters, Schoonekloof having been developed in the late nineteenth century and Schotschekloof and Stadzicht during and immediately following World War II.[2] Schotschekloof tenements — monotonous modernist slabs — were erected for Cape Muslims during the 1940s as housing to replace slums leveled as a result of the 1934 Slum Act. The area known as the Old Malay Quarter, bounded by Buitengracht, Strand, Voelboog and Witford streets, is the oldest inhabited section, parts of which date back to the seventeenth century.

Just what constitutes now - and constituted in the past - the Bo-Kaap is hotly contested. Although the city was founded by the Dutch East Indies Company in 1652, land grants permitting permanent settlement in Cape Town were only doled out in 1658. After Jan de Waal purchased the land in the Schotschekloof in 1760, and between 1763 and 1768 he erected several small rental houses on the flanks of Signal Hill, the earliest such housing in the area that came to be known as Bo-Kaap.[3] Several slave lodges were constructed there during the eighteenth century, all of which disappeared following the abolition of slavery by the British government in 1834, a period which also saw the construction of rental housing, especially low-cost housing, grow at a significantly greater rate after 1840.[4] Over the course of the nineteenth century, the Bo-Kaap gradually became one of two major working class districts in Cape Town; housed in narrow housing terraces snaking up the flanks of Signal Hill, former black and mixed race slaves mingled with the rest of the city's working class of European and Asian origins.[5]

The typical block form in the Bo-Kaap consisted of rows of narrow, flat roofed single story flats with plastered facades. The lack of appropriately dimensioned timber dictated roof spans and room widths, and the poor quality of locally produced bricks meant that walls needed to be plastered, gave Cape architecture some of its most characteristic features.[6] These features were especially pronounced in the Bo-Kaap, where absentee landlords built rows of housing units significantly narrower than were the houses in the oldest part of the city. Aiming for cheaper housing, they also standardized windows and doors and eliminated the decorative gables and parapets typical of higher income areas.[7] While the some of the eighteenth century terraces exhibited typical Cape Dutch details such as undulating parapets, two panel portals, and fixed upper sash and movable lower sash windows, the arrival of the British at the end of the eighteenth century altered the style once again. Typical elements of Georgian architecture such as slim windows, paneled double doors and fanlights, found their way into housing of all social classes, including the rental housing in the Bo-Kaap.[8] At the end of the nineteenth century, new housing in the Bo-Kaap began to include pitched roofs, bay windows, and cast iron work on balconies and verandahs, at a time when a larger number of houses also became the property of the occupants.[9] A dense network of alleys and narrow, sometimes hidden passageways ties the houses of the Bo-Kaap together. In most houses, a central passageway leads directly from the front to the back door and then opening onto a walled courtyard where the family could socialize in private. On the front, the stoep faces the street and serves as a place where more public socializing can occur.

This housing type extended through not only the smaller area today described as the Bo-Kaap west of Buitengracht Street, but the traditional area, from Long Street and parts of Adderly Street up the flanks of Signal Hill and out to Amsterdam Street and the old coastline and docks below Loader Street. The architectural texture of the Bo-Kaap to the west and east of Buitengracht Street differed little through most of the nineteenth century, so much so that some documents at the Cape Town Planning Department describe the Bo-Kaap as extending to Adderly and Long Streets even today. Even residents of the area are unsure of the precise boundaries of the various sections of this part of Cape Town.

These are more than academic disputes: The Malay Quarter, situated between Wale and Strand streets, is asserted as the historic center of Muslim Cape Town and the heart of the Bo-Kaap, and as such, is the subject of a historic preservation campaign. Indeed, the controls exerted by Islam on its members in Cape Town, and their manifest differences from the Christian community, encour-

aged them to cluster together in the city's working class areas, where they could be called to prayer five times daily, and where it would be easier to maintain their religious and social practices. Nonetheless, such designations leave the Waterkand area (between the Strand and the old docks) and the rest of Schotschekloof out of the equation, but equally importantly, they seriously distort the history of the district as a whole.[10] Of equal import for the Bo-Kaap in the nineteenth century with respect to race was class: the working class which inhabited the small housing terraces included mixes of race and ethnicity, and also included working class whites. City officials from the second half of the nineteenth century through most of the twentieth century found the Bo-Kaap disturbing not only because of race, but because it collected a mix of working class and unemployed poor, and along with them a range of locales associated with vice. Bars and hotels in the Bo-Kaap drew negative press in the late nineteenth century because they were characterized as places from which "a stream of moral pollution is constantly flowing."[11] Even though there was an exodus of "white" residents of the Bo-Kaap once the area began to fill up with newly emancipated coloured and black slaves in the 1830s, low-income whites families continued to live there throughout most of the twentieth century.

The relations between the Muslim community and the Christian authorities of Cape Town were far from smooth. Until well into the nineteenth century, Cape Town authorities forbade the Muslim community to practice its religion, so secret meetings were held in homes and in an abandoned quarry along the flanks of Signal Hill. In 1886, city authorites forbade the Muslims from using their historic burial grounds, supposedly for reasons of public health (Cape Town had been hit by a smallpox epidemic in 1882). The Tana Baru (new ground) had long been the community's cemetery, parts of which dated back to 1805. The forcible closure prompted immediate disobedience and a massive rebellion and riots that enflamed the city for days, rallying the Muslim community as no other government action had managed to do in the past.

For white Cape Town residents, class concerns intersected with racial fears prompted by the steady migration of black Africans to South Africa's urban areas; throughout the twentieth century a series of laws tightened the grip of the white minority over coloured and black South Africans, particularly spatial control. In 1923 the Native Urban Areas Act forbade black Africans from owning land anywhere except rural areas. By contrast with the laws regarding blacks, control over other racial groups varied throughout South Africa. The fear of Cape Coloured and Indians moving into white areas finally spurred enactment of the Group Areas Act in 1950, which instituted a formal policy of separating races in different areas. These assorted acts were not simply neutral statements about racial separation; they werved as he legal pretext for forcibly classifying and separating the different racial groups, and as they were implemented, the effect on families and individuals was devastating. Under the color of this purportedly legal system, between 1950 and 1984 over 126,000 families were forced to abandon their homes and businesses and move to the Cape Flats area.[12] Cars arrived with GG license plates, and individual families were pressured to move out. Although many said that they would not go, as one of the former residents, Pedro Meyer, describes it, one day their houses would suddenly be empty, the famiies having moved to the Cape Flats.[13] A combination of threats and quiet harassment ultimately convinced people to leave. The black Africans were the first to go; they lived throughout the Bo-Kaap, but throughout the 1960s they were steadily removed. Mrs. Miriam Bakana ran a small hotel for 14 Bantu laborers at 18 Dixon Street; in 1963 the city's director of Bantu administration notified the town clerk that since new housing was being made available for the Bantu (in the Cape Flats) her license would not be renewed; furthermore, she and her husband would also be required to move to Guguletu Bantu township according to the provisions of the Natives (Urban Areas) Consolidation Act.[14] Once the black Africans had been removed, attention turned to the Coloured population. A slow bureaucratic and legalistic process of denying residence and business permits gave spurious legitimacy to the racist program.

The owner of the small grocery store at the end of Loader Street recalled how up until 1969 there had been thirteen shops nearby, but in 2000, only his remained.[15] Although a Muslim who lived behind his shop in defiance of the law, Mr. Ali managed to resist the pressure to move even after officials attempted to claim that he had no business permit. He showed them his permit, which also included a small hotel behind the shop and which gave him the semi-legal grounds for living there with his family. Mr. Ali purchased the property in defiance of laws forbidding such ownership to coloured people through subterfuge: an elderly gay man who lived nearby held 51% title in a fictitious company, while he held the other 49%.

Prior to apartheid, there had been no such thing as a coloured identity. As informants repeatedly asserted in interviews, those who were wealthy enough could move up in society, and so could those who were pale enough to pass for white. Most families had branches which intermarried with people of different races and ethnicities, which were only redefined as White, Coloured and Native in 1950. In the same year, the Population Registration Act required all South Africans to be classified according to race - a necessary component of the Group Areas Act, for races could not be isolated if race was not a fixed component of an individual's identity. In 1953, the Separate Amenities Act ensured that facilities would be clearly identified as being available to a particular racial group. These legal props for apartheid led to the forty year effort to clear the black and coloured South African population out of areas reserved for whites, and to the creation of a ring of townships spreading out in the Cape Flats south of the city. They also led to the destruction of some of the city's oldest and most richly textured urban districts, such as District Six, and to the fundamental transformation of others, such as the Bokaap.

Already by the 1930s, an awareness of the poor physical condition of Bo-Kaap's buildings converged with fears about crime, disorder, infectious diseases and racial mixing, setting in motion movements to eradicate the slums.[16] While the public rationales for the Slum Clearance Act named the bad effects upon slum dwellers of unhealthful conditions in substandard housing, the judgments in fact concerned the effect of slums on the population that did not live

there. One of the areas designated for "urban renewal" was the Bokaap, along with District Six and the area between Bokaap and the docks. The latter was the first to go, but because no replacement housing was provided when demolition began, residents crowded into the other areas, replicating and even worsening the very conditions slum removal was designed to cure. The dubious success of this first program significantly slowed implementation of slum removal in the other two areas, but the City Council nonetheless proceeded to acquire so-called derelict housing in the Old Malay Quarter and to plan for the rows of tenement flats in the Schotschekloof. World War II intervened, and forced city officials to place the plans on hold until after the war.

Although the process of dismantling mixed race urban areas dates back to the slum removal campaigns of the 1930s, it heated up after the 1948 elections that brought the Nationalist Party to power, when apartheid became formal public policy. In turn, the assault on this working class, racially mixed district also triggered a response from members of the white community who wanted to preserve the urban texture of the Bokaap. The history of the Bo-Kaap becomes increasingly complex, as the efforts to preserve it as a 'Malay' quarter were led by a white man, the Afrikaans writer and poet I. D. du Plessis.[17] Beginning in the late 1940s, du Plessis spearheaded a campaign to recognize a section of the Bo-Kaap as the historic Malay Quarter, not because of distinguished architecture but on cultural grounds, because of what he argued was a historic community which had continuously inhabited the area for nearly two hundred years.

Du Plessis was responsible for designating the Bo-Kaap as the area between Chiappini and Rose Streets, from Wale Street to Strand Street. From the 1930s forward, Du Plessis aggressively led the campaign for the preservation of the Bo-Kaap as an exclusively Malay quarter. His role as the Secretary of Coloured Affairs in the first Apartheid cabinet after the 1948 Nationalist Party victory gave him the political clout to see that his goals were achieved - the Bo-Kaap was not leveled as District Six had been. What up until the end of the 1930s had been repeatedly reviled in the press as a slum became, from the 1940s onward, a quaint and picturesque corner of Cape Town whose identity needed to be preserved. In order to preserve the Bo-Kaap, however, du Plessis had to construct a narrative that would support this objective. In an era when the goal was to achieve complete racial apartheid through the Group Areas Act, preserving the Bo-Kaap as a Muslim, or Malay, Quarter, neatly resolved the problem. Du Plessis could claim that the coloured population was being kept together in one district, just as the Group Areas Act required, while at the same time, the small scale neighborhood was being retained, with its picturesque houses and street life. Achmat Davids observes that the Muslim community, defined as "Cape Malay", were encouraged to see themselves as the elite among an otherwise oppressed group, and that indeed, since 1925 they had sought the designation of a Malay identity that separated and raised them above people of Indian, African and mixed descent.[18] An article in a resistance newspaper, The Torch (11 March 1952) praised the Cape Malays as being more civilized than and distinct from the "savage and benighted blacks," even though the latter were often Christian.[19]

Du Plessis finally achieved his objective in 1957, when the swath of territory today known as Bo-Kaap was designated a "Malay Group Area," and historians such as Jeppe argue that this was part of his strategy as Secretary of Coloured Affairs to ensure that a policy of divide and rule was achieved in a local setting.[20] The story, as we shall see, is more complicated than can be explained by the written history, but even the recorded history is intriguing. By framing themselves as the elite among the far more numerous coloured and black groups, the Muslims, or Malay people, did not see their fates entertwined with those of the other groups and hence they separated themselves politically from them - something that continues even today, as Cape Town is the only place in post-apartheid South Africa where the National Party continues to be elected to govern the city. Of course, groups within the coloured population also saw themselves as superior to the native, or black, population, and likewise have not always seen their struggles as allied. Therefore, the preservation of the Bo-Kaap required the removal of all non-Muslim coloured people. Pedro Meyer reported that some coloured people converted to Islam in order to apply for residence permits in the Bo-Kaap, but generally, the removal of the non-Muslim population was an unrelenting, ongoing process.

In terms of the urban and preservation programs being advanced for the Bo-Kaap, this meant that other groups had to be removed from the Bo-Kaap if the Malay identity of the area were to be maintained. Du Plessis warned repeatedly about the danger the community faced from the presence of other groups, and before the Group Areas Act, particularly the native population, which he argued was eroding the strong Muslim community.

In 1944, du Plessis wrote:

> *"Shebeens have sprung up in clusters, wine is bought in from Monday to Saturday by 'runners,' dagga smokers make the Malay Quarter unsafe, and an influx of natives has added to the housing problems of the Malays. Any renovation....should lead to saving the most picturesque part of the city and preserving for some of the Malays a place which enables them to live according to their customs."*[21]

In order to protect the Bo-Kaap, du Plessis fought both the City Council and the steady encroachment of commercial development that pressed upwards from Buitengracht, just as it already had already swept through most of the blocks north of Long Street throughout the nineteenth and early twentieth centuries. Despite his best efforts, however, some of the properties which the council purchased from the 1930s on were leveled, and the blocks redrawn to accommodate commericial uses in 1961.[22] And even though it had been designated a Group Area in 1957, the Mayor's office was still declaring that other than a first group of 17 houses renovated in 1950, the rest of the housing stock remained dilapidated slums to be torn down before redevelopment could occur.[23] Du Plessis argued that because of the "charm which time [had] bestowed on [them]," the original buildings should remain and be renovated as a far more appealing draw for tourists.[24] On 5 July 1957, the Council finally issued a proclamation limiting all future development to residential use, effectively terminating the threat of commercial develop-

ment. A tug-of-war about restoration ensued through the 1980s, as the residents sought assistance to pay for renovations, assistance that was largely not forthcoming from the Council. Between 1970 and 1976, another 52 units were renovated in the core of the Bo-Kaap, and in 1985, a third group was slated for renovation. This last group of 69 buildings was destined not for existing residents in the Bo-Kaap, but for sale on the open market at well above the prices most residents of the Bo-Kaap could afford. The Council justified their actions on the grounds that they needed to recover some of their costs, but for the Bo-Kaap, the spectre of gentrification now became a reality. Under apartheid, the young professionals who purchased these houses were still coloured, but after the end of apartheid, the small houses became available to all races. Since 1985, much of the preservation attention at the Bo-Kaap has been focused on how to resist gentrification and maintain the integrity not only of the housing stock, but of the community itself.

To return to the issue of the community's identity, I remarked earlier that du Plessis had to construct a narrative about the originary "Malay" character of the Bo-Kaap, which necessarily entailed eliminating or downplaying the historic presence of other low-income and working class groups. The other groups - Filipino, African, Portuguese, Italian, and others defined as coloured - were eliminated from the histories du Plessis wrote, and they are still absent today. Street names sometimes testify to the origins of those who settled a section, such as Chiappini Street, but elsewhere their presence has been completely erased. Narratives presented by local Muslims and Muslim tour guides emphasize that today's Malay residents followed their Imams to Cape Town when the Dutch removed them from Indonesia, especially Java, and imprisoned them on Robben Island. In their stories, an unbroken tradition from the late seventeenth century up to today binds the Muslims to the Bo-Kaap. The inhabitants of the early slave lodges in the Bo-Kaap did include Muslims from Indonesia, but they also included slaves from elsewhere in Africa, Sri Lanka, and India.

Likewise, the Bo-Kaap museum documents the lives of the Muslim families in the Bo-Kaap, but completely ignores the presence of other groups. Just three blocks over from Wale Street, where the Bo-Kaap Museum is located, is the area largely settled not by Muslims, but by people from the island of St. Helena who are Anglicans. Their descendants apparently mingled freely with the Muslim population, and indeed, in the second half of the twentieth century the most prominent and sought after midwife in the Bo-Kaap is an Anglican woman from this community. The houses on Bloem Street and its environs, with the Anglican church of St. Paul's, are in general much smaller than those near Wale Street, and have not benefitted from renovation funds that have spruced up other parts of the Bo-Kaap.

One hotly debated issue in recent years is the question of who built the housing in the Bo-Kaap; many historians believe that the labor force consisted of European artisans who immigrated to Cape Town following the Anglo-French war of the 1780s, but those involved in the Bo-Kaap preservation community maintain that it was Cape Malay artisans who were responsible for the buildings.[25] Nonetheless, even the Bo-Kaap museum itself was originally a house erected by Jan de Waal in the 1760s, in what was called the Dutch style. Although more research will be necessary to establish the ethnic make up of the labor force, it seems unlikely that some of the slaves and indentured servants brought in from throughout the world were not involved in the construction industry.

The section of the Bo-Kaap between Loader Street and the docks, today known as De Waterkant [waterside], is part of the historic working class Bo-Kaap district even though du Plessis excluded it from the borders he drew for the Bo-Kaap. De Waterkant has only been recognized as a distinct area in its own right during the last decade, when most of the renovations have been completed and it has become a public center of gay culture. Only the removal of the coloured population during the 1960s and 1970s made it possible for this new group to move in and gentrify De Waterkant. Much of the building stock remained in place, however, and has been gentrified over the past three decades into an area of small bed and breakfast hotels, bars, restaurants and coffee shops. It has also become the center of Cape Town's gay community, with a full complement of clubs, bath houses, theaters, galleries and associated retail and commercial activities. Historically, the section of de Waterkant below Loader Street, because of its proximity to the Docks, was known as a 'den of iniquity,' full of bars, brothels and flop houses. A typical case is the Manhattan Cafe, which was originally (in the eighteenth century) a house, then it became a hotel, later a brothel and bar, and now the Manhattan Cafe. Although the polemics about vice in this area date back to the mid-nineteenth century, perfectly respectable working class families of a variety of races and ethnicities continued to live and work in the area until the Group Areas Act and the forced removals of the 1960s and 1970s.

Apparently there was a long-standing but generally quiet presence of homosexual presence in the Bo-Kaap (remember that it was an elderly gay man who helped Ali purchase his grocery store), even before World War II. Because these histories are not recorded officially recorded, it is difficult to reconstruct them. But interviews with members of the gay community confirm that the gay presence in de Waterkant and the Bo-Kaap generally predates the recent gentrification of de Waterkant. Although not known outside of the gay community, even I. D. du Plessis, who launched his campaign to preserve the Malay Quarter during the 1940, was homosexual, with a particular preference for Malay men.[26] The role of du Plessis' homosexuality and preference for young Malay men has been completely ignored in histories of the Bo-Kaap, but nonetheless it is intriguing. Like many homosexuals of western European descent of the last two centuries, du Plessis had to conceal his sexual preference, and like many others, he also gravitated toward men of a lower class and especially coloured men. Just how this led him to fetishize Malay culture and Malay identity cannot be reconstructed, but in doing so he managed to transform his personal fetish into an arm of state policy with the creation of a Malay identity, and to marry this identity with a specific urban area, the Bo-Kaap. Perhaps this was only possible because his personal goals intersected with National Party apartheid policy, but nonetheless it is clear that du Plessis was largely responsible for designating the borders of the Bo-Kaap, identifying it as a coloured area, and one that should be preserved for the Malays. It is then something of an irony that

the center of the homosexual community in Cape Town is part of the historic Bo-Kaap, with an identical urban fabric and comparable history of diverse architectural influences.

NOTES

[1]Timothy F. Truluck, "Bo-Kaap: Changing Attitudes and Actions," Honours Paper, University of Cape Town, Department of Environmental and Geographical Science, 1989, pp. 9-10.

[2]Truluck, p. 10.

[3]Joanna Behrens, "Bo-Kaap Architecture: A Critique of Structuralist Theory," Honours Paper, University of Capetown, 1991, p. 50.

[4]Derek Japha and Vivienne Japha, "The Two Faces of Urban Conservation in South Africa," in *Traditional Dwellings and Settlement Reviews*. Vol. 33 (1991), p. 14; L. Townsend and S. Townsend, *Bo-Kaap. Faces and Facades* (Cape Town: Citadel Press 1977), 14.

[5]The history of racial and ethnic classifications in Cape Town is complicated; indigenous black residents of the area were known as Khoi-San; Cape Malays were those Muslims who supposedly came to Cape Town from Malaysia from the seventeenth century forward. Under apartheid, the distinctions were white, native and coloured, the latter being any racial mix.

[6]Japha & Japha, pp. 16-17; Behrens, p. 51.

[7]Behrens, p. 52.

[8]Behrens, p. 54-5.

[9]Behrens, p. 61.

[10]Current maps designate the area as Schotschekloof, while informally and in local literature it is variously termed Malay Quarter and Bo-Kaap

[11]Editorial, 8 January 1876, *Cape Times*.

[12]Natives (Urban Areas) Consolidation Act, No. 25/1945.

[13]Robert Silke and Jason Josselsohn, Interview with Pedro Meyer, 21 July 2000.

[14]State Archives, Cape Town, S: 3/CT; V:4/1/9/1/180;R: GN72, 1963, "Proposed removal of Mrs Miriam Bakana from 18 Dixon Street to Guguletu."

[15]Mr. Ali and son, interview by Robert Silke and Jason Josselsohn, 3 August 2000.

[16]Truluck, p. 19.

[17]I. D. du Plessis, *The Cape Malays* (Cape Town: Maskew Miller Ltd 1972); ibid., *The Cape Malays - History. religion. traditions. folk tales - The Malay Quarter* (Cape Town: A. A. Balkema 1972).

[18]Achmat Davids, " Complacenty to Activism: The Changing Political Mood of the Cape Muslims from 1940-1985," unpublished paper. Workshop on the history of Cape Town, December 1985, University of Cape Town.

[19]*The Torch*, 11 March 1952.

[20]S. Jeppie, "Historical Process and the Constitution of Subjects: I. D. du Plessis and the reinvention of the 'Malay,' unpublished honours thesis, University of Cape Town, 1986.

[21]du Plessis, *The Cape Malays* (Cape Town: Maskew Miller, 1944), pp. 81-82. Shebeens were clandestine saloons operating in the townships under black or coloured ownership; they originated in the early twentieth century as a form of resistance to state run beer halls.

[22]Cape Town, Mayor's Minutes, 1961

[23]Cape Town, Mayor's Minutes, 1957.

[24]du Plessis, *The CapeMalays*.

[25]I. Abrahams, "Who Built Bo-Kaap?" *Cape Argus*, 31 December 1988, p. 6.

[26]Dr Jack Lewis, interview with Robert Silke, July 2000.

MEDIA

LIFE, TIME, AND SPACE:
ARCHITECTURE IN THE DIGITAL AGE

Life, Time, and Space:
Architecture in the Digital Age

Moderator: Catherine Ingraham, Pratt Institute

Speed and Relativity:
Toward Time-like Architecture

MAHESH SENAGALA
University of Texas, San Antonio

Dead and/or Alive:
Architecture, Dis-Information, and Vitality

JASON VIGNERI-BEANE
Pratt Institute

Extradigital

KELLER EASTERLING
Yale University
no manuscript available at press time

Architecture:
The Hinged Discourse

MEHRDAD HADIGHI
University at Buffalo, The State University of New York

Speed and Relativity:
Toward Time-like Architecture

MAHESH SENAGALA
University of Texas, San Antonio

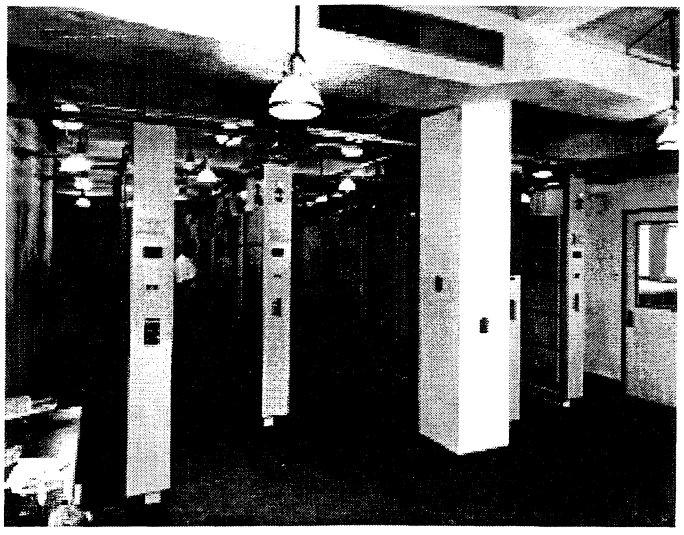


Figure 1: U.S. Army Photo A51244. Bell Relay Computer. *showing racks in which the computing. storing and controlling relays are mounted.*

INTRODUCTION

> *When an observer achieves the speed of light. the space outside his frame of reference both ahead of him and behind merges so that the space he sees is infinitely thin. Front and back as well as sides can be imagined to be all here. Gertrude Stein's devastating description of her hometown. "There is no there. there." could also apply to the condition of space at the speed of light: There is no there. there because it is all here . . . Whenever space contracts. time. its complement. dilates. (Leonard Shlain. 1991)*

Cultural critics dating back to Jacques Ellul have repeatedly pointed out the shift—in technological societies—from space-centered institutions to time-centered institutions, from material-based economies to information-based economies and from fixed, coherent belief systems to fluid, fragmented worldviews. The proposition put forth in this paper is that architecture, as it is traditionally defined and practiced as a space-based profession, is being increasingly marginalized. Time and speed have come to be the major realms of world action today. Architecture of space has become impotent, immaterial and marginal while architecture of time is becoming increasingly significant. This paper examines the impact of such transformations in the context of information technologies.

Architecture as (timeless) space

For millennia, architecture has been understood, practiced, and theorized as the discipline of space.[1] It is an eternally held notion that architecture fundamentally deals with the formation and configuration of space through the use of material. Traditionally, architecture has been employed to determine and fix social conditions through the use of materials and spatial patterns.

Various discourses of architecture have so far revolved around static formations of physical space. Theoretician K. Michael Hays rightly pointed out that we have "moved from Sigfried Giedian's modernist notion of space-time to Henri Lefebvre's Marxian 'production of space' to a Foucaldian linking of space, knowledge, and power, to most recently, a concern shared by those interested in the construction of gender, sexuality, and difference with space and its physical internalization" (Hays 1998). Henri Lefebvre's seminal work Production of Space effectively sums up the discourses of production of space (social, physical, political, etc.) and how various disciplines—from mathematics to art—have tried to territorialize those discourses (Lefebvre 1991).

FROM SPACE AND TIME TO SPACE-TIME

> *Speed finally allows us to close the gap between physics and metaphysics. (Virilio 1991)*

The physics and metaphysics of Theory of Relativity transformed our understanding of space, time and the inseparability of space, time, and movement. Back in 1939 Giedion wrote the famous book *Space Time and Architecture* (Giedion 1971). He was the first to bring the issues of interconnectedness of space and time albeit he does not explicitly discuss the impact on or applicability of Theory of Relativity to architecture.

In 1908, Minkowski remarked, following Einstein's formulation of the Theory of Relativity in 1905, that "from now onwards space and time are to degenerate to mere shadows and only a sort of union of both retain independent existence," there was a deep sense in which time and space are 'mixed up' or interlinked (Born 1962). This is evident from the Lorentz transformations of special relativity that connect the time t in one inertial frame with the time t' in another frame that is moving in the x direction at a constant speed v. The relationship is:

$$t' = [t - vx/c^2]/[\text{square root}(1 - v^2/c^2)]$$

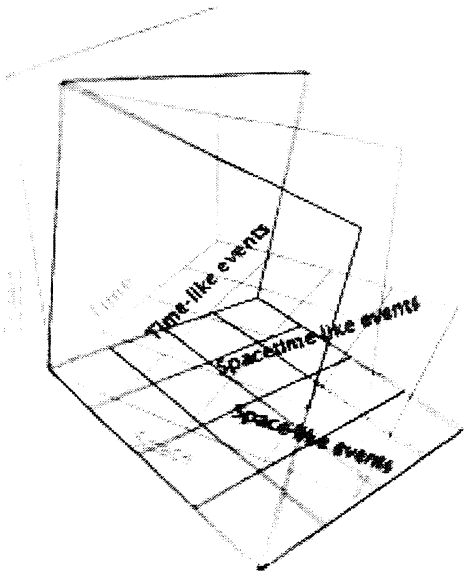


Figure 2: Lorentz transformations

In this equation, t' is dependent upon the space coordinate x and the *speed*. In the language of relativity, events are describable only as "*space-like*" or "*time-like*" or "*space-time-like*" (Born 1962). In this way, time is not independent of either space or speed.

While most people have assumed that the inseparability and interdependence of space and time are not a matter of common sense or day-to-day experience, the interdependence of space and time manifests itself in an intriguing if not baffling manner in our built environment. The physics of space-time interdependence is directly connected to the metaphysics of the relationship between space, time, and movement. This dynamic becomes very evident when we examine the impact of speed on the dematerialization of space and valorization of time.

Unlike many people (including architectural theoreticians) who have come to treat Theory of Relativity to be applicable and observable at only a cosmic scale, Paul Virilio has poignantly pointed out the metaphysical implications of space-time and speed: "If as suggested by relativity theory, speed expands time in the instant it contracts space, we arrive finally at the negation of the notion of physical dimension, and we must ask once more, 'what is a dimension'." (Virilio 1991)

FROM TIMELESS TO SPACELESS: THE END OF ARCHITECTURE?

2MPH-30MPH (10,000 BC to present): Somatic Space

At the beginning was the space of the body: the material space. Movement of knowledge was synchronous with the movement of the body. Being and knowing unfolded in the material world with human body at its center. Architecture, the first mass medium known to humankind was the chosen agency to organize, control, stipulate, and command the space structure of civilizations. Therefore, politics was firmly rooted in the architecture of the material space. *Architecture was the central realm of communion and communication.* Architecture was conceptually "timeless." Public buildings were built to last forever —for eternity, if you will.

2MPH-1000MPH (1400 AD to present): Textual Space

Not until the advent of printed text did the grip of somatic space loosen on the human civilizations. As Victor Hugo exclaimed, word killed stone. Knowledge could now move by itself through the virtual medium of printed text with the human messenger being only an infrastructural carrier—relegated to a marginal status. Knowledge was, for the first time in human history, liberated from being "embodied" in architecture and human body. Soon, societal institutions began finding legitimacy in printed text. Consequently, architecture was stripped of its central political and cultural role and pushed aside. However, architecture was still a place to "commune" while communication was relegated to print medium.

186,000MPH (1900 AD to present): Broadcast Space[2]

The next wave of virtual media—radio, telephone, telegraph, cinema, photography, and television—transformed the composition and ethos of how societies built themselves. While text was still rooted in the physicality of paper, with the electronic media one did not have to move a thing in order to communicate. While print media undercut the epistemological contiguity of the built world, *electronic media undercut the ontological contiguity of experience and context.* Political debates and propaganda could "take place" and reach millions of people without moving a thing — all happening in simultaneous time. As Marshall McLuhan noted, there would have been no Hitler without radio. While books and bodies could be banned, exiled, and locked up in buildings, electromagnetic waves could not be. Walls, windows, and doors of traditional architecture lost their meaning as knowledge and communication could not be organized, controlled, or prohibited through conventional architectural means. The traditional notions of wall, enclosure, perspective, horizon, etc., which were based upon somatic space, became meaningless in the light of televisionic space. Solar day

held little meaning in the televisionic day, which came to structure new rhythms of the cities in technological societies. Hence, architects had to ask such a seemingly basic question as "what does a brick want to be" ten thousand years after we first built with a brick. This turn to legitimacy in the use and truth of material was symptomatic of the *im*materialization of architecture, as we have known it so far.

186,000MPH (1946 AD to present): Cyberspacetime

Cyberspace and virtuality are two of the many notions popularized by the advent of general-purpose computers. No other medium has received so much hype and attention (with an obsessive fascination for William Gibson's portrayal of cyberspace) albeit some of it is well needed. Unlike the previous media, electronic or not, we now have a medium and technological environment that holds the prospect of rivaling human intelligence or at least a few aspects of it. The new medium is truly cybernetic and digital with its interactivity. In my explorations to follow, I will stay away from Gibsonian narratives of cyberspace.

THE MESSAGES OF THE NEW MEDIUM-ENVIRONMENT

> *...the "message" of any medium or technology is the change of scale or pace or pattern that it introduces into human affairs. (Mcluhan 1964)*

I will now discuss a number of significant characteristics of the new medium-environment by tracing various symptomatic techno-cultural trends.

TREND #1

Miniaturization: Honey, I Shrunk the World!

> *Now all you need to do is create a vacuum in a rectilinear tube so as to allow one ray of light to pass through. No more roads to be laid, no more surfaces to be leveled. Now one produces vacuum out of volume. (Virilio 1991)*

Cyberspace is non-spatial. The suffix *space* in the word *cyberspace* is a misnomer and a metaphor at best. In sharp contrast to the material space of the pre-print civilizations, space is now a simulation, a representation, and a metaphor for our bodily experience of four-dimensional space. The logic of cyberspace is non-spatial in its propagation, generation, manifestation, and production. What then is the true logic of cyberspace? The true logic of cyberspace is in its reliance on time. 600MHZ, 10MB/Sec, 56K BAUD, real-time ($1/10^{th}$ of a second), nanosecond, refresh-rate . . . do you hear anything related to space in this list? The measure of cyberspace is time— the digital, technological time of the pulsating electrons. An email sent to you is measured in terms of size and time taken to reach you, but not in terms of the space that it traveled to reach you. Interestingly, printed media and electronic analogous media both contain within them traces of space they travel. A letter from your friend in Finland would contain the traces of its trajectory. A radio reception fades away as you move away from the transmitter. However, with digital environment, space and distance bear no effect on its content.[3]

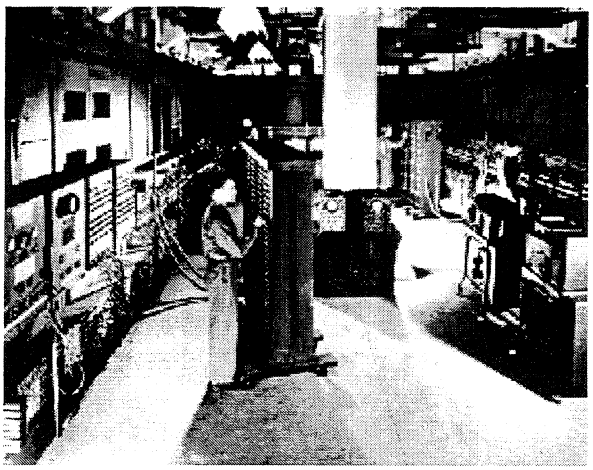


Figure 3: ENIAC *at University of Pennsylvania. 1945 AD. U.S. Army Photo.*

Miniaturization, which is at the heart of de-spatialization of our world is, according to Daniel Bell, one of the major transformative trends of technological development (Bell, 1973). In 1946, world's first general-purpose computer, ENIAC (Electronic Numeric Integrator and Computer) was unveiled in Philadelphia. It occupied a room of nearly 23,000 square feet. It consisted of 18,000 vacuum tubes, 70,000 resistors, and 10,000 capacitors, arranged in 40 panels in an 80-foot "U." It weighed about 30 tons. It performed 5,000 additions in one second or 2.50 multiplications in one second. Given below is an original lay out of the various machinic components.

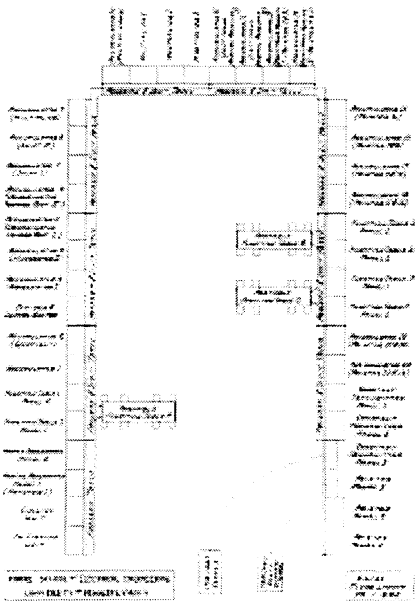


Figure 4: U.S. Army drawing. A layout sketch of ENIAC. *1945 AD.*

In 1996, all the original capabilities of "ENIAC" were built on a microchip of size 7.44 by 5.29.mm (0.004237 square feet) using a 0.5 micrometer CMOS technology: a 5,429,138 fold shrinkage in space!

First, architecture was robbed of its communicational significance by printed word. This was followed by the electronic media stripping architecture of its material significance and communal role. Till the advent of microchips, architecture was at least performing an infrastructural role, which was very different compared to the politically central role it played in antiquity. Finally, the slaughter of architecture — the most conservative profession by any account — is complete with the arrival of the computer-mediated and networked virtual worlds. Architecture has paid its price for its inflexibility of methods, materials, techniques, and boundaries by being robbed of its fundamental roles. All the powerful technological nations have moved into a time-centered system of economy and politics. The world has migrated from geopolitics to chronopolitics. What is left behind? Architecture, definitely.

Paul Virilio comments:

> *A strange topology is hidden in the obviousness of televised images. Architectural plans are displaced by the sequence plans of an invisible montage Where geographical space once was arranged according to the geometry of an apparatus of rural or urban boundary setting, time is now organized according to imperceptible fragmentations of the technical time space, in which the cutting, as of a momentary interruption, replaces the lasting disappearance, the "program guide" replaces the chain link fence, just as the railroads' timetables once replaced the almanacs. (Virilio 1991)*

He goes on to observe that "The new produced and projected space has less to do with lines, surfaces and volumes than with the minutiae of view-point, the dynamite of tenths-of-seconds. These viewpoints are simultaneously time-points in the tele-topological continuum of long-distance projection and reception." (Virilio 1991)

Going back to Minkowskian notion of interconnectedness of time, space and speed, we could conclude that the human quest for speed, the quest to conquer space, the quest to save time, translate to the end of space or at least the end of its centrality. Speed, pursued through the internal combustion engine (the automobile) had transformed the structure of our cities. Automobile-centered city development had led to movement-based (infra)structure of the cities. Speed pursued through instantaneous communication of electronic and digital media is now leading us to a total subversion of four dimensional space-time into fractured and discontinuous melange of artificial horizons, perspectives, juxtapositions, connections, light and knowledge flowing through non-spatial infrastructure.

The metaphysical transformation initiated by non-spatial technologies, simply put, is that speed transforms space into time. Alternatively, we could say that acceleration transforms space-like events to time-like events. All the powerful institutions of socio-political transformation have now moved into the non-spatial and non-material domains. Less than 2% of the US economy is paper-based; the rest is electronic and digital. Where money is, is where action is. As architects, we certainly know that there is no money in architecture. That is simply a consequence of having no money in space-based ventures. Virilio exclaims how the last bastions of space have been taken away from architects: "So it makes perfect sense that when we discuss space technologies today, we are not referring to architecture but rather to the engineering that launches us into outer space." (Virilio 1991)

There is really no use grieving over the marginalization of architecture. However, we must be aware of, if not understand, the shifts and inversions in the today's technology-dominated world.

TREND #2

Ubiquity: Being Everywhere and Being Nowhere

> *With acceleration there is no more here and there, only the mental confusion of near and far, present and future, real and unreal—a mix of history, stories and the hallucinatory utopia of communication technologies. (Virilio 1995, p.35)*

Another bastion of spatial primacy is being breached through technology's pursuit of ubiquity. To be everywhere negates the spatial notion of being here or there. Being everywhere also negates the notion of center and periphery. Whole world becomes a homogeneous field of unvarying value. Marshall McLuhan noticed this phenomenon already a few decades ago: "Electric speeds create centers everywhere. Margins cease to exist on the planet." (McLuhan, 1964) Architecture has traditionally worked with configuring body's position in space in relation to another body or activity. This configuration created the notions of here, there, orientation, direction, juxtaposition, adjacency, distance etc. These notions are now being replaced with the arrival of ubiquity. You carry your cell phone and your computer around, as one advertisement of a dot-com company makes it amply clear, the place, and orientation of your body and its relationship to the built world simply does not "matter" anymore.[4] That advertisement at once avouches the death of architecture as we had known it till yesterday.

TREND #3

Communing in Time: Real-time, simultaneity, and instantaneity

> *For telecommunications, coming together in time means, inversely, distancing oneself in space . . . it is as if telecommunication's 'populating of time'—such as vacations, interruptions, and so forth suddenly replaced all the ancient cohabitations, the populating of space, the actual urban proximity. (Virilio 1991)*

Real-time is defined as the simultaneity of events occurring within 1/10th of a second. In a large auditorium, it may take up to 1/3rd of a

second for you to hear a speaker if you are seated at the other end of the room. In the meantime, its broadcast or cybercast would have already reached a person thousands of miles away! If one of the fundamental laws of space dictates that no two objects can occupy and the same place at the same time, it meant that no two people could experience exactly the same event. However, that phenomenon is circumvented through electronic broadcasts where millions of people could occupy the "same seat" in the auditorium and experience the same image and sound even when they are thousands of miles apart! The existence of electronic real-time necessarily precludes possibility of materEal space. The mantra of real estate industry used to be "location, location, location." The new slogan for the virtual real estate is "time, time, time."

Theory of Relativity makes it clear that there is time dilation between one frame and another. For example, the faster a clock moves (say, in a space ship), the slower it runs, relative to stationary clocks. Time dilation shows itself when a speeding twin returns to find that his (or her) Earth-bound twin has aged more rapidly. Interestingly, we have been experiencing a time dilation in architecture and culture today. Speed exposes the finest nuances of time to human experience. Each nanosecond expands to become eternity. The impatience of a driver experiencing time dilation at a traffic light, the rush of people speeding to escape the time dilation of the expressway, the impatience of a person in front of a slow computer which takes an extra second to perform a complex calculation are things that each of us have experienced. In architecture, we once used to build for eternity. We now design buildings that are made to last for 10-20 years. For we cannot visualize a future beyond such a time frame anymore.

TREND #4

The Omega Point: The Formation of Noosphere

Nearly five decades ago, much before the computer became a popular machine, Teilhard deChardin prophetically proclaimed that the human evolution is heading toward a global coalition of an interconnected world. He called such a world "Noosphere" (the sphere of interconnected human beings). He predicted that such a coalition would happen at a point in time called "Omega Point." Not in a too distant future, we can easily envision people being connected with the invisible threads of digital communication where material space will not have much meaning. As of today, there are an estimated 56,000,000 hosts the Internet. The Internet is growing at a rate faster than television, radio, and telephone combined. What does this mean to architecture? It means one of these two possibilities: architecture will remain a space-centered, marginalized and conservative profession; or architecture redefines its boundaries to address the contemporary developments and jumps up to the center stage.

Fluidity is one of the conditions experienced everywhere in this global economy. In economics, one of the problems faced is the fluidity of money and transactions. According to some analysts 98% of US economy is electronic. The condition of fluidity coupled with motion at the speed of light leads to volatile local conditions and intensified global conditions. Fluidity positions any human activity to be handled temporally.

The problem with the education and practice of architecture today is that, in general it ignores or even denies the transformations occurring everywhere in the technologically advanced parts of the world. We revel in the glory of the past because that is all we have left. Or we sell ourselves as a service-oriented industry bending over backwards to respond to the "needs" of the clientele at the expense of larger ethical issues. Recognition of a phenomenon does not automatically mandate an acceptance of a condition. Nevertheless, it does mandate a response. Ignorance and denial or a reliance on past glory is certainly not a very intelligent response.

TREND #5

Virtuality: All that is sold literally melts into air

Greg Lynn raised a valid question when he said that "The term virtual has recently been so debased that it often simply refers to the digital space of computer aided design. Virtuality is also a term used to describe the possession of force or power." (Lynn 1999) If by virtuality we mean the force and potential or quality and essence of being without material existence, then we are reminded of Daniel Bell's notion that our economies have begun to do more and more with less and less material agencies (Bell 1973). Economies are becoming increasingly based on mental labor and movement of information, rather than physical labor and the movement of matter. Nicholas Negroponte has made a similar observation when he noted that the world is being increasingly concerned with the movement of bits than the movement of atoms (Negroponte 1995).

However, contrary to a widely-held belief that virtuality is somehow a direct offspring of the computer, we need to recognize that the notion of virtuality, at least as far as architects are concerned, dates back to the day when we as a profession started drawing instead of building. Once again, as Greg Lynn critically noted, "Architecture is the profession concerned with the production of virtual descriptions as opposed to real buildings". We have been designing the buildings virtually. Legally speaking, we do not even "oversee" or supervise the construction process; rather, we "observe" it distantly. Surely, a virtual medium, an intermediate agency to try, visualize and evaluate various conditions "virtually" on paper or through a model or in a computer helps one thing: control over failure. Truly speaking the built work becomes a representation of the virtual drawings than the other way round. The drawings become the master bodies of knowledge from which to build the "result". It now takes less than 9 months for Chrysler to begin a new model car, design it, test it and put it on the assembly line. It used to take them 3 years before the use of the computers.

STRATEGIES FOR A RESURRECTION OF ARCHITECTURE

[Human being] has been liberated little by little from physical constraints, but he is all the more the slave of abstract ones. He acts through intermediaries and consequently has lost contact with [material] reality . . . Man as worker has lost contact with the primary element of life and environment, the basic material out of which he makes what he makes. He no longer knows wood or iron or wool. He is acquainted only with the machine. His capacity to become a mechanic has replaced his knowledge of his materials. (Ellul 1964)

One might pose the question "does the discussion thus far mean the end of architecture?" Far from and worse than that, architecture is (going to be) alive but, in general, it will continue to lead a life of insignificance. Instead of being the bone or muscle of the society, it is being reduced to the fat of the society and relegated to remain in the societal margins. When the economy is doing well it swells. Otherwise it flinches. The field of architecture is surely at a point of its existential crisis. What then are the strategies that may restore the vitality and centrality to the field of architecture? To begin with, here are a few strategies:

Redefine and redraw the boundaries of what we call architecture. To embrace virtual worlds on one end and entrepreneurial initiatives on the other maybe a good place to start. This strategy would also entail intensification and expansion of the discourse of architecture. Architecture needs to overcome its reputation of being a conservative profession that thrives only on the strategy of resistance.

Architecture, in any event, must become a critical practice as opposed to being a merely technical service provider who produces infrastructure in response to the so-called clients' needs.

While most of the societal institutions find their centers of action transferred to virtual worlds, until we can say "Scotty beam me up!" we are bound by the laws and limitations of being embodied in a corporeal body. Toyo Ito calls it the primitive body. Disease, pain, death, pleasure, sexuality, and the primacy of having to interact "face-to-face" (as opposed to "interface-to-interface") in the material world, still govern our existence. Liberation from the constraints of material space and bodily existence does not mean marginalization and neglect. Human body has lost its centrality. Nevertheless it is still the center of existence.

One reason that people turn to architecture is that it mediates how humans dwell (in a Heideggeran sense of dwelling as an ethical prerogative of human beings) in this world. Architecture has the potential to mediate between the tangible and the virtual, between the material and the ethereal. Such mediation definitely invokes a critical role for architecture. Instead of merely "housing" and "accommodating" things and flows, instead of degenerating to a status of infrastructure, architecture could, through a critical response to its "times", provide the much needed connection and mediation between various realms of existence and experience.

Traditionally a majority of the architectural professionals have vociferously maintained the narrow boundaries of architecture as that which is physically built. Evolution often involves a transformation of a species into a whole other kind of species. Perhaps a greater tolerance, if not an enthusiastic promotion of expanding the boundaries of architecture to embrace a number of adjacent territories may lead to a revitalization of the field of architecture.

NEW AND CRITICAL DIRECTIONS: TIME-LIKE ARCHITECTURE

The cultural expectation that buildings must be permanent infers that building's physical and symbolic form should persist. Rather than designing for permanence techniques for obsolescence, dismantling, ruination, recycling and abandonment through time can be studied. (Lynn 1999)

A number of architects have directly or indirectly addressed the notion of time-like architecture: Greg Lynn, Peter Eisenman, Toyo Ito, Bernard Tschumi, Rem Koolhaas, Zaha Hadid, Richard Rogers, Neil Denari, Wes Jones et al. have developed work that takes into account the time-like events that dominate our world today. Although it is not possible to go into the details of their works to exemplify the ideas discussed in this essay, a brief survey of some of their ideas might help.

Greg Lynn discusses the role of digital technologies in enabling ways to deal with time-like events in architecture:

The introduction of time and motion techniques into architecture is not simply a visual phenomenon . . . Another obvious aesthetic fallout of these spatial models is the predominance of deformation and transformation techniques available in a time based system of flexible topological surfaces. These are not aesthetic choices but technical statements of the structure of the topological medium. (Lynn 1999)

While Lynn stays away from any discussion of the ethical and socio-political issues and repercussions of time-like architecture, his work does open doors to further thought in this direction.

CONCLUSIONS

In the age of telepresence and networked virtual worlds, the notions of space, time and materiality have undergone dramatic shifts. The metaphysics of Theory of Relativity explicate the interdependence of space, time, and speed in a discontinuous field of forces. Where movement is relatively little, events become "space-like." Where movement takes precedence over stillness, events become "time-like." Speed is the distinguishing factor between these two

kinds of event readings. Through various communication and transportation technologies, we have moved far beyond the 2MPH speed of a walking human being to 186,000MPH speed of radio waves. We have moved from populating space to populating time. In the process, architecture has lost most of its social, political, cultural and existential significance. This was partly due to the conservative nature of the profession and its allegiance to "timelessness" and static tectonics even in the age of Noosphere.

The latest information technologies possess dramatic new potential. They allow ubiquity, simultaneity, instantaneity, virtuality, remote-interactivity and capable of real-time computation. These phenomena are anti-spatial and pro-temporal in nature. Thus, architecture is faced with the most daunting prospects of all time, contrary to the proclamations of some cyberspace proponents.

New technologies raise new ethical questions and open up new possibilities. Architecture needs to address the time-like environment in which it finds itself today. The tasks for architecture and design computing are many. Architecture could mediate between the tangible and the intangible, between the material and the virtual and between space and time. Architecture could become the point of contact of the realms that are worlds apart. If, as Heidegger proclaimed, dwelling is the primary ethical imperative of human beings, then architecture needs to be brought into the world with a critical mission of connecting, re-spatializing and temporalizing a world that is fast disintegrating into bits of sand.

REFERENCES

Bell, Daniel. *The Coming of Post-Industrial Society*. New York: Basic books, Inc., Publishers, 1973.

Benedikt, Michael. *Cyberspace: First Steps*. Cambridge, Massachusetts: MIT Press. 1991.

Born, Max. *Einstein's Theory of Relativity*. New York: Dover Publications, Inc. 1962.

Casey, Edward. *Fate of Place: A Philosophical History*. University of California Press. 1995.

Derrida, Jacques. *Archive Fever*. Chicago: University of Chicago Press. 1996.

Ellul, Jacques. *The Technological Society*. New York: Vintage Books. 1964.

Giedion, Sigfried. *Space. Time and Architecture*. Cambridge, Massachusetts: Harvard University Press. 1971.

Hays, K. Michael. ed. Architecture Theory Since 1968. Cambridge, Massachusetts: MIT Press. 1998.

Lefebvre, Henri. *The Production of Space*. Cambridge: Blackwell Publishers. 1995.

Lynn, Greg. *Animate Form*. New York: Princeton Architectural Press. 1999.

McLuhan, Marshall. *Understanding Media: The Extensions of Man*. New York: The Signet Book. 1964.

Peterson, Steven. "Space and Anti-Space." Cambridge, Massachussets: Harvard Architectural Review number 01. (1980).

Shlain, Leonard. *Art & Physics: Parallel Visions in Space. Time & Light*. New York: Quill William Morrow. 1991.

Virilio, Paul. *Lost Dimension*. New York: Semiotext(e). 1991.

Virilio, Paul. *The Art of the Motor*. Minneapolis: University of Minnesota Press. 1995.

NOTES

[1]Space is defined here as a 'domain of possibilities or activities'. Place maybe defined as a set of institutionalized spaces. The shift during Modernism from place to space indicates a breakdown of traditionally instituted space and the emergence of a radical, fluid and unformed conception of space. See Steven Peterson's article "Space, Anti-space" (Peterson 1980) for further discussion on these issues. Also see Edward Casey's The Fate of Place for an in depth discussion of various issues of space and place from antiquity to the present times (Casey 1995).

[2]For contextual contiguity of the ideas being presented here, and for reasons of brevity I am consciously avoiding a discussion of the role of automobile in the transformation of architecture.

[3]Here, it would be apt to recall Marshall McLuhan's discussion about light bulb as a medium. He shows how its content and message are inseparable. He says "the electric light is pure information . . . For electric light and power are separate from their uses, yet they eliminate time and space factors in human association exactly as do radio, telegraph, telephone, and TV creating involvement in depth." (McLuhan 1964, pp. 23-25).

[4]The advertisement by mySAP.com shows how easy, quick, and advantageous it is to book your tickets "on line" irrespective of your physical position as opposed to standing "in the line" in an airport terminal.

Dead and/or Alive:
Architecture, Dis-Information, and Vitality

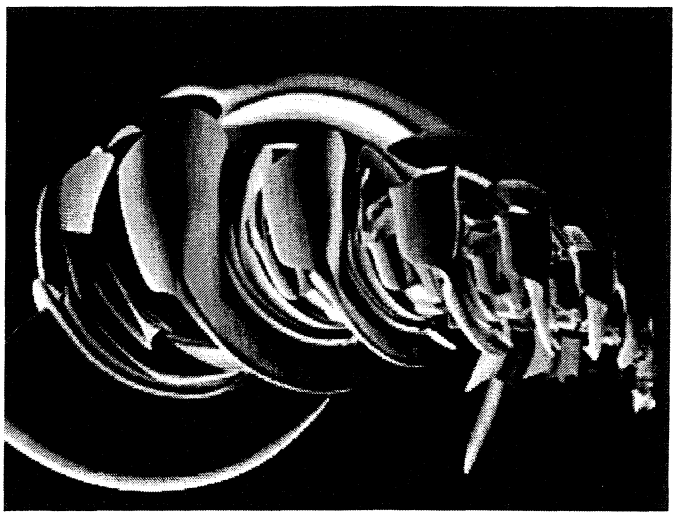
JASON VIGNERI-BEANE
Pratt Institute

MOLECULES (MICROSTRUCTURES, DIGITIZATION, PRODUCTION)

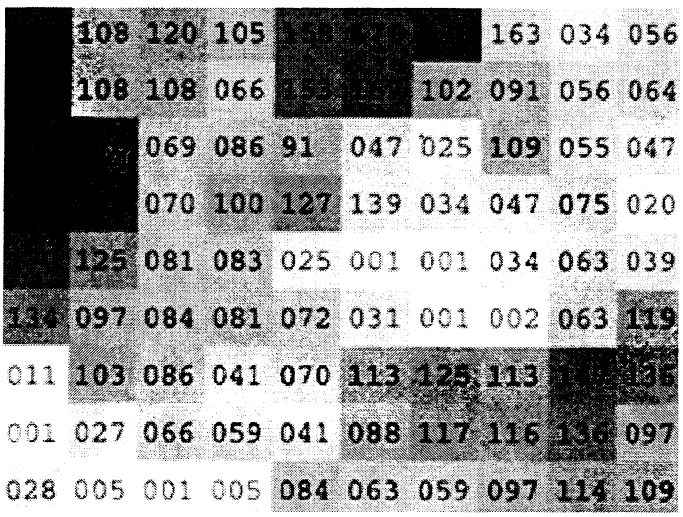
The digitization of architecture seems to have produced a new approach to the old problem of thinking about the organic analogy in architecture. This analogy is, by definition, an imperfect form of induction because it hinges on the indeterminacy of representations and their arrest of biological states. The subjects of the linguistic sciences and the life sciences have seen particular difficulty in approaching one another in architectural discourse. Recent developments in the digital practice of architecture have promoted the advanced return of an organic model as architects have begun to explore algorithmic processes, self-generating structural series, topologically driven membrane buildings, and animated forces that pressure and influence form. Amidst the interest, energy, and sensation that this important work has generated, the question of semiotics seems to have wavered, almost by definition, in significance.

At the same time, the life sciences, the physical sciences, and semiotics have formed strange but conceptually powerful bonds. These interdisciplinary exchanges could inform architectural discourse of strategies for the production of buildings that do not have to choose science at the risk of language nor language at the risk of science. They can problematize the inevitability of the "semiotic" building and the "organic" building from being dead and alive, respectively. Most notably, statistical mechanics cracked the limits of these disciplines by proposing an investigation into the microstructures and micro-states of objects, dead or alive. There is a semiotic stake in this investigation into the living because it ultimately targets the arrest of information that is present at the molecular level. Maybe I should have titled this essay 8 pages, 37 paragraphs, 357 lines, 4,032 words, 22,123 characters, and 4,010 spaces.

One of the most stunning philosophical assertions by statistical mechanics is the idea that the molecular level of an object carries the sets of internal information necessary for the life, or death, of that object. (This is a great lesson for architecture.) Further, the presence of information does not guarantee the viability or the vitality of that object.[1] This is to suggest that the presence of the components of an object may or may not lead to the presence of that object. There is such a fundamental difference between the item-



Karl Chu - Phylogon - Topological Generation



Bit-Mapped Skin - Tonal Units and Encoding

ization of an object and the actual configuration of that object that the odds of an object actually becoming present are so low that one could call it chance. Or one could call it the fragility of language, the arbitrariness of the sign, or the vagueness of representation. To architecturalize this scenario one could say that any number of architectural objects does not guarantee the configuration of a building.

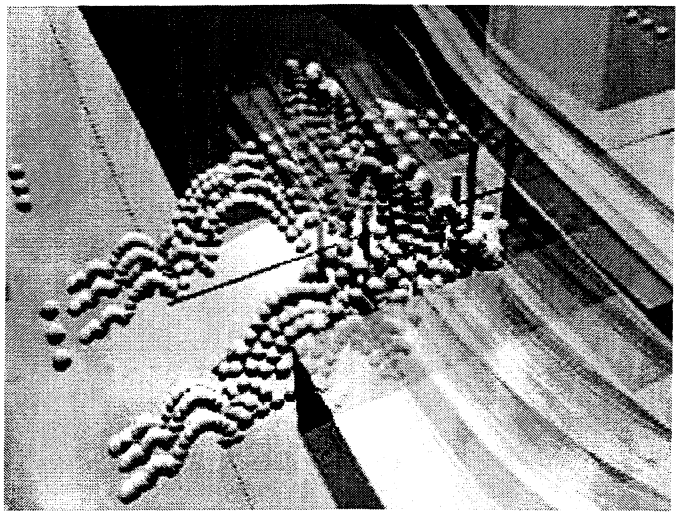
One could make the case that digital formats for the production of architecture – software – promote the possibility of this fragile coherence and strange incoherence between the object and the phenomena that constitute it. For the most part, the characteristics of a digital object are seen by design software as operationally discreet. A material is unrelated to the surface it materializes. Planes are upheld as extricable from the volumes that they comprise. Hue is independent of saturation. Channels of color are independent of the color itself. The color unit itself is, in turn, independent of its location on the map of other color units that resolve an image. The cultural rules that underwrite contracts between structure and skin, solid and void, and other architectural binaries are tested each time that one mis-uses one of the many functions of repetition.

Paradoxically, digitization places heterogeneous media into a homogeneous representational framework otherwise known as binary. In doing so, programming is forced to extract the micro-structural principles of difference that are specific to each media in order to translate those principles, aspect by aspect, into computable language. The atomization of media into discreet principles is manifest in the proliferation of menus, tool-bars, subdivided dialog boxes, and so on that display, in excess, a kind of meta-set of moves that the designer might make during the execution of both simple and complex constructions. These meta-sets often suggest both the limits and infiltrations of various media by evidencing the differences and similarities by which different disciplines handle different matters in different programs. Or, for that matter, similar matters in different programs. Is text encoded as vector-based (equation-based) geometries or is it resolved by a bitmap? If the text is bitmapped then is it text or is it merely the image of text (a text-ure) as approximated by a grid of pixels? If that text is vector-based then what is its status if it is imported into an architectural modeling program that is also founded on equation-based geometries? Or, what is the status of an image – a map of tonal units – when it is used to displace a meshed surface into the undulations of a three-dimensional form? Such cross-pollinations of media depend on two states of representation: the representation of the object and the representation of that representation in digital coding that cuts across media, discipline, object, and cultural rules to simply drive the machine. The critical value of the machine is that it produces both the representation of the object and the way of working on that object. All of this is delivered by a coding that hinges on the already-abstracted and repetitive nature of language.

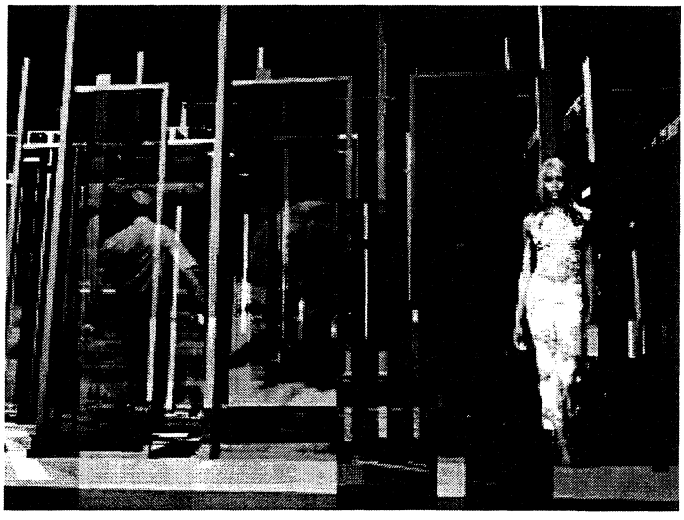
REPETITIVE STRESS (HISTORY, META-LANGUAGE, VAGUENESS)

The apparent mutual exclusion of the physical sciences and life sciences was radically questioned by the quantum physicist Erwin Schrodinger in an important set of lectures in 1943.[2] The lectures breached the representation-production question by suggesting that organic matter is driven by a kind of "code-script" that legislates the configuration of properties of an object in its present state as well as in the "permanence" of certain properties in future objects that it reproduces. He, like the theorists of hypertext and hypermedia, analogizes this condition with architectural terminology:

> *But the term code-script, is, of course, too narrow. The chromosome structures are at the same time instrumental in bringing about the development they foreshadow. They are law-code and executive power – or, to use another simile, they are architect's plans and builder's craft – in one. (Schrodinger,* What is Life? *p. 22)*



Greg Lynn - Modeling and Generating Contracted



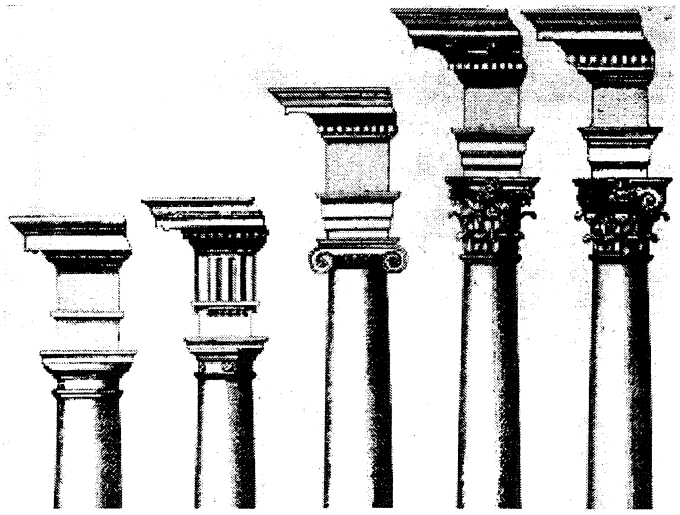
Jason Vigneri-Beane - Sterilized Figures

This suggests an internal logic that is, of course, a critical matter in the media driven processes of the digital project. The economy of the computer lies in its ability to perform simultaneously as a machine of representation and, more importantly, a machine of enunciation that contracts the modeling and the generation of an object into one process. (Some of the finest digital work has shrewdly implemented the work of algorithmic functions.) This contraction seems to intensify post-structural desires to deliver the object as a product of auto-writing. Input of parameters legislates output of forms by the processor, thereby relieving the architect of the *full* burdens of authorship. In the end, objects generated by processes of computation generally demonstrate an intense state of abstraction and repetition by producing topological shells and iterative structures that are defined by systems of points, lines, and planes. Charged with this abstracted meta-language of architecture, these structures have had to default on questions of figuration, reference, and, history. While they are able to sustain remarkable numbers of internal differentiations of micro-structure, the execution of radical semiotic and programmatic differences has proven elusive because, in the end, digital modeling is about the deployment of coordinates. This micro-structure of coordinates, in turn, functions analogously to pixels as the resolution of the image through repetition of color units in a bit-mapped grid. Rather than *being* the curved line it *resolves* the curved line. Resolution comes with excess - a series of segments stands in for a single curve - and at a loss - finite and discontinuous information stands in for a scalable and continuous object.

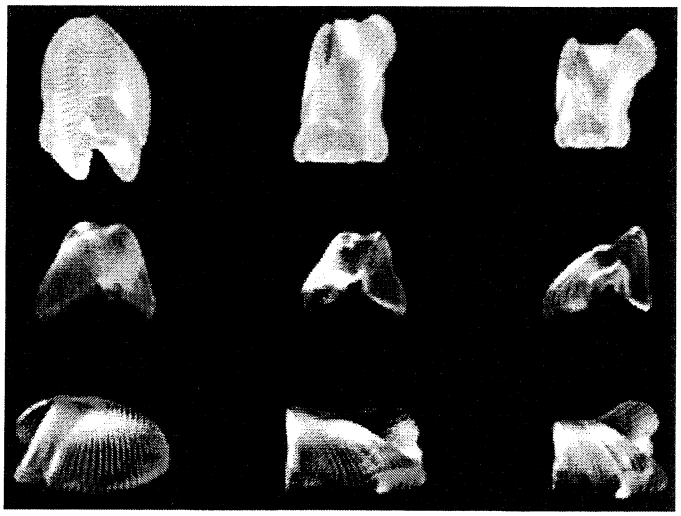
The logic of repetition is implicated again when a crucial point in Schrodinger's lectures proposes that one of the phenomena that differentiates inorganic matter from organic matter on the molecular level is that solids are structured by *periodic* crystals in the former and *aperiodic* crystals in the latter:

> *A small molecule might be considered the "germ of a solid." Starting from such a small solid germ, there seem to be two different ways of building up larger and larger associations. One is the comparatively dull way of repeating the same structure in three different directions again and again. That is the way followed in a growing crystal. Once the periodicity is established, there is no definite limit to the size of the aggregate. The other way is that of building up a more extended aggregate without the dull device of repetition. That is the case of the more and more complicated organic molecule in which every atom, and every group of atoms, plays an individual role, not entirely equivalent to that of many others (as is the case in the periodic structure.) We might quite properly call that an aperiodic crystal or solid and express our hypothesis by saying: We believe a gene – or perhaps the whole chromosome fibre – to be an aperiodic solid. (Schrodinger,* What is Life? *p. 60-61)*

This discussion suggests that there is a critical matter of the component and how that component is deployed. This is a matter of life, death, and the vitality of the digital object because the computer does not function without repetition. It is important to ask: without the repetition of what? The "what", we know, is both the coordinate and the string of binary digits that define the coordinate but the "what" rarely takes on figural tectonics that have a semiotic correlation in construction practices or gaming in architectural figures that are, as Schrodinger has characterized it, "not entirely equivalent."[3] This suggests that the repetition of units does not have to be merely a system of coordinate-points but could actually be a system of architectonic components that are significant of programs, histories, formalisms, technologies, and so on while still satisfying Schrodinger's criteria of similarity with differentiation. At the same time, and for all of this figuration, these components are still upheld in a state of play because, in the digital model, they are simultaneously concrete objects of signification and radically abstracted codes. Their constitutions are always one function away from declension to error and encryption because the computer, while technically omniscient, is, in the spirit of Samuel Beckett, culturally nascent. It performs operations masterfully without choosing to ask, "for what the cultural rules?"



Vignola - Canon of the Five Orders - Components



Greg Lynn - Embryonic Houses - Iterations

A is also 01000001, a is also 0110001, and the space between them is also 00100000.

The fundamental architectural act of (coded) repetition seems to be a function of the production economy of architecture. If it is, then perhaps there is another turn to the economy of architecture that is less strictly about the mass production of objects and the labor of physical assembly. Perhaps the accommodation of production is the necessary excuse for another strategy of production that has a stake in sustaining the meta-language of architecture. Or, as in the progeny of the cell for Schrodinger, perhaps there is a language of architecture that, although varied, mutated, and erratic, persists. Looking back on architecture, one finds a strange tradition of the instruction manual: The "*N*" Books of Architecture as an anticipation of the contemporary will to disseminate the principles of building in a set of canonical parameters that provide certain algorithms for the way one, anyone, produces a building. These parameters address both the construction of the component and the way in which the architect deploys that component. At the same time, they demonstrate a line of research into meta-linguistic variations on the architectural object as detailed by Tafuri's discussion of Serlio's "modulation" of type in *The Seven Books of Architecture*.[4] A contemporary version of this might be Greg Lynn's on-line *Build Your Own Embryonic House*. Relationships between the component and the system of deployment can spur strategies of repetition that are just as self-reflexive as they are programmatic in the sense that to *deploy* is also to *display*. Schrodinger again:

> *As we shall presently see, incredibly small groups of atoms, much too small to display exact statistical laws, do play a dominating role in the very orderly and lawful events within a living organism. They have control of the observable large-scale features which the organism acquires in the course of its development, they determine important characteristics of its functioning: and in all this very sharp and very strict biological laws are displayed. (Schrodinger,* What is Life? *p. 20)*

The etymological coincidence of display and deploy (*displicare*) suggests the routine architectural acts of exhibiting structures, materials, and formal devices. In the end, these exhibitions are meta-displays that the assembled object in question evidences the moves that constitute the architectural language: point/line, plane/volume, structure/skin, inside/outside, solid/void. However, these terms of architectural discourse are in constant states of crisis because the binary sets that they propose will always be undone by the seriality and multiplicity of the objects that they attempt to classify. The crisis of representation here suggests once more the fragile and indeterminate relation between the presence of information as a micro-state and the configuration of that information into something that is fleetingly meaningful, if not stable, as a macro-state. It also reminds us of the flaws of binary logic that characterize classically trained set-theory because it demonstrates that the notion of crisply defined categories on which classical set-theory and, by extension, language are founded can not accurately describe the world. In 1922 Bertrand Russell characterized the error as the inherent *vagueness* of language:

> *Vagueness and precision alike are characteristics that can only belong to a representation, of which language is an example. They have to do with the relation between a representation and that which it represents. Apart from representation, whether cognitive or mechanical, there can be no such thing as vagueness or precision; things are what they are and there is an end of it. (Russell,* Vagueness *p. 62)*

Set-theory is, of course, critical to the invention and success of the computer. One of the major, if not unwitting, contributors to the invention of the "logical design" of digital computing has also had a direct impact on the logic of digital modeling. George Boole's thinking appears by name in AutoDesSys's Form-Z as a way of combining basic modeling objects or "primitives" to produce more advanced compound three-dimensional geometries. While digitization owes so much to Boolean Algebra, Boolean sets have come under criticism by theorists of Fuzzy Logic.[5] This emergent branch of deviant logic advances by criticizing classically-trained set theory on its inability to provide for scenarios of nuanced or soft decision making. Problems of logic and investigations of vagueness drive the fuzzy theorist's project of relieving sets of the burden, or impossibility, of crisply defined classification in order to bring multiplicity and vitality to logical processes. Fuzzy logic would propose that there are no objects that are either X or not X. Rather, all objects have a greater or lesser degree of membership in the set of objects that can be classified as X or not X.

This understanding of logic, vagueness, and the need for sets that have dynamic membership ultimately fosters advances in artificial intelligence – the convergence of

computation and neural science – because it allows for input and output that is not about binary switching of yes-no, true-false, on-off, 1-0. Rather, it suggests, again, that to approach the performance of an organism in a digital framework, one must work with phenomena as micro-states that have relationships to categorized macro-states based on indeterminacies and iterations of information. The sets of architectural objects that assemble a building are also complicated in the way that the fuzzy theorist might suggest. They are sets of objects that are parts of a whole complex of states, relations, histories, performances, formalisms, and so on. One could not point to a building – an assemblage of architectonic sets – and say that one set of objects is form and another program, or one set is about material and another about history because there is a constant but errant infiltration of the properties of sets by other sets. It is possible that meaning is actually produced by this instance of infiltration, which should really be called the intersection (or multiplication, in Boolean algebra) of incidental sets.

GRAFTS (ENCRYPTION, RECOMBINATION, HYBRIDIZATION)

If, on the micro-level, architecture consists of sets of information such as materials, performances, aesthetics, economies, and logics then the question would be: what fragile arrangements and statistically probable mis-arrangements (or dissolutions of order) of micro-

states would be possible with information that is not contracted to an already-determined configuration? The breaking-down of objects into sets of information enables the recombination of that information. We should say that the issue is really about sets of sets of objects and sets of sets of information that support both the internal gaming of meta-language and the hybridization of multimedia in objects. Recombination could result in multiple macro-states that are generated by the same micro-states if we can deploy their significant figural objects in meta-linguistic ways.

Significant objects are already ciphers.[6] They are already entities that have been encoded with meaning. The principles of cryptography that have intensified relative to progress in digitization form part of this possible model for architecture. Cryptography, like digitization, depends on the arbitrariness of linguistic symbols as ciphers. It functions by capitalizing on the deliberate but fragile contract that the system of signs known as language has with the microstructure (alphabetic characters) that comprises it and the significations that it triggers. It refigures language through language's own notably figural microstructure. It is both information and dis-information. At the same time, and for all of its careful means of obscuring information, cryptography is about embedding meaning in a form that has been filtered through three mechanisms of abstraction that were first formalized by Alberti.[7] Translation, transposition and substitution of alphabetic characters give text a macro-state of legible form that delivers illegible content. (For example, input the phrase *this is text* into the German Enigma machine and it could output *vkqi ao uimp.*) After encryption, the resultant micro-state of text still contains all of the information or data that was present in the legible macro-state of the text before it was encrypted. The encrypted text is now a very different macro-state that contains the same information in its micro-state. If one can properly reconfigure the micro-state, or alphabetic characters, then one can render the text legible and *resolve* its meaning and its fulfillment of the cultural contract between units of language and meaningful statements. In order to understand encryption (and computation) one must understand the exchange of figural grammatical rules for abstract mathematical sequences.

Encryption upholds the combination of figuration and abstraction in an unlikely, but powerful, way: the presence of figuration is precisely what intensifies abstraction. And, in turn, the abstracted counter-relational deployment of letters intensifies individual figurations. (Geometrical arrangements take the place of grammatical arrangements.) These figures, no longer contracted to proper arrangements as words, form an open set of letters that are the precise, but opaque, manipulation of a precise and once-transparent, text. Although it is still significant if decrypted, this liberated microstructure is prepared for substantial exchanges with other microstructures to form other linguistic, or tectonic, tissues. Like the physicist Schrodinger, the horticulturist Garner employs the architectural language to relate the play of form and function produced by grafting plant tissues:

> *When stressing the two vital factors for success, compatibility and cambial contact – particularly the need to place cambiums in contact – the possible contribution made by transformation of adjacent living tissues should be recognized. This contribution comes only from living cells, once again underlying the value of good craftsmanship and the maintenance of life in stock and scion. Even though cells have ceased to divide they may be reactivated to serve particular purposes. (Garner,* The Grafter's Handbook, *p.65)*

. . . then . . .

> *It appears that living plant cells can change from one form to another in response to surroundings or stimuli, hormonal or physical. (Garner,* The Grafter's Handbook, *p.65)*

. . . and then . . .

> *Reversals of form and function, apparently not due to any recognized artificial cause, have been observed as, for example, when*

W'R QMGMAX; MTN JPX HBTW RMY JPX QMVJ CI J
K. JPXT JPX HBTW'R ACUTJXTMTAX YMR APMTWXI
JR JVCUFGXN PBL, RC JPMJ JPX SCBTJR CI PI
:CRXN, MTN PBR HTXXR RLCJX CTX MWMBTI
)TW AVBXN MGCUN JC FVBTW BT JPX MRJVCGCWXVI
MTN JPX RCCJPRMEXVR. MTN JPX HBTW RQMHI
K YBRX LXT CI FMFEGCT, YPCRCXDXV RPMGG VXI
MTN RPCY LX JPX BTJXVQVXJMJBCT JPXVXC:
XN YBJP RAMVGXJ, MTN PMDX M APMBT CI WC(
H, MTN RPMGG FX JPX JPBVN VUGXV BT JI
AMLX BT MGG JPX HBTW'R YBRX LXT; FUJ JP:

Substitution Cipher - Legible Form/Illegible Content

Bridge-Grafted Trees - Intersection of Sets

parts of white petals become green leaves or shoots become fruits and fruits become shoots. (Garner. The Grafter's Handbook, *p.65)*

A well-practiced method of blurring the limits between linguistic practices and life sciences could be said to be the art of grafting. Grafting breeches both the limits of biological and semiotic identity because it seeks to operate on named biological macro-states in such a way that depends on the infiltration of micro-states of those entities. In other words, it seeks to enhance the performance of the pear by constructing that pear out of pear-quince-pear union. Or it makes a more viable cucumber out of a cucumber-cucumber union.[8] Or, in some other words, the graft involves a hybridization of macro-states that hinges on the combination and recombination of the micro-states that legislate those macro-states. These combinations can be both internal to the set of objects under a single classification (cucumber-cucumber) and external to sets of multiple classifications (pear-quince-pear.)

The multiplicity of identities that results from grafting has resulted in rare instances of true hybridization – a kind of botanical multi-mediation that is more than an enhanced union. There are cases known as chimera that are produced when budding occurs on the joint of the root-stock and scion, the existing component and the added component of the union, respectively.[9] In this particular zone, a bud could be produced by the overlapping of different cellular tissues, each with their own code-script or micro-state of legislation. Chimera are interesting errors of identity because they show the mutability and heterogeneity of objects that are often repressed by the assumption that macro-states are fixed. There is a crisis of identity that is both biological and semiotic: what type of plant is this? This question conflates a genetic question and a linguistic question in a way that is critical (as crisis) to both botany and architecture: (What will the code-script that legislates the state of this plant/building produce?) + (What is the classification of this plant/building?) What is it that one plant with two tissues produces three flowers – yellow flowers, purple flowers and flowers that are an errant mixture of both colors. Or that a single plant must go by two different names in the same language of nomenclature? I mean to suggest architectural thinking here because it tends to allow buildings to prescribe the macro to the micro rather than allowing complexity and multiplicity to develop out of internally and externally errant systems. It is not, however, that this kind of development of grafting is imprecise, random, or casual. Errancy emerges out of precision or multiple precisions. Precise work on the micro-state of architectural information can not lead to states of singularity and determinacy. Like the cellular tissue of chimera, these states have component-sets of microstructure that, as sets, move in and out of relation with themselves and with other sets. They execute their own internal logic, at times, and they intersect with the logic of others, at times, to form a vital and *digital* architecture – a molecular hybrid of production and representation. Just as the botanist stresses the need for a complicated biological compatibility, the philosopher, Derrida, through the micro-structure of writing, confirms its etymological trajectory from the graft (*graphos.*)

All this is possible only in the gap that separates the text from itself and thus allows for scission and for the disarticulation of silent spacings (bars, hyphens, dashes, numerals, periods, quotation marks, blanks, etc.). The heterogeneity of different writings is writing itself, the graft. It is numerous from the first or it is not. *(Derrida,* Disseminations, *p.356)*

. . . and just before that, and to end this essay with the beginning of his . . .

That is how the thing is written. To write means to graft. It's the same word. The saying of the thing is restored to its being-grafted. The graft is not something that happens to the properness of the thing. There is no more any thing than there is any original text. (Derrida. Disseminations, *p.355)*

NOTES

[1]Ahmet Omurtag. "Chance, Risk, and the Amorality of Nature." New York under 17' of Water. IAS 2000 Summer Program in Architecture and Urban Design. Pratt Institute. 17 July 2000.

[2]Erwin Schrodinger. *What is Life? The Physical Aspect of the Living Cell,* Ed. Roger Penrose. (Cambridge: Cambridge UP, Canto, 1992) 3-20.

[3]Erwin Schrodinger. *What is Life? The Physical Aspect of the Living Cell,* Ed. Roger Penrose. (Cambridge: Cambridge UP, Canto, 1992) 60-61.

[4]Manfredo Tafuri. *Theories and History of Architecture.* Trans. Giorgio Verrecchia. (New York: Harper and Row, 1980) 114.

[5]Daniel McNeill and Paul Freiberger. *Fuzzy Logic: The Revolutionary Computer Technology That Is Changing Our World.* (New York: Touchstone, 1993) 23-44.

[6]George W. Smith. *Computers and the Human Language.* (New York: Oxford UP, 1991) 3.

[7]Simon Singh. *The Code Book: The Evolution of Secrecy from Mary Queen of Scots to Quantum Cryptography.* (New York: Doubleday, 1999) 45-46.

[8]R.J. Garner. *The Grafter's Handbook,* 5th ed. (London: Cassell, 1989) 135-136.

[9]R.J. Garner. *The Grafter's Handbook,* 5th ed. (London: Cassell, 1989) 288-289.

REFERENCES

Derrida, Jacques. *Dissemination.* Chicago: University of Chicago, 1981.

Garner, R.J. *The Grafter's Handbook.* 5th ed. London: Cassell, 1989.

Gregg, John. *Ones and Zeros: Understanding Boolean Algebra, Digital Circuits, and the*

Logic of Sets. Piscataway, NJ: IEEE Press, 1998.

Keefe, Rosanna and Peter Smith, eds. *Vagueness: A Reader. Cambridge:* MIT Press, 1996.

Lineberger, R. Daniel. "Origin, Development, and Propagation of Chimeras."

Horticulture 201H. Texas A+M. (1995): Online. Internet. 24 Sept 2000.

Lynn, Greg. *Animate Form.* New York: Princeton Architectural Press, 1999.

Lynn, Greg. "Embryonic House." *Greg Lynn Form.* (2000): Online. Internet. 27 Sept. 2000.

McNeill, Daniel and Paul Freiberger. *Fuzzy Logic: The Revolutionary Computer Technology That Is Changing Our World.* New York: Touchstone, 1993.

Mercier, Vivian. *Beckett/Beckett*. New York: Oxford UP, 1977.

Omurtag, Ahmet. "Chance, Risk, and the Amorality of Nature." *New York under 17' of Water*. IAS 2000 Summer Program in Architecture and Urban Design. Pratt Institute. 17 July 2000.

Ruelle, David. *Chance and Chaos*. Princeton: Princeton UP, 1991.

Schrodinger, Erwin. *What is Life? The Physical Aspect of the Living Cell*. Ed. Roger Penrose. Cambridge: Cambridge UP, Canto, 1992.

Schwager, Russell. "Enigma Machine Applet." *Russell Schwager*. (2000): Online. Internet. 24 Sept 2000.

Serlio, Sebastiano. *The Five Books of Architecture*. 1611. New York: Dover, 1982.

Singh, Simon. *The Code Book: The Evolution of Secrecy from Mary Queen of Scots to Quantum Cryptography*. New York: Doubleday, 1999.

Smith, George W. *Computers and the Human Language*. New York: Oxford UP, 1991.

Smith, Laurence Dwight. *Cryptography: The Science of Secret Writing*. New York: Dover Publications, Inc, 1955.

Tafuri, Manfredo. *Theories and History of Architecture*. Trans. Giorgio Verrecchia. New York: Harper and Row, 1980.

Vignola, Giacomo Barozzi da. *Canon of the Five Orders of Architecture*. 1562. Ed. Branko M. Mitrovic. New York: Acanthus Press, 1999.

Willamson, Timothy. *Vagueness*. London: Routledge, 1994.

Architecture:
The Hinged Discourse

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In 25 BC, Marcus Vitruvius Pollio wrote *The Ten Books on Architecture*, the earliest surviving architectural treatise. In it, he spoke of the architect, as the artisan, designer and builder, as the master craftsman. He argued for a triple essence to be achieved by the architect, those of constructive strength, practical utility, and aesthetic effect. The triple essences were to be achieved through the architect's first hand, mechanical, and tactile knowledge of materials, and their structural, aesthetic, and formal properties. The singularity of the piece of stone, its form, its grain, the pattern of its breakage, its material strength, and its surface texture was understood through a tactile analysis by the hand of the master craftsman, on-site and off-paper. On the other hand, this tactile analysis had to be accompanied by an aesthetic analysis, on-paper, and off-site.

Vitruvius writes:

> *"The architect should be equipped with knowledge of many branches of study and varied kinds of learning, for it is by his judgement that all work done by the other arts is put to test. This knowledge is the child of practice and theory. Practice is the continuous and regular exercise of employment where manual work is done with any necessary material according to the design of a drawing. Theory, on the other hand, is the ability to demonstrate and explain the productions of dexterity on the principles of proportion.*
>
> *It follows, therefore, that architects who have aimed at acquiring manual skill without scholarship have never been able to reach a position of authority to correspond to their pains, while those who relied only upon theories and scholarship were obviously hunting the shadow, not the substance. But those who have a thorough knowledge of both, like men armed at all points, have the sooner attained their object and carried authority with them."*[1]

Architecture, for Vitruvius was conceived as a form of knowledge; a form of knowledge about the physical environment that was acquired and practiced through the active and ambulatory presence of the architect on the construction site: seeing where the sun rises, and sets, where the prevailing winds come from, and where the high and low spots of the site are. The architect/builder/artisan/designer, through presence on the construction site, by handling the stone, the chisel, and the hammer, was to achieve the triple essences of constructive strength, practical utility and aesthetic effect in the building that was built.

A number of key issues arise in relation to this 2000 year old treatise by Vitruvius:

1. Perhaps the most obvious and the most profound is the distinction, not raised, but acknowledged, between theory and practice. Vitruvius is theorizing on the practice of architecture. He is analyzing the constructive language of architecture built by other architects, and theorizing in the written language. The works of architecture referenced in The Ten Books on Architecture are representations of themselves in the books. They do not appear as language, rather described in language.

2. Perhaps not as obvious, but just as profound is the fact that the Vitruvian architect is engaged in the design, and the production of the building. Both the intellectual labor and the physical labor are a part of the architect's realm of responsibilities. The distinctions that are later drawn between design and construction, that elevate intellectual labor to the noble, and physical labor to the ordinary, are here non-existent. The two are considered as part and product of the same activity.

3. The presence of the architect on the job site, and the first-hand handling of material realities is assumed to communicate such realities to the architect.

4. Drawing, both in its techniques of construction and its use, was not a "blueprint" from which buildings were to be made; it did not exist as a representation or a reproduction in reference to the building yet to be made. Instead, it was a mode of studying and examining construction and material issues.

In 1452 AD, during the Renaissance, Leone Battista Alberti (1404-72) wrote *Ten Books on Architecture*, The most significant treatise on architecture since Vitruvius. In it he spoke of the architect as the artist and the designer, and not as the craftsman, or the builder.

Yet he still insisted on the Vitruvian triple essences, rephrased to strength, convenience, and beauty. Alberti, as the pre-eminent theorist of architecture during the Renaissance, was reflecting on the contemporary developments in Italy. The Renaissance was associated with a growing secularism and a renewed interest in Classical Roman civilization. Patronized by merchant-aristocrat families, a new kind of architect emerged who was no longer a craftsman but a creative and a versatile artist in pursuit of aesthetic excellence. Filippo Brunelleschi (1377-1446), whose Founding Hospital and cathedral dome at Florence are the inaugural buildings of the Renaissance, was a goldsmith, and Michaelangelo (1475-1564) considered himself primarily a sculptor. Hence a new breed of architects was born: those who would privilege the aesthetic over the constructive, the on-paper over the on-site. Not only is intellectual labor separated from and privileged over the physical labor, but also a particular type of intellectual labor is preferred; that related to the oculus. The primacy of visual aesthetics has greatly altered the path of architecture since the Renaissance. Alberti as the theorist of the age, poses the relationship of the three essences to be different than the Vitruvian model. Here Alberti argues for beauty, to be of utmost importance.

> *"...this part of building, which relates to beauty and ornament, being the chief of all the rest, must without doubt be directed by some sure rules of art and proportion, which whoever neglects will make himself ridiculous. But there are some who will by no means allow of this, and say that men are guided by a variety of opinions in their judgment of beauty and of buildings; and that the forms of structures must vary according to every man's particular taste and fancy, and not be tied down to any rules of art. A common thing with the ignorant, to despise what they do not understand!"*[2]

The post-Renaissance architect as the artist and the designer, would have first hand knowledge of the rules of art and proportion, but would only be familiar with the craft and the constructive aspects of architecture through deferred learning.

Here, in this first major break in the conception of architecture, a number of bifurcations are introduced in the production of architecture:

1. The design and the construction of architecture are bifurcated. The Medieval architect as the designer/artisan/builder has been split into the Renaissance architect and the stone mason, or builder. The architect is responsible for the creative aspects of the design, the communication of that design; and the builder is responsible for the execution of the design. As a result, the architect is no longer physically engaged in the construction of buildings.

2. The simultaneity of the intellectual labor and the physical labor of the medieval architect has been split, so that the architect is responsible for the more noble intellectual labor, and the builder is responsible for the more ordinary physical labor.

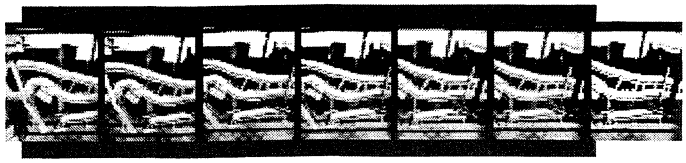
3. The product of the work of the architect is no loner a building, it is a representation of the building. The architect produces drawings, the blueprints from which the builder manufactures the building. The architect works in reference to the building, and not on the building. The architect works on-paper, and off-site. As a result, the architect is primarily concerned with the appearance of the building, that which could most readily be reproduced and represented in a drawing, especially one constructed using the rules of perspective.

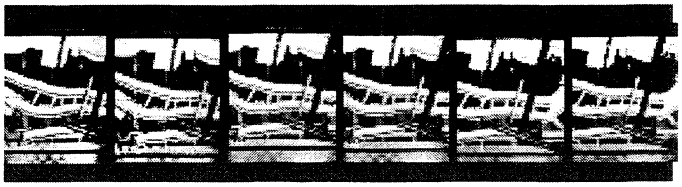
4. Situations, territories, materials, and their singularities have been split apart. The Medieval architect worked with a piece of stone, as a piece of stone with all of its material singularities. The Renaissance architect works with a drawing of the piece of stone, only able to specify its shape, and dimension, and estimate its texture.

Through the separation of design and construction, theory and practice, drawing and building, and profession and discipline, the architect's work is always mediated through drawings, which are on paper, and off site. The static geometry of the appearance of the artifact is reproduced in absolute measure, on paper, with only notational or referential information to its material and constructive conditions, as they are experienced on site, and off paper. Given that material singularities, and constructive particularities do not appear visually in an architectural drawing, the whole nature of architectural drawing in relation to material singularities becomes suspect.

Perhaps the most fundamental shift in architecture that can be attributed to the Renaissance is the occularization of the practice of architecture. With Brunelleschi's invention of the scientific construction of perspective, the single, self-centered eye of the architect and the viewer dictated the primacy of the privileged position of the center in any symmetrical design. Hence the experience of architecture was profoundly limited to the visual, more specifically, to that governed by the fixed point of view of perspective, and not by the activity of the human body, its motion, and other senses. Medieval architecture as a form of knowledge about the physical environment was transformed to Renaissance architecture as knowledge of form, knowledge of rules and mathematical proportions that dictate formal configurations.

In the Sixteenth Century, architecture, along with civil engineering, medicine, law, clergy, and accounting became "learned profes-





sions", the first step towards the outlining of the legal within the architectural. It was not until the first part of the Twentieth Century that architects began to establish a "Code of Ethics", and eventually specialized education and licensing laws. By this time, yet another bifurcation had been introduced in the production of architecture: that of the profession versus the discipline. The profession, bound by, licensed by, and educated by the Profession's Code of Ethics, and the discipline, bound by the creative and constructive rigors of architecture.

This brief analysis of the history of architecture delineates a tendency towards the continual bifurcation of the discipline away from situational, material, and territorial singularities. This, perhaps, is not unique to the discipline of architecture, certainly not in an era when everything arrives as pixels, far from the tactile and the physical. Even the site of construction is no longer a territory to be followed and traversed in order to be studied; rather, it is a series of glowing dots of phosphorous recorded by the United States Geological Survey's Land Satellite, with digital precision, part red pixel, part blue pixel, and part green.

The Medieval architect, having to materially follow the territory of the construction site, to materially scale the surfaces and record the landscape of each piece of stone, having to triangulate the different particulars of the surfaces in relation to one another, is now replaced by a drawing, a site map, or a satellite photo, which records the territory without ever touching it, measures the landscape without ever traversing it, forms the geometry of the stone without ever lifting it, and drafts a map without ever ruling it. The Medieval architect's logic of operation could not exist purely outside of the territory, outside of the landscape, and outside of the material; it could not exist purely on paper, and off-site.

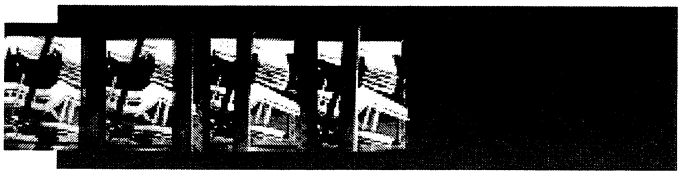
The architect had to physically engage the territory and the materials, their surfaces, and their nuances. The tools and the techniques of reproduction: measurement, recording, and drafting techniques, had to be continuously altered according to the terrain of the territory, and the complexity of the material at hand. On the other hand, the site plan, though far more precise in its measure, neutralizes the territory, and the participants. The same drawing technique will record a site in Baltimore, that will record the Amazon, New York City, and the Salt flats, each reproduced from a fixed position in space.

This analysis is not nostalgia for a manual, mechanical, or analog world. On the contrary, it is in search of a material hyper-tactility, and a material language with real-time engagement and real-material consequences, in a mediated, binary, always-already-reproduced environment. It is in search of a productive model that is on paper and off-site, which is mediated, and digital, yet off paper and on-site, with hyper material sensibilities. It is in search of a productive model that is mediated, yet material, which reproduces with the measured precision of the static eye, and can yet experience frenetic mobile flux as an ambulant, heuristic architect. This model is neither solely about composition nor solely about organization.

The hinge model proposes the space of architecture to be the space of projection, where the material singularities, and architecture's measured organization can be projected onto one another; a projected space for the deployment of the tactile presence as the undermining agent of resistance for the mediated reality of the drawn and the digital, and the deployment of the mediated as the undermining agent of resistance for the tactile.

The space of the hinge is a continuously moving, tense-space between opening and closure, between design and construction, between theory and practice, between profession and discipline, and between intellectual labor and physical labor. The complexity of this position is in maintaining the tension of the hinge: never to be permitted to be simply open, nor simply closed, always in fluxive tension. The complexity of this position is in engaging the potentially violent unrelieved stress of a sheet of steel without fixing it, in engaging the potential energy within the torques and bends of a piece of lumber without straightening it, engaging the unpredictable movements of vapor, and chaotic wind-blown rain without controlling it. The complexity of the hinge-position is in the mobilization of the static geometry and the absolute measure of the architectural drawing for sudden material flight. It is to make the architectural drawing move beyond its own structure of two-dimensional representation and address the possibility of the impossible-to-reproduce. It is to construct the mobile fluxive space through the geometry of the immovable within the space of reproduction. It is to construct the ground-level plane of the medieval architect through the metric plane of the Land-Satellite image.

The accompanying project, SLIP, was produced in a graduate architecture design studio at the University at Buffalo during the Spring semester of 2000.[3] The proposal, as the name might imply, was a slip between drawing and construction, between the precise Land-Sat accuracy of a map of Buffalo, NY, and the material consequences of slip-forming the same map in concrete. It was a slip between the physical labor of producing the slip-formed concrete structure, a continuous 96 hour effort, beginning on Friday February 25, 2000, and ending on Tuesday February 29, 2000, and the intellectual labor of programming Freudian slips. It was a slip between the production of architecture on-paper, off-site, and the production of the same on-site and off-paper. It was a slip between the studio as a construction site, and the studio as the site for drawing and modeling of architecture. It was a slip between Derrida's hinge theories in "Plato's Pharmacy", and the practical requirements for the design of a pharmacy. It was a slip between a 16" masonry circular



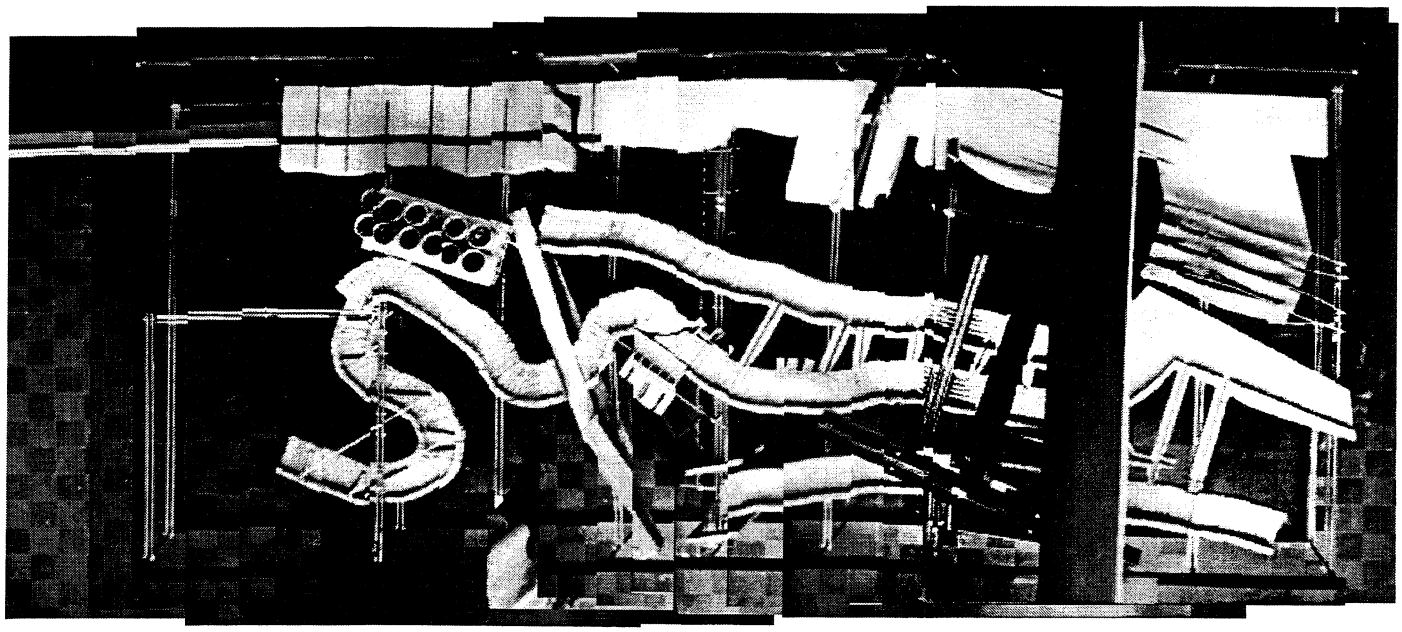
saw, and a draughting compass; a slip between half a ton of concrete and 90 grams of mylar. It was a slip between architecture as theory and practice, as drawing and building, as discipline and profession, as intellectual labor and physical labor, and as artistic production and constructive production. It was a slip between architecture.

NOTES:

[1]Marcus Vitruvius Pollio, *The Ten Books on Architecture*. Translated by Morris Hickey Morgan (New York: Dover Publications, Inc., 1960) p. 5.

[2]Leone Battista Alberti, *Ten Books on Architecture*, Translated by James Leoni (London: Transatlantic Arts, Inc., 1755) p. 113.

[3]SLIP was conducted as a graduate architecture design studio at the University at Buffalo, spring 2000 by the author. The contribution of the following students to the development of "slippery" ideas and to the work of the studio was invaluable: Gloria Arango, Eric Brodfuehrer, Melisa Delaney, Carrie Galuski, Rami Haydar, Charlotte Kahr, Michael Maggio, Sean McCormack, Kerron Miller, David Misenheimer, Bharat Patel, Redman Toska, Ron Trigilio.



PRAXIS

Building Process

Pedagogy

Disciplinary Thresholds

Tectonics

Building Process

Moderator: Daniel Hoffman, Arizona State University

The Hyphen of the Hybrid

ALICE CHUN
University of Pennsylvania

The Studio in Sustainability

DAVID FOX
University of Tennessee—Knoxville

Design Build Begins at Home:

Constructing Our Own World at the Alexandria Center

SUSAN PIEDMONT-PALLADINO
JOSEPH WHEELER
Virginia Polytechnic Institute and State University,
Washington/Alexandria Architecture Consortium

Transformer:

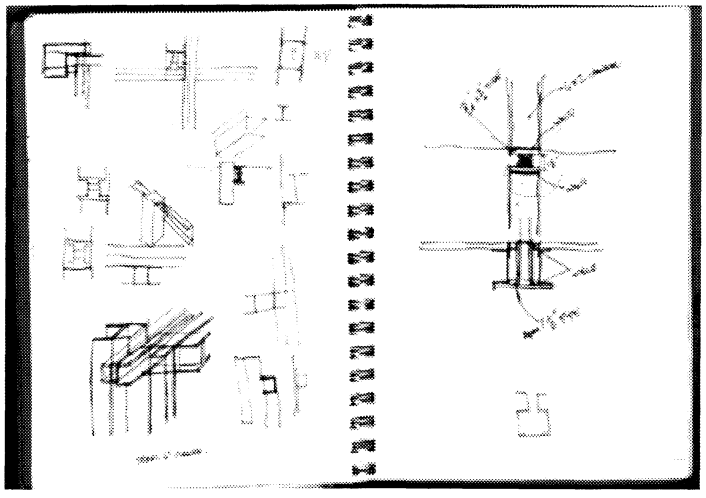
The Work of the Architect between Idea and Object

GEORGE ELVIN
University of Illinois at Urbana-Champaign

The Hyphen of The Hybrid

ALICE CHUN
University of Pennsylvania

"Architecture is the most unselfish of the arts, it belongs to the passers-by, and every old house and garden... is a gift to the nation, to be enjoyed by future generations who will learn from it more history and art and philosophy than may be found in books." -George Sitwell, On the Making of Gardens



The discourse of how we learn the fundamental nature of architecture has undergone a shift towards using the computer to teach. This quote by Sitwell evokes an aspect of design pedagogy absent in the academic realm where computer programs are now being used and abused. The result of which is now showing deep scars on the body of architectural education. It seems that the programs that we use for teaching—Form-Z, PhotoShop, Auto-CAD, and various other virtual modes of representation— show the architectural qualities of future built artifacts, but do not teach the fundamental nature and the appreciation of those qualities. Computer software representations do not teach the sound or smell of things. They do not teach how materials merge and come together. They do not teach the inherent lightness or heaviness of things. They do not teach the intrinsic strength or weakness of things.

This odd condition, this lack of learning begs the question, **how do we learn these things?**

The answer is (simple): through the impact of experience that takes place within a design-build process. However, this answer does not solve the problem since the solution of the predicament is the hyphen in the hybrid word "design-build". The aim of my paper is to give an answer to what is the hyphen between design and build.

In a small book devoted to a discussion of the modern condition, Bruno Latour states that the word "Modern" includes two sets of entirely different and distinct practices. One is the act of purification and the other is the practice of translation. The latter creates a mixture of entirely new types of beings, hybrids of art and culture. The design-build process is a process of translation since it is manifest in a game of projection, it parallels on the one hand the exquisite corpse of the surrealists, and on the other hand the 'pataphysics' of Alfred Jarry, by kindling the origins of "monsters". The design-build process becomes a re-interpretation of a rich architectural Praxis. I would venture to say that it is a process of translation that brings the beginnings of understanding the qualities of architectural constructions. This can be modeled within the dual paradigm elaborated by Bruno Latour by analyzing the work of the ETHEREAL THEATRE, a design-build project erected for the Phila-

delphia Fringe Festival during the summer of 2000 by a group architectural students from Temple University.

ETHEREAL THEATRE: A new body, an exquisite corpse (of constructions) created as a hybrid condition, born through the collective conscious of each participant in the studio. So long as each participant considers these two practices of translation and purification separately, they are truly modern and willingly subscribe to the to a critical project.

PROGRAM FOR THE ETHER: PHENOMENAL (PURE ELEMENT)

Light and Lightness is a key element: The theatre is used during the day and night so the walls had to be versatile, adaptable, and multifunctional for the use of dancers, media artists, etc. Walls had to transform the identity of the space used with the prowess of light. The phenomenon of floatation and suspension are carried by the structure of the platform. Variant conditions will alter the quality of the stage but the construction is designed to become a host or participant for the performances. Because of weathering and the air, it will be packed into a compact storage area in winter, and then employed in the warmer months. A system to accommodate this transformation was required.

PROGRAM FOR THE THEATRE: PHYSICAL (PURE ELEMENT)

The stage: the limits 32' x 20' x 12' (Includes the side areas and space.)

Roof will be a movable structure.

Height of walls 12' maximum

As acts of knowledge, all real acts of construction begin with the unknown. This precarious position that urges the quest for knowing, kindles the process of poetic logic and monsters. To demonstrate is to make an act of knowledge. One gains knowledge through the act of making. The Ethereal theatre, pedagogically developed as a design studio, was created through a series of full-scale details that undermined the "traditional" method of building since all the necessary construction documents were encrypted within the sketchbooks of the students, the notes on the walls of the metal shop, and in the traces within the seams of the melted steel. Each evolution of a detail, led to the knowledge of the boundaries within each material. The nature of steel tested to its boundary; the floor of the stage required a natural spring or flex for various media and dance performances. The steel, in this case, works analogously since it has the resilience of flesh and muscles. Wood could not be used because of the weight. All components of the construction needed to be light enough for two people to *handle*. All parts required adaptability, compatibility, and thus ethereality.

Why ethereality?

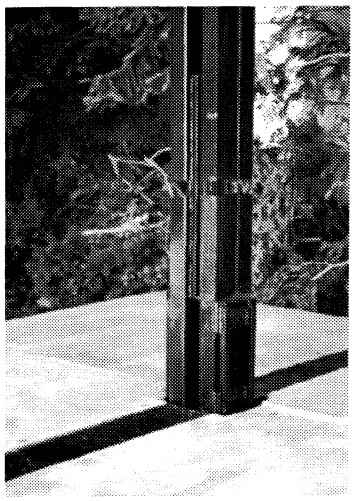
Since the process of construction had to incorporate two distinct issues, the nature of the culture, (art and performance), changing nature of site, and the hybrid condition is inherent in the project. Ethereality deals with the demonstration of "Poetic Logic." which is the marriage of these two conditions.

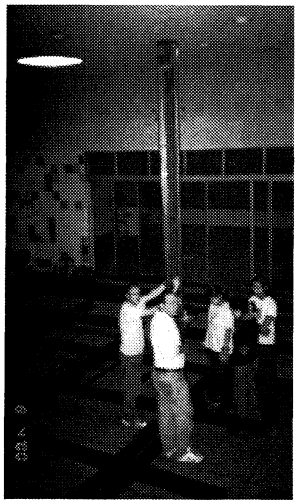
So where were the origins of "Poetic Logic" born from? Giambattista Vico states in The New Science: Logic comes from logos- from *fabula* (fable) carried to Italian *favella*, speech. In Greek the fable is *mutus* (mute) because speech was born out of mute times, as mental or sign language came before vocal or articulate language. Whence logos means both word and idea. Poetic monsters and metamorphosis arose from a necessity of this primary human nature, its inability to abstract forms or properties from subjects. By their logic, they had to put subjects together, or to destroy a subject in order to separate its primary form from the contrary form, which had been imposed on it. In Roman law, as Vico observes, children born of prostitutes are called Monsters because they have both the noble and the bestial, coming from uncertain origins. "And it was as being monsters of this sort we shall find that children born of noble women with out benefit of solemn nuptials were commanded by law of the Twelve Tables to be thrown in the Tiber.[1]

The De-Monstration occurs when there is the knowledge of both halves of the origin of the monster. It is no longer a monster but evidence as it's own witness. In the act of translation, we regulate the proliferation of "Monsters" by representing their existence formally. Architectural monsters or hybrids are then "de-monstrated". Here is the moment where we go back to understanding technology as a method of understanding the art of making. Demonstration is the result of the design build process. I hope to show this through the process of the Ethereal Theatre.

The process of construction involved translations of the intersections between the beautiful (phenomenal) and the ugly (physical). The Greeks believed the origins of beauty began with the origins of the heavens, the sky, and the air. The relationship to these formless things, of many identities, were the essence of the gods or the "beautiful". Things with a specific identity became related to the mortal, the "ugly". They constructed demonstrations of the marriage be-

tween the cosmological phenomena of light, vision, and experience with the physical realm of the earth, body, and measure.



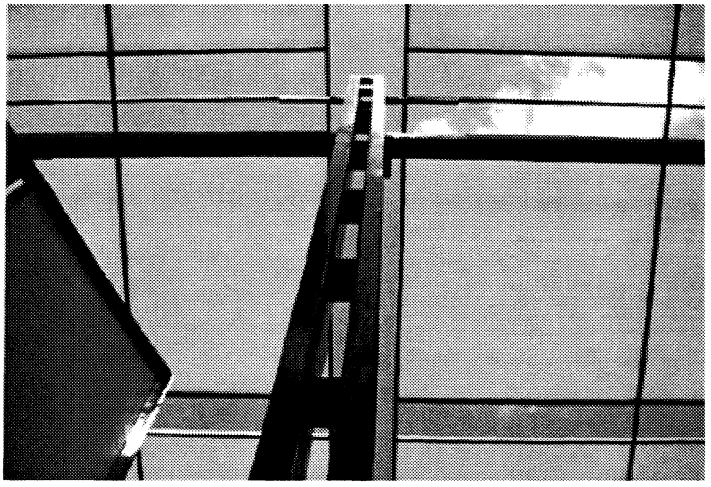


The Ethereal Theatre included the design of a mobile form that could adapt to various sites in the city. The impact of experience teaches how one can encompass the beauty of lightness, wonder, and the phenomena of materiality. The challenge is the movement from the process of purification (identities and non-identities) to the process of translation (phenomena of the hybrid). Employment and transformation of these relationships to method making, began first with 1/4" models, then 1/2", then with full-scale details and constructions. All drawings were done on site. In some cases the details could not have been born from drawing, but only from the space of cause and effect. An example of this instance came when the connection between the floor and the columns. The wrath of steel became evident as there was not any tolerance from the steel when a miniscule fraction of an inch was needed to insert the base of the columns into the sleeve attached to the underside of the flooring structure. Within ten minutes a new detail was fabricated, where the feet of the columns were amputated and a new prosthetic was attached. In hind site, the detail as it became, was in some ways, always meant to be.

Technology in this studio was pursued as an erotic procedure that attempted to express a search for knowledge. Technology is the fertile factor for the architectural production of elegant meanings, as Marco Frascari states, "it deals with both the construction- the logos of techne (elegant art)— and the construing—the techne of logos (rhetoric). Elegant technology translates from figures of thought to figures of site, and figures of making"[2] The translations are ambiguous but the implications may be understood by verbal and visual cunning.

This theatre was built for an actual client, The Fringe Festival. Funds were donated by a private Foundation to provide for the material construction costs. The Fringe Festival is an annual event that occurs in Philadelphia during the month of September for two weeks. The term 'Fringe' refers to artists who are on the edge, or exploring the boundaries of existing modes of performance and dance. Multimedia performances, classical ballet, modern dance are a few of the functions that took place and will take place there.

Purification process begins with the "pure elements' the body, the building materials, the projected dimensions, the individuals and the culture. In this case the primary material was steel. The individuals or participants were a class of 19 students ranging in age from 20 to 36. It was a vertical studio. Within the primary condition of the human and tactile condition, the students found themselves in touch with the objects that were made. The primary link being the hand. In the design- build process we embrace and define our humanity from this phenomenon. As Malcolm McCullough states in a brief book dedicated to the argument of craft, "skill also differs from talent and from conceptual grasp even if it reflects that. Talent seems native, and concepts come from schooling but skill is learned by doing. It is acquired by DEMONSTRATING and sharpened by practice. The circumstances of practice are often themselves a source of satisfaction. This is because skill is sentient it involves cognitive cues and affective intent."[3]



A construction of logic bears the birth of a simple system of footings and structure for the stage. The basic notion of the level and reference to the ground became the backbone to the whole construction. Crafting the structure could not begin with out crafting the execution of the setting according to the ground plane. As Henri Focillon writes "when one realizes that the quality of a tone or of a value depends not only on the way in which it is made, but also on the way in which it is set down, then one understands that the god in five persons manifests himself every where."[4] Through the hand, identity involves execution, and expression involves workmanship, pleasure, and craft. The practice of work maintains a necessary connection to an inner history. "The hand knows that an object has physical bulk, that it is smooth or rough, that is it is not soldered to heaven or earth from which it is inseparable. The hand's action defines the cavity of space and the fullness of the objects that occupy it. Surface, volume density and weight are not optical phenomena. Man first learned about them between his fingers and in the hollow of his palm. He does not measure space with his eyes, but with his hands and feet."[5] In this case the columns, structure,

and footings had to bow the strength of the human body. The strength of a material required the employment of something extremely light but extremely strong. Thin miniature steel c-channels and I-channels were fabricated and used in 27 different ways. Our bodies were the unit of measure for all the constructions. Fabrication processes beckoned the hand as a unit of measure for the beam and joists.

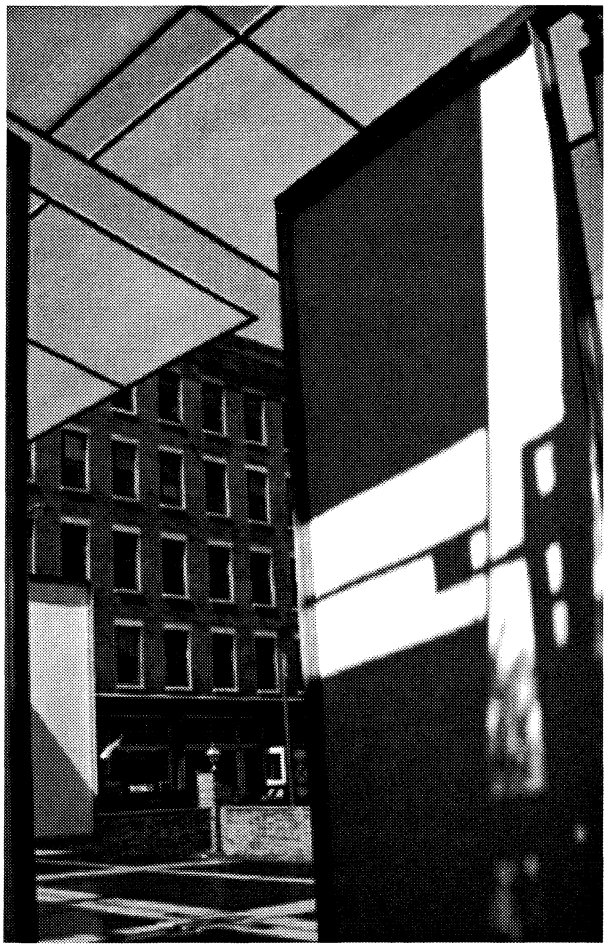
Work proceeded with a translation between the conscious of each individual member of the studio to the collective conscious, then to the reactive and active space of communication between production and projection processes. This engaged the circumstance of making hybrids and confronting monsters, from each joint to the balance of weight on the wing and roof panels. "Every man-made form - and in particular, every architectural form - does not exist solely as a static consequence to an otherwise irrelevant act of production, but conversely, that the nature of form is inlaid in the process of making."[6]

Octavio Paz states within a compelling short film called "In praise of Hands", "In the work of hand craftsmen there is a constant shifting back and fourth between usefulness and beauty. This continual interchange has a name: Pleasure." Things are pleasing because they are useful and beautiful. This copulative conjunction defines craftwork, just as the disjunctive conjunction defines art and technology: usefulness or beauty". Within the process of making, every inch of the materials were caressed, marred or marked, by all the hands of the participants. Evidence of extent became a rich character on the auratic skin of the theatre. Slight differences within simple and minimal details were noticed because fabrications were all hand made. One could sense the hands on it. A reporter for the City Paper came to the opening and commented on how she enjoyed the fact that everything was *not* machine perfect. Human labor evokes appreciation.

Industry, worshiped objects that have no soul but their use. Industry breeds efficiency. " The industrial object tends to disappear as a form and to become indistinguishable from its function. It' s being is it's meaning and it's meaning to be useful. It is the diametrical opposite of the work of art.... The destination of the work of art – is the air conditioned eternity of a museum; the destiny of the industrial object ordinarily escapes both of these."[7] As McCullough sites, "The handcrafted object reflects not only informational economy of energy, but also, pleasure. Its production involves some play, some waste, and above all a kind of communion. Its long life continues to enhance its qualities through use and contemplation. Architecture as a model represents and serves its culture. It is daily handling and use is a humble act of participation in that culture."[8] "Since the thing is made by human hands, the craft object preserves the fingerprints –be they real or metaphorical – of the artisan who fashioned it. These imprints are not the signatures of the artists; they are not a name. Nor are they a trademark. Rather, they are signs; scarcely visible, faded scar commemorating the original brotherhood of men and their separation. Being made by human hands; the craft is made for human hands; we cannot only see it but caress it with our fingers."[9]

According to Webster, the word " craft" derives from the Middle English Craeft, Which simply meant strength or power. We must resemble that because such forces were regarded with suspicion. The word origin also retains and givers breathe to intellectual skills, of thoughtful and poetic making. It is one of cunning process of translation between the mind the hand and the material. In later meaning the word referred to a more specific power, namely specialized skill or dexterity. "The crafty architect has the hands of and angel and the mind of a thief."[10]

In the manual arts "We fashion tools and coax materials. Under visual guidance, what would otherwise be brute grasp grows into a specialized skill. Hands acquire some independence through training but they still turn to the eyes for a purpose...Reflection finds



harmony in the steady flow of the hand and eye, tool, and material. The crafty artifact is therefore as much a product of the eye as of Vision. Rudolf Arnheim: Visual Thinking " We need and want to rebuild the bridge between perception and thinking. I have tried to show that perception consists in the grasping of relevant generic features of the object. Inversely, thinking, in order to have something to think about, must be based on images of the world in which we live. The thought elements in perception and perceptual elements in thought are complementary. They make human cognition a unitary process, which leads without break from the elementary acquisition of sensory information to the most generic theoretical

ideas. The essential trait of this unitary cognitive process is that at every level it involves abstraction. Therefore, the nature and meaning of abstraction must be examined with care. There is no getting around the fact that an abstractive grasp of structural features is the very basis of perception and the beginning of all cognition." The use of which became a fundamental building tool and test to the constructions that took place on the theatre. The speed of accuracy pre-defines the calculated error. Many of the tests of alignment, from the leveling of the floor beams to the plum line of the wings, were used by sight and oddly enough when checked by actual measurement all intuitive answers were correct.

THE PROCESS OF TRANSLATION: THE HYBRID

When we look into the surrealist mirror of the exquisite corpse. The game of design would be started by one participant then eventually completed by another. One cannot escape the logic and wonder of the pata physician. The realm of the hybrid, the new body, the "mediation", or the" network' can be accomplished through the use of Pataphysics. The process of making the hybrid or monster became a primary exploration with in the studio.

As Alfred Jarry might put it, the world of Pataphyics is a most unique world in which forms may be generated though this science. It creates the inverse of cosmology. Pataphysics is the science i the exceptional and specific. It enacts discovery though demonstration; it celebrates technical processes and architecture as a verb. It narrows the distance between form and content. Measure becomes a subject and object. New definitions and identities are born out of two entirely different identities. This new third identity is instilled by the memory of both previous identities; it is the "monster" of the former identities.

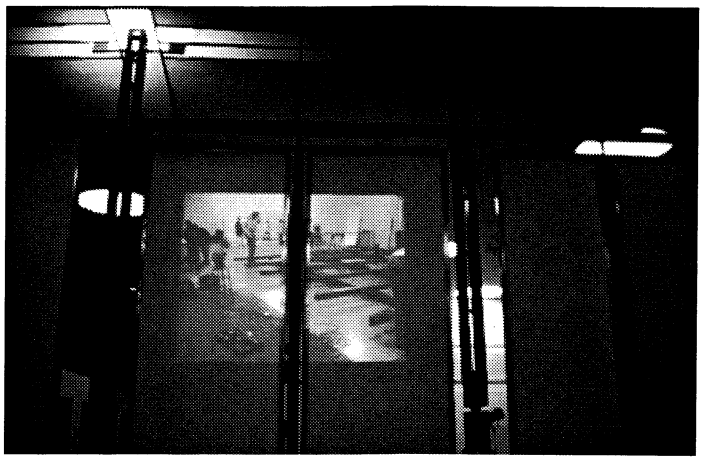
"An epiphenomenona is that which is super induced upon a phenomenon. Pataphysics is the science of that which is super induced upon metaphysics, whether within or beyond the latter's limitations, extending as far beyond metaphysics as the latter extends beyond physics. It is the science of the particular." [11] It could be envisioned as the production of new identities, or the process by which the birth of "uniqueness" occurs.

"Definition: Pataphysics is the science of imaginary solutions, which symbolically attributes the properties of objects, described by their virtuallity, to their lineaments."[12]

We discover that architectural theory is not science, but that architecture as a mode of production is necessarily technology. It prefers a practice through poesis, revealing a moment where meanings are fused into the impact of experience over a practice that waits for a subject to tell us an objectified meaning. This story can best be told through the story of the "sentinels" or columns. The nickname arrived when the difficulties of construction was lifted from our site when the columns where finally put in place. During construction, the columns were made on the ground and laid for the most part like dead figures waiting to be buried. For some reason all the demons of bad weather, misaligning hinges, and dark mood of the all humans involved, disappeared as soon as the columns rose up from the dead and linked into their slotted spaces. The columns themselves were hybrid since the same stock of parts for the floor structure was used as well as the same sectional configurations. The height of the columns propelled the design team to think of ways to join by separation with nominal dimensions.

Lightness being the driving phenomena for the structures, a celebration of materials through the reveal, became a common demonstration of our discovery. A minimal budget compelled us to find a light yet inexpensive panel system to be the skin of the wings and roof. An accidental discovery of the cheapest material panel to be manufactured called coraplast, was used for the perfect backdrop, for film and digital media, shadow enhancing space of the stage, for dramatic dances, and the lightness and rigidity of the panel made it a perfect skin for the wings. The wings being the side and back panels of the stage, they allowed the performers to stand prior to performance. Coraplast became the more than just a cheap plastic but a perfect skin. The "Marvelous confusion of the animate and the inanimate the modern mannequin and the romantic ruin. The first – crossing of the human and the nonhuman. The second – a mixing of the historical and the natural."[13] In the surrealist image repertoire evokes the reconfiguring of the body as machine. In this way the ethereal theatre, become a new body or host to the performances as it participates within the realm of "viewing in", which is the etymological origin of *theatre* and *theory*.

Through the impact of experience, that takes place within a design-build process. The process becomes a fertile architectural Praxis. ETHEREAL buildings create hybrid conditions, born through the collective mindful work of each participant; architectural monsters are then "de-monstrated". The process of construction incorporates two distinct issues, the nature of the culture, (art and performance); changing nature of site, and the hybrid condition becomes inherent in the project. The process of construction translates between the beautiful (phenomenal) and the ugly (physical). The challenge is the movement from the process of purification (identities and non-identities) to the process of translation (phenomena of the hybrid). This purification process begins with the interfacing the body and the building materials with the projected dimensions articulated by a dialogue between individuals and culture. The primary link is the hand; in the design-build process we embrace and characterize the phenomenon of an architectural praxis, which knows how materials merge and come together and what is the inherent lightness or heaviness of things, together with the intrinsic strength or weakness of things. Through the hand, identity involves execution, and expression involves workmanship, pleasure, and craft siting a cunning process of translation on one side between mind and hand, and on the other side between material and measure. The hyphen between design - build becomes a subject and object.



NOTES

[1]Giambattista Vico, The New Science, p127.

[2]Marco Frascari, Seminar on Elegant Technology, University of Pennsylvania, 1990

[3]Malcolm McCullough, Abstracting Craft, p.3, 7, 8.

[4]Henri Focillion, The Life of Forms in Art, p.174, 180

[5]Ibid, p.162-163.

[6]Guseppe Zambonini, Notes for a theory of Making in a Time of Necessity.

[7]Octavio Paz, "In praise of Hands"

[8]Malcolm McCullough, Abstracting Craft, p. 67.

[9]Ibid.

[10]Marco Frascari, Seminar on Poesis, University of Pennsylvania, 1990.

[11]Alfred Jarry, Selected Works of Alfred Jarry, p 193

[12]Alfred Jarry, Selected Works of Alfred Jarry, p 193

[13]Andre Breton, Manifestos on Surrealism, p.

BIBLIOGRAPHY

Arnheim, Rudolf. *Visual Thinking.* Berkeley: University of California Press. 1969.

Breton, Andre. *Manifestoes of Surrealism (1924)*: University of Michigan Press. 1969.

Focillon, Henri. *Life in the Forms in Art:* (1992 edition). New York: Zone. 1934.

Foster, Hal. *The AntiAesthetic.* Seattle: Bay Press, ed., 1991.

Frascari, Marco. "A Secret Semiotic Skiagraphy: The Corporeal Theatre of Meanings in Vincenzo Scamozzi's *Idea* of Architecture." In *Architecture and Shadow.* edited by David Murray. Via 11. Philadelphia: Graduate School of Fine Arts, University of Pennsylvania: New York: Rizzoli, 1990.

Frascari, Marco. Seminars at the University of Pennsylvania. Philadelphia, PA. 1990-1991

Latour, Bruno. *We Have Never Been Modern.* Nous n'aims Jamais ete Moderns: Essai D'anthropologie Symetrique. Paris: La De Couverte. 1991.

McCullough, Malcolhm. Abstracting Craft: The Practiced Digital Hand. MIT Press. 1998.

Paz, Octavio. And the World Arts Council. 1974. In Praise of Hands. Greenwich, CT: New York Graphic Society. 1974

Vico, Giambattista. *The New Science.* Trans. T. G. Bergin and M. H. Fisch. Ithaca: Cornell University Press, 1970.

The Studio in Sustainability

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PROJECT DESCRIPTION

The Studio in Sustainability (SIS) is an upper level architectural design studio at the University of Tennessee whose mission is to teach students through an ethical, haptic approach to architectural education. The principle place for exploration is in the inner city neighborhoods of Chattanooga, Tennessee. Two houses have been designed and built by students in the Lincoln Park district of the city and the next two, now in design, are for the Alton Park district of the city.

The goal of the studio is meaningful education. The SIS uses the experience of designing and building small, urban houses to research and develop prototypes for optimal, innovative uses of energy-saving building materials. The work is a critique of recent housing that does not reflect important cultural and economic shifts in the way people live.

This course was divided into three structured sections. The first was devoted to analysis and design. The second was given to development and the third to testing through construction. The finished houses were sold at fair market value. A part of the construction, education and research costs were recovered and cycled back into the program for next year.

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In the summer of 1998 and 1999 the SIS completed two energy-saving, low-maintenance, passive-solar houses (1,400 ft^2) in the Lincoln Park district of Chattanooga. The City of Chattanooga contacted the SIS to expand the program based on the success of the first two houses. The SIS then expanded the program to include students from the Howard School for Academics and Technology, which is an inner city public high school with a strong vocational arts program. The goal of the work was not only to research, design and build two more houses in the inner-city neighborhood of Alton Park, which is near the high school. Also, the goal was to make an opportunity for community participation. Having inner city high school students working with the UT students made this vital connection. The City was agreeable to this proposal and plans are for this work to begin in August 2000 and end in August 2001.

The SIS has worked with a nonprofit organization, the Chattanooga Neighborhood Enterprise Development Corporation (CNE). CNE has provided financing, site acquisition, and expertise in the construction process. The City of Chattanooga intends to work with both CNE and UT to fulfill the goal of building progressive, energy efficient solar housing for Alton Park. This neighborhood has been targeted by the City because 51% of the people who live there are of low to moderate income.

The SIS seeks to provide inner city home buyers housing that significantly cuts their energy costs. An energy-efficient, low maintenance house creates value for future generations. The research uses labor that teams minority youth and upper-level university students and establishes a unique mentoring relationship. This method of work addresses the issues of long term value resulting from the community involvement of inner-city neighborhoods.

A meaningful aspect of the studio has been the participation of the SIS in community forums to gather information and understand the expectations of the district. These forums have involved the Alton Park residents in the design process and will help insure work that meets their needs. Because of the community forums and the first two houses the SIS have identified the following needs of inner city Chattanooga:

> There is a need to involve college level students in the design and construction process to challenge them to the ethics of sustainable architecture and the nurturing to health the sick parts of the city.
>
> There is a need for the continued participation and education of residents of the neighborhoods. The future users of the housing are targeted for involvement, especially those now in high school.
>
> There is a need for research that produces well designed, energy-efficient housing targeted to low income home buyers.

There is a need to integrate well-designed housing into the urban fabric and rehabilitation of neighborhoods to create long-term value. The information involving energy efficient technology and its adoption to high-density urban neighborhoods will be thoroughly documented and disseminated.

The SIS seeks to address these needs by incorporating into the educational program a team of inner-city high school students to work with the upper-level college students to design sustainable houses. This will show the residents of Alton Park, the city government and the building industry that the idea of sustainability implies a comprehensive, long-term approach to energy conservation and property values. It will also show the public energy efficient design options by offering commercially available solutions to consumers and the building industry.

Building affordable and energy efficient housing in an urban context proves the work can serve as a prototype for future growth. Continuous expansion of the city boundaries is not possible or sustainable. This work generates alternatives to urban sprawl by providing available alternatives to traditional suburban development and potentially attracting those who otherwise would not consider urban housing. The SIS uses the Department of Energy's "Energy Star" guidelines for commercial buildings as the benchmark for power consumption with a long-term goal to exceed these performance criteria. The work shows that innovative housing is a means to stop urban devaluation.

BACKGROUND INFORMATION

The University of Tennessee College of Architecture and Design (UT CAD) is the only school of architecture in the state. It has a special mission to serve the principal cities of Tennessee with quality education, research and public service initiatives related to all aspects of architecture. Campus partnerships with business and government provide both jobs for graduates and solutions to the economic and social needs of Tennessee and the nation.

The City of Chattanooga and CNE has created available choices to sprawl by increasing housing densities, providing electric vehicles for public transportation, and sensitive community growth. For the last twenty years, Chattanooga has made a concerted effort to create meaningful, sustainable change. Vice President Al Gore named the city a "Sustainable City."

CNE has an outstanding, ten-year record of restoring many inner-city neighborhoods by the renovation and construction of various housing types. CNE is the principle organization in the city addressing the housing needs of lower income home buyers.

The Howard School for Academics and Technology is an inner-city public high school and is one of the oldest in Chattanooga. The school has agreed to work with UT to start this innovative program through its vocational arts classes by working with the SIS in the design and construction of solar houses. The curriculum at Howard covers the fundamentals of urban design and architecture in various courses. The SIS partnership benefits Chattanooga by integrating the research into the community and provides fieldwork for these high school students. The partnership benefits the SIS by reinforcing the ethics of responsible design for the revitalization of our cities.

The SIS seeks to engage and teach students to help solve the problems of urban devaluation and the general deterioration of inner city neighborhoods. The mission of the SIS has evolved to address the following:

Education: To establish and continue the participation and education of residents of the neighborhoods in the design process. The future users of the housing are targeted for involvement, especially those now in high school. The Howard high students will take part in the construction process. It is expressed hope of the SIS to involve college students with inner city high school students in a unique mentoring relationship to the benefit of the city and the educational agenda.

Energy Conservation: Little research exists showing the results of energy-efficient solar housing targeted to urban home buyers. A vast amount of information exists about solar-energy technology and benefits, but very little addresses a reduction of a low-income homeowners' energy costs, especially in the South. This work will be done through research from the UT CAD and done with Oak Ridge National Laboratories.

Urban Design: There is a lack of work that integrates energy efficient housing into the urban design and rehabilitation of neighborhoods in the south. Energy conservation is a long-term value. The freedom of choice to give up a car is also a valuable savings that fits into the notion of long term value. The information gathered over years involving these changes to urban neighborhoods would be thoroughly documented and disseminated.

TIME PERIOD & CURRICULUM

The structure of the SIS class work is as follows:

Schematic Design During the fall semester 2000, the UT and Howard students will design various schemes for the Alton Park neighborhood. The best work will be chosen by evaluators from the community.

Development During the spring semester 2001, students refine the schemes to include cost estimates and design details. The project is made into a workable solution during this phase.

Research Concurrent to the schematic design and development, the materials research will test and evaluate the technologies planned for construction.

Construction Beginning in May 2001, the project coordinator, Taylor Bowers, will supervise the students in building two of the schemes.

This is the same structure that followed to complete the first two houses, except the involvement of the Howard students. It will remain a model for later work. The studio has proven that energy-efficient solutions can contribute to both the sustainable and the economic revitalization of cities. The Studio In Sustainability has infrastructure to use the findings to teach, research and teach the public about urban housing on a local, regional, and national scale.

CASE STUDY 1

Research

The first house was designed in a fourth-year level studio. The constraints were a narrow site with an assumed east-west orientation that CNE had recently acquired. Twelve schemes were submitted individually at the end of fall semester, 1997. One was chosen that best addressed the criteria:

Energy conservation

Site constraints

Materials

To address these issues the structure of the studio was created to guide the students through a series of exercises that stressed rational solutions. The problem in this initial house was that only generic site information was available. All that was known was the site was to be long and narrow and on an east west axis.

Because the SIS had to assume a site the class divided into three teams of four and began to study three inner city neighborhoods. CNE had acquired property in these areas and was working to restore them. Each was once a lively, working class neighborhood that was built to serve nearby manufacturing and industry. Also, each was characterized by architectural elements since lost. From their studies that includes historical, photographic and diagrammatic analysis, the students identified the automobile, electronic media and thermal control as the things most responsible for change in way the people live. The SIS identified these three factors as the generators of form for the modern suburban house. Studied relative to the older neighborhoods of Chattanooga the following was learned:

The shift in the design aesthetic from pre to post World War II was complex and varied. The SIS concluded the following:

1. Older, pre World War II, houses were closer to the street, accommodated pedestrian traffic with sidewalks and were designed from a building module in the range of 24",36" and 48". These numbers determined the window patterning, room size and proportioning systems (height to width and length).

The automobile generated the suburban plot of large front yard, driveway, relatively small side yards and large backyard. Houses were designed to serve the automobile through the relationship to the street and through the modulations of the structure. In the modern, suburban house, which the SIS identified as post World War II, the building module doubled in size to an 8 and 16 foot module that accommodated the car and the larger lot sizes of the green-field, tract developments. In addition, the standardization of materials allotted the 4 x 8 foot (48" x 96") sheet size as the basic unit of construction, homogenizing the housing aesthetic.

The SIS found that the scale of the older housing was smaller and intensely relative the setbacks of the street and the close proximity of the adjoining house. Modern housing was detached from it surroundings by the car and the expanded module. Zoning ordinances evolved to meet the needs of suburban, tract housing. The application of these new codes to urban situations ironically placed restrictions on the growth of inner city Chattanooga.

2. Thermal comfort became a determinant of the post World War II housing aesthetic by sealing the house from the outside and eliminating the front porch as a cooling device. The house no longer was designed as a response to specific regional weather criteria but instead became a generic house (the SIS defined this as a gen-house) that was benign to temperature, seasons, and site. Furthering this gen-house was the proliferation of large grading machines that flattened the landscape. The modern site became universally flat. The SIS concluded that Frank Lloyd Wright's dictum: "of the hill, not on the hill," became inconsequential since bulldozers accommodated more housing per acre by removing the hill.

The SIS also concluded that housing became enslaved to cheap energy that made the interior condition more important than the response to the exterior conditions such as climate.

3. Given the detachment made by the car and thermal control, most notably, a constant, year-around temperature, the house grew to be vessel for consumerism. Specifically, electronic media devoured the interior of American life. Through television, and now the computer, people no longer need to participate with the exterior world. The traditional house was built around either the fireplace or kitchen as gathering points for family life. Television, the telephone and the computer, possibly in each room of the house, fosters individualism and decentralization. This condition fragments the design scheme into an inwardly focused series of cells.

The result of media proliferation is consumerism on a vast scale. The house serves the role of filtering and storing vast amounts of *stuff* bought at the thousands of strip malls and shopping centers. These retail markets gain power through advertisement and communication in media sources, mostly electronic, and creates a paradox of never having enough yet having too much. The SIS concluded that electronic media decentralized the interior by removing a place for gathering.

The SIS concluded that any gen-house could be anywhere.

Design

This work addresses the above findings.

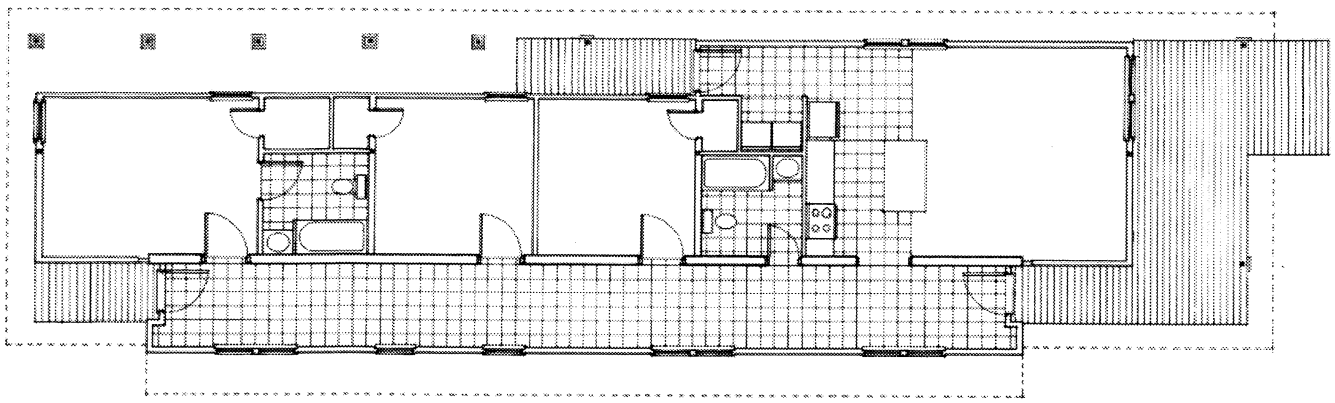

Fig. 1 Plan of House 1.

Fig. 2 Photo describing the use of modular materials that determined the length, width and breadth of the house as it fit into the narrow site conditions. Structurally insulated panels were used to test and confirm the added benefits of thermal control of this product. The SIS used materials that offered an option to traditional, stick built construction methods.

Fig. 3 Photo of House 1. The Final cost was approximately $75.00/sf for 1400 sf. The house was sold for $55.000.00 in the fall of 1999.

CASE STUDY 2

The second house came from a third-year level design studio. Again, the constraints were a narrow site but with an assumed north-south orientation. Fourteen schemes were submitted individually at the end of fall semester, 1998. Four were chosen that best addressed the criteria:

Energy conservation
Site constraints
Materials
Budget

Research

Here, the curriculum will be discussed as it relates to the structure of the semester. It first must be noted that a small, single family house does not fit well into structure of upper level studios at the University of Tennessee. The themes of upper level design at UT are generally for large scale building programs. Much time was spent in the details of the work to compensate for the small scale of the work. Exact drawings, precise area calculations and a thorough discussion of materials is critical to successful work. Students were unaware of the difficulties that accompany a small program and feel most design work can be done quickly. Much time is spent refining the work and understanding the relationship of materials to qualities of space. This project was moved to a third-year level design class and was fulfilled with the aid of a supporting course to cover design development.

Readings covered design theory as well as topics ranging from sociology to technology. The studio met three days a week from 1:30 to 5:30 PM and began with almost 2 hours of discussion of the reading material and topical issues. For example, Monday would be devoted to the sociology of the city and urban design issues; Wednesday would be devoted to technical discussions of energy conservation and material uses; Friday would be devoted to design theory such as transparency and collage. Each discussion was inter-connected, and great care was given weave these issues together into a comprehensive program. The idea of a small house then became a means to look at larger issues of architecture and how students' approach to design fit into a greater whole.

In this case various differences arose that forced the class to study closer:

The cost was an original design determinate for the student design projects. House I was estimated to cost 75.00/ ft2. It was critical to the success of the program to lower this to 65.00/ft2 or lower. Materiality became an important design determinant.

The house was designed and built on a narrow site that could not fit a typical low-income house. The site did not offer much southern exposure but allowed a window wall as a low cost energy control. This condition determined the parti.

Design issues growing from the research of the first project was used to determine the spatial conditions of the second. Use of the porch, private exterior spaces and a strong relationship to the existing context were studio issues discussed throughout the semester.

Design

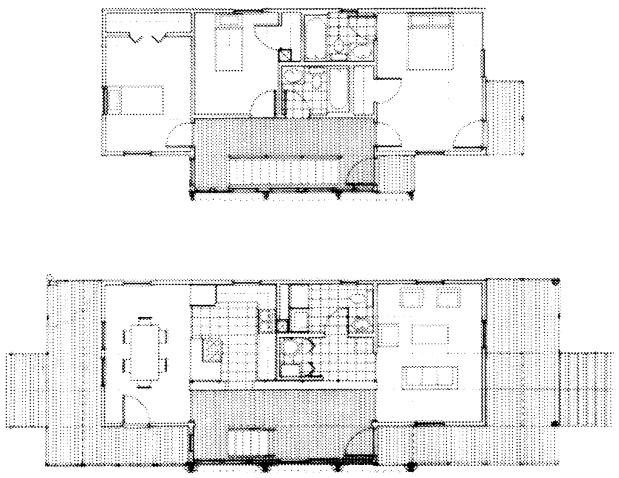

Fig. 4 Lower level plan of House 2.

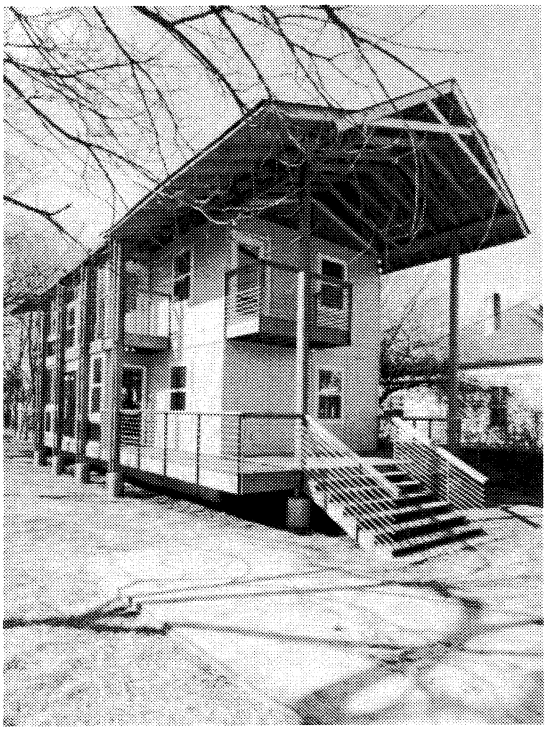

Fig. 5 This photo illustrates the use of a front porch to create an exterior room that also aids in the control of interior temperature. It also had an oversized stair platform and created a place for gathering and participating with the street and community. The addition of a porch was intended to be an economical use of space. House 2 used a back porch intended for exterior dining.

Fig. 6 Exterior photo showing the rear elevation of the house in context.

Fig. 7 Interior photo of window wall.

Fig.8 Construction crew of House 2

House construction began with a crew of eight when the semester ended, in mid-May. It was 80% completed through August, when the semester ended.

An important component of the work was to explain to builders and the public the actual cost of such a project. To address the concerns of liability and benefits that must be met in a payroll, a contractor was hired by CNE as an intermediary. Other student design-build hedge the final costs by disallowing labor and setting up a program where time is donated for college credit. In this the students were earned a three-hour elective credit. Importantly, the students were paid a wage of $7.00/hour. The time was carefully documented and monitored by the students so that the budget could be better controlled. This was an important learning experience for cost control and management. Project manager, Taylor Bowers who, along with professional subcontractors hired by CNE finished the work in the fall.

The Final cost of House 2 was approximately $65.00/sf for 1450 sf. The house was sold for $55,000.00 in the spring of 2000.

CONCLUSIONS

Architect designed housing using innovative materials can be cost-effective and competitive with standard developer work. It was found that labor costs were almost half the final costs.

Design must be localized. Neighborhoods must be studied to address the unique characteristics. A study of the history of the neighborhood to include zoning and material uses is important. Work that is responsive to a neighborhood is critical. Residents respond negatively to generic housing.

Some response to the climate is needed. Regardless of the blind dependence on thermal control, natural heating and cooling is needed. The heating and cooling costs are being confirmed, but anecdotal evidence is very positive.

CURRENT WORK

Two houses in a different neighborhood from the first are now being designed this semester. They will be finished in the summer of 2001. Inclusive to these will be the addition of inner-city high schools students to the design and construction teams. In an effort to be more inclusive to the needs of a specific neighborhood the residents will help build the houses. The same formats for the structure of the semester are being used in addition the same goals and objectives.

Design Build Begins at Home:
Constructing Our Own World at the Alexandria Center

SUSAN PIEDMONT-PALLADINO
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Virginia Polytechnic Institute and State University,
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INTRODUCTION: HAROLD AND THE PURPLE CRAYON

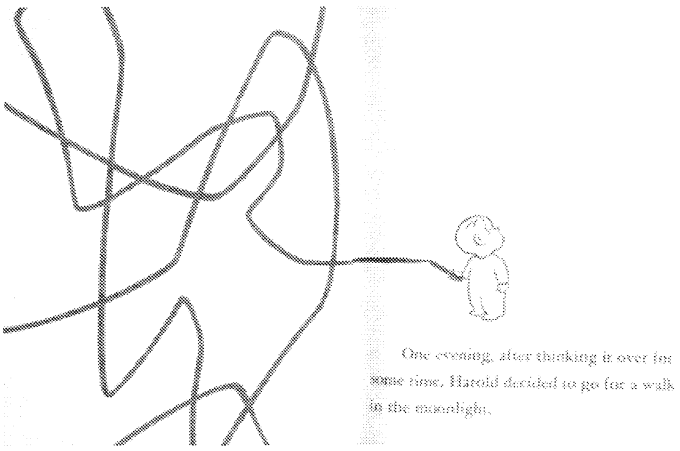

Fig. 1: From "Harold and the Purple Crayon

> *One evening, after thinking it over for some time. Harold decided to go for a walk in the moonlight. There wasn't any moon and Harold needed a moon for a walk in the moonlight.*
>
> *And he needed something to walk on. He made a long straight path so he wouldn't get lost. And he set off on his walk, taking his big purple crayon with him...*
>
> —From *Harold and The Purple Crayon* by Crockett Johnson

We all inhabit a world not of our own making. What architect hasn't shared Harold's dream of drawing his own world? At Virginia Tech's Washington Alexandria Architecture Consortium, we do make our own world through extending the cycle of translation from idea to drawing to constructing. Like Harold with his purple crayon, we imagine the world we want and set about constructing it through our design/build program. Harold himself was a design/builder; but his was a curious form of design build, as the instrument of his design was also the instrument of building. His purple crayon served as both allowing Harold to inhabit his drawings the way we inhabit our studio projects. The immediacy and transparency of Harold's construction of his world exists only in the imagination of the architect, where the drawing is the construction of a world of its own. But a reader of Harold's story will notice that there are fears and near catastrophes that follow from his drawings. For Harold each line constructs a world full of consequences, from which his next lines must extricate him.

THE WASHINGTON ALEXANDRIA ARCHITECTURE CENTER

The Washington-Alexandria Architecture Center (WAAC) is a part of Virginia Tech's College of Architecture and Urban Studies. It serves a dual purpose; it is the urban extension of the College, which is located in Blacksburg Virginia and also a consortium of architecture programs from other universities with students and faculty from around the world. As such, the Consortium offers a one-of-a kind synergy of ideas and perspectives on architecture and urbanism. This paper also serves a dual purpose for in it we will discuss the acquisition of knowledge through action as an introduction to design/build and follow with a presentation of our design/build program.

Founded in 1980 to serve as an urban extension for the College, the Center expanded into a consortium in 1985. The members schools indicate the diversity of cultures represented: California Polytechnic State University of San Luis Obispo, Florida A&M University in Tallahassee, Miami University of Ohio, Oxford-Brooks in Oxford England, The Bauhaus University and Hannover University, both of Germany, Yokohama National University of Japan, and Texas A&M in College Station, Texas. Other participants in the Consortium have included North Carolina State University, and universities from Ukraine, Poland, Estonia, and Armenia. Each participating school sends fourth and/or fifth year students and one faculty member for a semester or an academic year.

The Center experiences the benefits and tribulations of its location far from the main campus. We are a "center" but also a satellite, in the middle of things and at the margins. Among the benefits of this frontier-like location is a sense of stewardship and ownership of our own building, often referred to as our "house" by students. This sense of shared domesticity is very different from the attitude of students toward typical university buildings and it depends on and is supported by an environment and pedagogy built on free-

dom and responsibility. The acceptance of this freedom of exploration and concomitant responsibility forms the social and professional contract among the faculty, between the faculty and the students, and among the students themselves. This contract of individual freedom and responsibility permeates the entire structure of the Center, from the self-selection of studio projects to how our facilities are run. It is crucial that the student learn freedom and responsibility as an inseparable pair, for that is part of the exercise of professional judgment. In this way, "pro-practice" is enacted day by day. The field of action where this is most immediate is the ongoing design build program where we live with the consequences of our ideas and action, and those of previous generations of students. Our building becomes a constructed narrative of the needs, desires, and actions of generations of students, an instrument of tacit knowing.

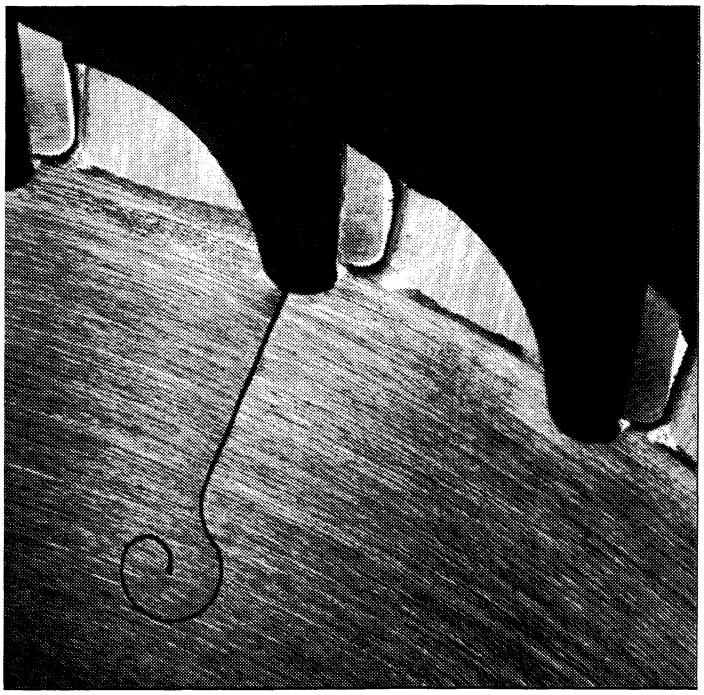

Fig.2: Table saw blade. photo by Steve Small

TACIT KNOWING

The concept of tacit knowledge is familiar to readers of Donald Schoen's The Reflective Practitioner where it is given a somewhat cursory treatment (p.52, 240), but it is philosopher Michael Polanyi who originated the term "tacit knowing" and describes it in detail in his book *The Tacit Dimension.* Too easily condensed into the glib aphorism "learning by doing," tacit knowing is a way of knowing the world and arguably the primary way that architectural knowledge is transmitted. Knowing tacitly means, "we know more than we can say." The relevance of Polanyi's theories to architectural pedagogy deserves a more extended treatment than it will be given here, but its essence is germane to design/build as a way of architectural knowing. Many of Polanyi's themes are echoed, though unreferenced, by neurologist Frank Wilson in his book *The Hand: How its Use Shapes the Brain, Language, and Human Culture.* We will address both of these authors' contributions to the acquisition of knowledge through action and follow with a presentation of WAAC's design/build program.

Polanyi's thesis is that "we know more than we can say." (p.4) He distinguishes between "knowing what" and "knowing how" and it is these two ways of knowing that we "know" more commonly as theory and practice. But Polanyi's point, and Wilson's, is that things are not quite so tidily divisible; the "how" and the "what" talk to each other. He explains: "...An explicit integration cannot replace its tacit counterpart. The skill of a driver cannot be replaced by a thorough schooling in the theory of the motorcar; the knowledge I have of my own body differs altogether from the knowledge of its physiology; and the rules of rhyming and prosody do not tell me what a poem told me..." (P20)

The territory of tacit knowing is the territory of architecture, of design in general and design/build in particular, with its "...problems and hunches, physiognomies and skills, the use of tools, probes, and denotative language." (P29) With this mapping of tacit territory, Polanyi takes us to the question of the architectural problem, the definition and clarification of which is often in the hands of the critic in traditional design studio projects. But we all know...even if we cannot say...that the program for a project can never account for the architecture, nor can the project itself be derived from its programmatic description. Polanyi in his discussion of emergence and innovation suggests that design problems are true discoveries in that the "uncaused action which evokes them is usually an imaginative thrust toward discovering these potentialities." (P89) The character that results from this uncaused action is more often than not a set of things and places we didn't know we needed until we had them, which are both more than and other than the initial hunch.

While Polanyi describes many forms of tacit knowing, such as those that make a chess player or a poet, it is the tacit knowledge that belongs to architecture that interests us here and the instrument of that knowing is the hand and its extensions, tools. The hand and its extensions operate at every level of architectural study. The act of drawing is a metaphoric construction; the building of a model, a construction of a metaphor. Frank Wilson's thesis is that far from our brains instructing our hands in what to do; our hands return information to our brains. Thus the tacit knowing that accrues to the student in the design build class (as well as to the faculty and students who participate indirectly) is in the completion of the sequence that begins in studio from idea to drawing to material of building, to dwelling, and of course back again. To borrow a familiar phrase from Schoen, the reflective conversation here is a material conversation, arising in a Polanyian imaginative leap into possibilities that are already inscribed and circumscribed by material.

In design/build, or "hands-on architecture" as Architecture Record's Robert Ivy describes it in an intuitive nod to Wilson's thesis, the hand and its extensions, tools, are the conduits of tacit learning. Wilson himself never cites Polanyi, so the application of

Polanyi's terminology to Wilson's descriptions is our own. He quotes an engineer whose dissertation topic was juggling: "Simply *telling* someone the idea *won't do.* No matter how sincere the inquiry, a great deal of practice, and a special kind of practice, is necessary for real understanding." (P.104) Wilson describes this practice as "intelligent rehearsal," distinguishing it from play. (Wilson's focus on juggling is not so far from design activity is it might seem; Le Corbusier compared the architect to an acrobat in his poem "The Acrobat")

DESIGN BUILD AT WAAC

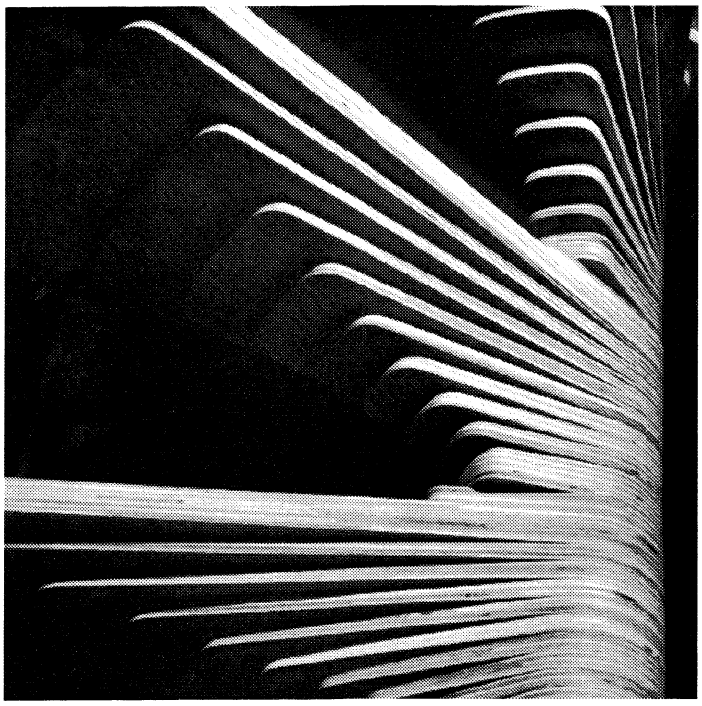

Fig. 3: Stacked plywood spiral stair: photo by Steve Small

What we do would not be possible without the cooperation of our patient and generous building. Built in 1923 as a school, 1001 Prince Street has load-bearing brick walls and wood floors. The building was renovated and converted to office uses in the mid-80's. There are many and complex reasons why its life as an office building was brief, but one of them surely derives from the typology of the building itself. To say that it looks too much like a school to be anything else sounds like a glib tautology, but there is truth to the aphorism that function follows form. Virginia Tech bought 1001 in1990 and the faculty and students of the Center have spent the last decade turning a school back into a school, into *this* school.

Design/build programs have proliferated in architecture schools over the last decade and are, for many universities, hybrid programs serving both as community outreach and as education. Serving both of those masters requires constant attention by the faculty to avoid the obvious pitfalls of sacrificing education to serve a client, exploiting students as cheap labor, or sacrificing architectural integrity for convenience. There are also some less obvious pitfalls in design build programs, such as relying on competition rather than cooperation, and a lack of critical reflection on the educational value, rather than on the public relations value, of the design/build experience. There are three aspects of the design/build program at WAAC that we feel set it apart and are crucial to its success:

1. Design/build is not a studio.

2. We are our own clients.

3. We are inefficient.

Each of these requires explaining. First, the decision to offer design/build as a three credit elective rather than as a studio addresses several issues. Most important, by not displacing a year of design studio, we make a necessary distinction between the increasing architectural, technical, and programmatic complexities of a student's design trajectory and the relatively simple design problems of design/build. Like some of our other classes in printmaking, photography, and furniture design, design/build is a lab class where the primary goal is technical and material empathy, the acquisition of "know-how." We recognize that there is, and rightly should be, a significant disparity between what a student is capable of designing in fourth or fifth year, and what the same student is capable of constructing. This also allows students of vastly different design abilities and backgrounds to share equally in the design/build effort. Thus the culture of individual ownership of design studio projects is disarmed and replaced with the collective effort necessary for and characteristic of design/build projects.

It is made clear to all participants that the design/build class is a group effort and that all ideas will be listened to. It is also clear that the ultimate decisions will be made by the teacher, Joe Wheeler, and the Director of the Center, Jaan Holt, as the projects serve the larger community of the Center. And this brings us to the second aspect of the class: we are our own clients. While there are certainly many opportunities for design/build projects in the community, we have found that our in-house program allows a wonderful educational leakage to occur: watching, listening, offering unsolicited yet welcome opinions, being drafted to help on a small part of something, these bestow a sense of ownership in the process and the results even on students who do not take the class. Our building has become a collection of constructed stories where nearly every corner has in some way been altered. (Some of these are freelance design build efforts. Recently a few students decided that their room needed a bigger door to make it more open to the room next to it, so they cut away the partition. We assess no penalty on such thoughtful destruction...it did make the room better. In the Center's narrative tradition that door will no doubt become known as the McSorley Portal)

This leads to the third aspect, our lack of efficiency. Inefficiency of any sort is a luxury in contemporary culture, but tacit learning depends on it and if the education of the student is the primary concern, then the process is inherently inefficient. This in effi-

ciency requires patience on the part of the design/build faculty and on the part of the WAAC community itself. Among the lessons learned in design studio is that sometimes work done is undone and redone as part of the learning process. The concept of doing, undoing, and redoing, even to the point of failure, is an essential part of learning how to design. When a project is undertaken for an outside client, however, the responsibilities of professionalism discourage that mode of working. We have undertaken many projects with outside clients, such as managing international design competitions, where deadlines, budgets, and the collective public reputation of the school impose a professional discipline on the project team. Our in-house design/build program allows the students to work in an academic cocoon while learning the consequences of translating their lines into things.

We will now describe several projects in general, and finish with an in-depth discussion of our most complex and successful project, the distance learning room.

THE PROJECTS

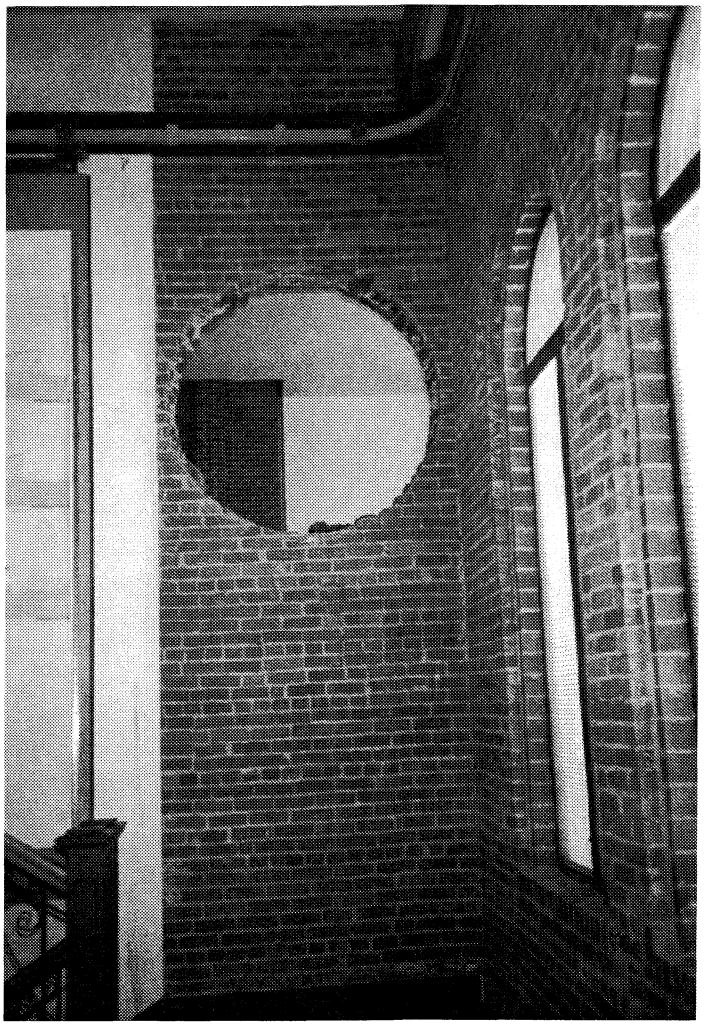

Fig. 4: New hole in the wall: photo by Susan Piemdont-Palladino

The workshops:

The first design build project at WAAC was in fact the construction of the wood shop...the purple crayon so to speak... from which all other construction would come. The discovery of a true masonry arch behind the drywall and metal door frame left over from the office renovation became the ritual beginning of the program as well as a tectonic theme for treating the rest of building. The building now reveals its rough brick in several places and a language of reveals and attachments, of skin and structure, has developed to give consistency to projects throughout the building. The masonry arch that now serves as threshold to the wood shop is a literal and a symbolic entry into the pedagogy of the Center. Its uncovering is a story shared each year with new design/build students as a way of inspiring them to attend closely to the conditions at hand. In fact, several other discoveries have since been made behind the veil of drywall.

Director's office, faculty offices and faculty conference room:

While turning the school building back into a school, we have also been engaged in turning offices back into offices. For these spaces the goal was to avoid the drywall default so the design and construction of the offices focuses mostly on sharing light through interior windows, making plywood shelves that also divide offices, and constructing new plywood paneled walls. Each office has acquired a slightly different character depending on what kind of light it receives and in what era of design/build class it was constructed.

The Library:

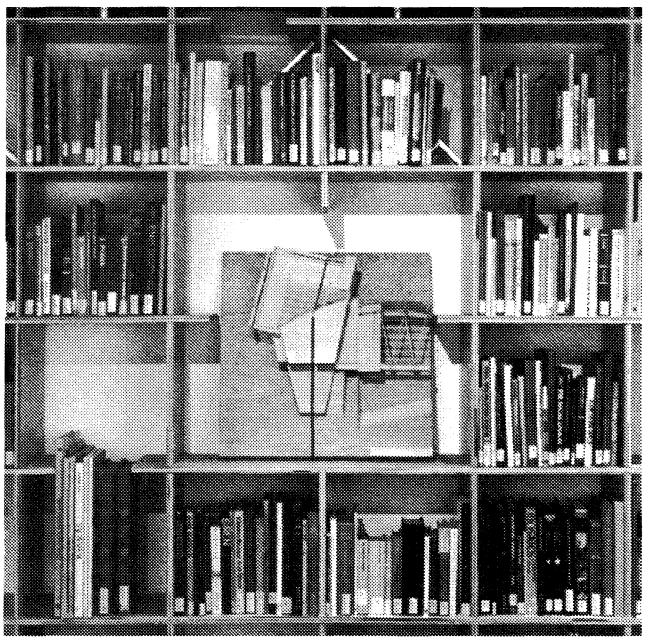

Fig. 5: Plywood shelves in library: photo by Steve Small

Currently the library is a single-storey room encased from floor to ceiling in plywood gridded shelves. As in many of the rooms, the floors has been uncovered and refinished to reveal the original maple. The corner of the room contains the stacked plywood stair, which leads to what will eventually be the second floor of the library. The library has been an ongoing project, its exceptionally disruptive work has often been undertaken in the summer. Its is a long and complicated story, mixed with larger issues and so we will not dwell on it here.

The Stair theater:

1001 Prince Street's character-defining element is its central stair hall. Entered at an intermediate level, the stair descends left and right symmetrically to the lower level and rises half a level to the main level. It splits again landing above the entry and then rises on center to the second floor. This space is the social heart of the school. The design includes two massive rolling panels to block the light from the three south facing windows on the landing and the installation of a motorized screen. As part of the furniture design class, two students from the Bauhaus designed bent plywood chairs for the steps.

Distance learning classroom:

This project will be discussed in considerable depth as it was the most programmatically and technologically demanding of the design build projects and is perhaps the best example of design/build at WAAC. Virginia Tech, like many universities today, has committed itself to expanding its distance learning capabilities. Thus to establish a distance learning link with the campus in Blacksburg, the Center received 4 large television monitors and the necessary microphones, cameras, and computer equipment to send and receive classes at a distance. The technicians who install this equipment have clear preferences for how the spaces for this equipment should be built: wall to wall carpeting, acoustic tile ceiling, no windows, matte plastic surfaces to reduce glare, and neutral colored walls. While these specs may indeed be wonderful for the cameras and the machines, they are not for humans.

We originally located the equipment in our only available room, on the south side of the building facing Prince Street. With 14' ceilings, 10' windows, white walls and maple floors it was soon clear that this was not a suitable place. The students could clearly analyze the failings of the existing condition and begin to design for the preferred one. There were four main issues to correct:

1. Acoustics: the room was too hard surfaced and the street noise of traffic and sirens was disruptive.

2. Light: the southern light coming in the three huge windows was too bright and backlit the audience. The artificial lighting was also unacceptable.

3. Unruly machines, cables and wiring: the equipment and its umbilicals tended to dominate the room

4. No spatial hierarchy: the room as set up allowed no teaching space, no orientation.

The new space, the VTel Room, represents exactly the opposite of what was "required" in the specs and stands as a measured critique of the original program. The maple floor and the hard surfaces remain in the new room, but the floor has a carpet that floats free of the walls by a few feet and one wall is a canted maple plywood wall that deflects sound. There are still three large windows, but they face north bringing constant light into the room. The incandescent artificial light is diffused through the aluminum and muslin "cloud" that also serves an acoustic purpose, floating overhead directly above the carpet. The wiring and cables are all gathered into a new type of baseboard, one that not only protects the wall but also serves as a raceway. And a special place has been made for the teacher in a corner with a portion of exposed brick wall, a motorized screen for slides, and a desk with the equipment. In the corner sandwiched between plexiglas hangs an artifact uncovered by the students in the process of making the room. Behind the furred out drywall of the office renovation the students discovered the blackboard of the old classroom and on it, still legible, was a teacher's lesson. Written in different colors of chalk are the names of colors and above each a circle showing the color.

The participants in the VTel Room project included students from Texas A&M, Cal Poly, graduate architecture students and landscape students from Virginia Tech. The skills they learned and exercised in the construction of the room included rough carpentry, finish carpentry, drywall, electrical, electronics, metal fabrication, plaster removal, floor refinishing, space planning, and selection of finishes and furnishings. The result is a remarkably telegenic room as well as good room to teach in even without using the distance learning equipment.

CONCLUSION

The discovery of potentialities at WAAC in the design/build program comes through a Polanyian in-dwelling, a day-to-day experience with our building. Several needs have prompted imaginative thrusts toward discovery: the need for a place to put our small collection of books, the need to locate distance learning equipment in an amenable room, the desire for a place to show slides and videos. The need for *a* library, and now for *a* larger library, can never fully account for *this* library. Certainly the desire for a place to show slides and videos in no way can account for the strange animal we call the Stair Theater. Thus the discoveries have yielded new places and things: a stair theater and a bent wood seat to use there, a plywood masonry stair, the old brick walls and archaeological fragments of the past life of the building.

Harold exercises his freedom and his responsibility in his quest to find —*draw* closer to— his house. He learns as he goes, as he constructs. The illustration that opens the story, and this essay, shows a meaningless scribble, to which Harold is not attending. Rather he is looking into the emptiness that represents the world awaiting his construction, into the space of the book. Harold's

drawing only becomes meaningful when it serves the task of making place. The scribble has no consequences. Michael Polanyi's dense prose hints at the complexities of the architect's freedom and responsibility, and the professional choices the student learns to exercise in the territory of design/building at home: "All his existential choices are made in response to a potential discovery; they consist in sensing and following a gradient of understanding which will lead to the expansion of his mental existence. Every step is an effort to meet an immediate necessity; his freedom is continuous service." (P81)

BIBLIOGRAPHY

Johnson, Crockett. *Harold and the Purple Crayon.* USA: Harper Collins, 1983

Piedmont-Palladino, Susan. *Devil's Workshop: 25 Years of Jersey Devil Architecture.* New York, N.Y.: Princeton Architectural Press, 1997

Polanyi, Michael. *The Tacit Dimension.* Gloucester, Mass.: Peter Smith, 1983

Schoen, Donald. *The Reflective Practitioner: How Professional Think in Action. USA: Harper Collins. 1983.*

Wilson, Frank R. *The Hand: How its Use Shapes the Brain, Language, and Human Culture.* New York, N.Y.: Pantheon Books, 1998

Transformer:
The Work of the Architect between Idea and Object

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Architecture is a process for transforming an idea into a built object. Architects transform ideas into information, construction managers convert that information into a plan of action, and contractors transform the plan into a completed object. Typically, idea, information, action and object are seen as sequentially dependent – the architect must complete construction documents before the construction manager can develop a workplan, and construction can only begin once these preceding activities are complete. In this sequential model of architectural practice, action and object are made to conform to the architectural idea as represented in the construction documents. The foundations on which the sequential model is built, however, are being shaken by recent changes in project delivery. Design-build and fast-track production, for example, require a reconfiguring of project teams and project tasks. Is the sequential model of architectural process appropriate for the dynamic, collaborative project environment we face today? This paper explores critical inaccuracies and implications of the sequential model, and describes an alternative model emphasizing integration of project teams and project tasks. This integrated model acknowledges the reciprocal dependencies between idea, information, action and object. In contrast to the sequential model in which the finished building is the result of conformation to detailed, preexisting construction documents, the integrative model examines the possibility that idea, information, action and object may evolve iteratively in a process of continuous transformation.

INACCURACIES OF THE CURRENT MODEL

The American Institute of Architects' *Handbook of Professional Practice* can serve as a reference model of the sequential process as operationalized in practice. It offers architects a straightforward method for scheduling their services under the familiar categories of schematic design, design development, construction documentation and construction administration. It is the accepted norm for defining architectural process, and it is the model that architects, their clients and consultants expect will be used when they enter into a project. While this sequential model offers many benefits, it also contains critical inaccuracies.

First, its sequential structure – the notion that each step is built on the completion of the last - assumes that design is complete before construction begins. This is less and less the case in practice however, as fast track production becomes the norm. Today we are more likely to see construction begin well before design is complete, and the sequential design-then-build model fails to account for the simultaneous unfolding of design and construction activities.

Second, the sequential model implies a rigid separation of disciplines. The contracts based on this model such as the AIA A-201 and B-141 reinforce this separation by prescribing separate owner-architect and owner-contractor contracts, low-bid awarding of construction contracts that limit early communication between designer and constructor, and the relegation of the architect to "observer" of construction. In practice, however, collaboration is becoming commonplace. Design-build contracts uniting architect and contractor under a single contract with the owner, are now used for over one-third of all projects in the US (HBE Blueprint 1999). Negotiated bidding on construction contracts, also on the rise, encourages early communication between designer and constructor.

IMPLICATIONS OF THE CURRENT MODEL

In addition to its inaccuracies, the sequential model also suggests several implications that may create inefficiencies and obstacles to practice. One such negative implication is waste. Consensus estimates show that poor project management wastes up to 30% of project costs every year (Puddicombe 1997). Part of this waste may be due to the mismatch between our inaccurate, sequential model of the transformation process and the dynamic, collaborative reality of architecture as practiced today. Second, the linear process is slow. More and more owners are looking to put design and construction on a fast track, and this requires an overlap of design and construction phases. In the sequential process model, however, design and construction are sequentially dependent – construction cannot begin until design is complete.

Third, the linear model is hostile to change. When it is assumed that design is complete before construction begins, design change (and therefore design improvement) during construction is strongly resisted. As the transformation process is currently structured, change costs an estimated $60 billion per year (Ibbs 1997). A more flexible model that recognizes the need for change could reduce its

cost and open the door to innovation and continuous design improvement during construction. Innovation is also inhibited by the separation of disciplines inherent in the sequential model. Early project team formation, collocation and common goal definition are regularly cited as the primary contributors to project success, and the organizational and contractual structures implied by the sequential model restrict these kinds of interdisciplinary and cross-phase cooperation (de la Garza et al 1994).

AN ALTERNATIVE

An alternative process model intended to be more efficient, faster, more flexible and open to innovation is proposed here. Its main distinction from the sequential model is its circular structure. Rather than assume that each step (idea, information, action and object) must be complete before the next can begin, this model breaks the process of transformation down into a series of smaller sub-steps (Figure 1). The second key distinction it makes is to do away with the traditional discipline- and phase-specific labels of design and construction and adopt terms that better reflect the dynamic reality of architectural practice by acknowledging and encouraging interdisciplinary collaboration and design-construction phase integration. These sub-steps or "fundamental processes" focus on the relationships between the traditional categorizations of design and construction.

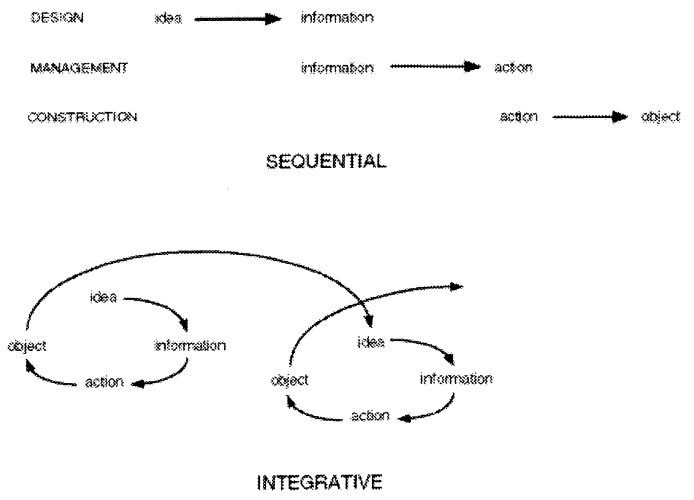


Figure 1. In a sequential architectural process, the built object is made to conform to design information completed prior to the start of construction: in an integrated alternative, feedback from incremental steps in the construction process can form the basis of continuous design improvement.

These processes form repeating feedback loops or cycles in which the act of transformation that concludes one step in the process becomes the subject of observation in the next (Figure 2). For example, a specific construction activity such as framing a wall could lead to observations by the architect that suggest improvements to the design of the windows within that wall. While lead times for product manufacture, inspections, workflow scheduling and a variety of other factors make it necessary to define some design elements far in advance of construction, certain design decisions may remain open to respond to the emerging reality of the building on site.

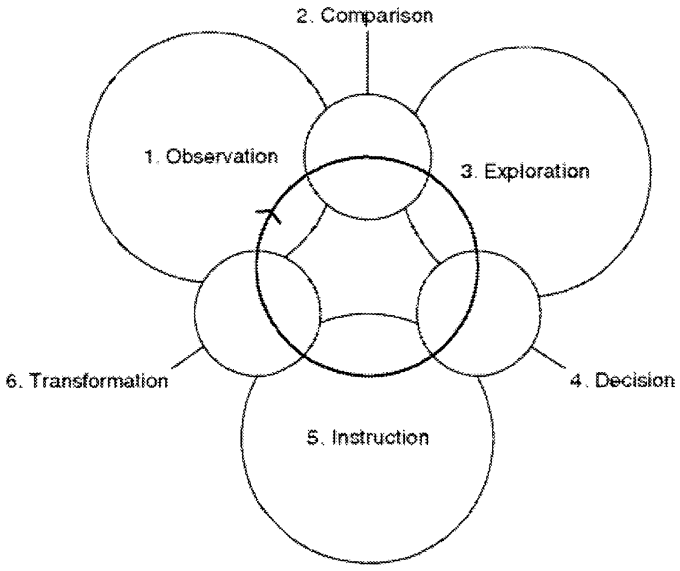


Figure 2. Fundamental processes in the transformation process.

These cycles repeat throughout the life of the project without distinction between traditional project phases. They occur in the planning stages, design stages and construction stages, each cycle building on the results of the one before. Repeating cycles can be found in Jones' principle of circularity (1980), Simon's locally well-structured problem-solving approach (1984), and Alexander's step-by-step process (1995). These authors, however, do not externalize the design process to include critical considerations of collaboration, communication and coordination.

To grasp the concept of the design-construction process as a series of repeating feedback loops or cycles it is necessary to abandon the idea of sequential dependency. While, for clarity, figure 2 shows the six fundamental processes occurring in sequence as we follow them clockwise around the loop diagram, in operation they form a complex network full of gaps and shortcuts rather than a linear sequence. They provide an alternative framework for conceptualizing and improving the dynamic process of transformation in architecture. In this integrated model of transformation, change is not resisted by a rigid, predetermined plan, and yet structure and order are provided in a way that allows for adaptation to inevitable unforeseen circumstances. The fundamental processes of observation, comparison, exploration, decision, instruction and transformation unfold in a circular, iterative pattern throughout the life of the project.

OBSERVATION

Observation is the act of paying attention to our surroundings. In design, observation is generally accompanied by the recording and

analysis of observed phenomena. The traditional approach that separates design and construction activities describes observation as an initial data-gathering activity (Archer 1984). The architect sketches on site and talks to users in order to define the context and program of the project. This static view places observation at the start of a linear sequence of design activities. Once this initial data-gathering phase is complete and schematic design begins, further observation is considered unnecessary or extra. The AIA standard contract, for example, excuses the architect from continuous observation during construction (AIA B141, Article 2.6.5).

In contrast to this tradition, observation as defined here is the continuous observation of the building condition throughout the entire design-construction process. In this dynamic design approach the observed condition of the building during construction can serve as the basis for continuous design improvement in a feedback loop pattern of activities similar to Deming's plan-do-check-act cycle of Continuous Process Improvement (Deming 1982) (Figure 3).

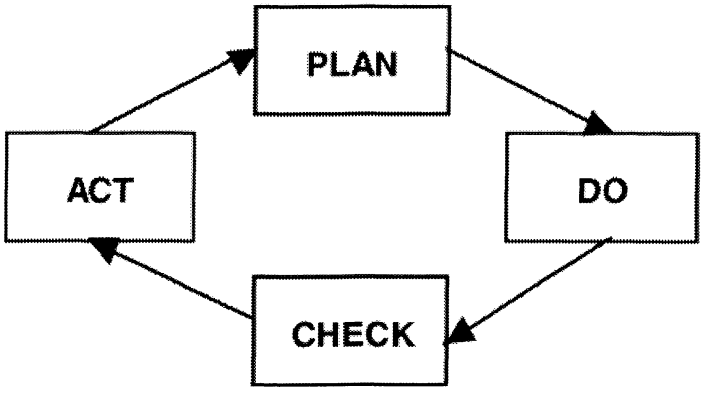


Figure 3. The iterative Plan-Do-Check-Act cycle of Continuous Process Improvement

Standing in a framed room, for example, the architect observes the actual emerging space and structure of the room and directly determines the location of windows in the framed-up wall. His or her observation and analysis of the actual space enters the mix of factors such as lead time, constructability, and the look of the facade, on which design decisions are based. The window as placed then becomes the basis for the next step in the cycle – the location of the mullions within the window, for instance. This does not mean that there was no window design prior to wall framing, only that constructed work may become a consideration in and basis for developing design.

Existing form, whether unbuilt site or evolving structure, is not the only type of condition that requires observation. If the purpose of design is to resolve a discrepancy between actual and desired conditions, then knowledge of actual conditions (factual knowledge) must be accompanied by knowledge of ideal conditions (deontic knowledge) (Rittel and Webber 1973). The dilemma facing the designer is that every step in the act of designing changes the understanding of the desired end. The idea of holding the end or solution constant while the problem continues to evolve is especially confounding. In the integrated model, the team extends the design process into the construction phase that occupies the bulk of the project schedule. This allows additional time to observe, analyze and reconcile the factual knowledge of existing conditions with the deontic knowledge of desired conditions.

In this way, deontic knowledge, the definition of the desired end, can be based not only on factual knowledge of predesign conditions of site and program, but on factual knowledge of the real building as it evolves. Writer John Barth (1994). calls the convergence of actual and desired conditions coaxial esemplasy, "the ongoing, reciprocal shaping of our story by our imagination, and of our imagination by our story thus far." A writer does not attempt to finalize every detail of the story before he or she begins writing, but allows the factual knowledge of the "story thus far" to continuously develop the deontic knowledge of the end (Figure 5).

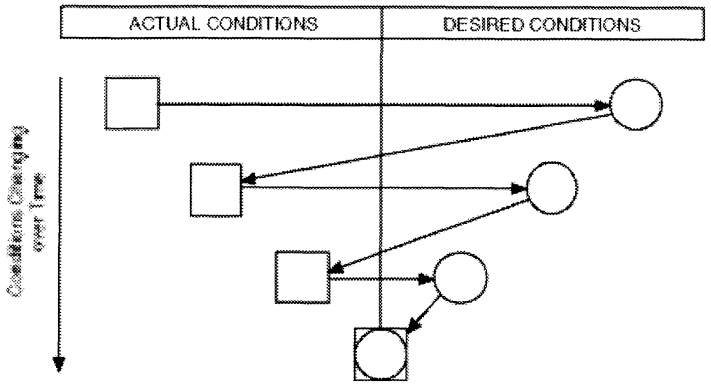


Figure 4. Convergence and mutual influence of actual and desired conditions.

COMPARISON

Comparison is the analytic act of evaluating two or more alternatives according to some criteria. A design problem is identified when we compare actual and desired conditions and find a significant difference between the two. The realization that our built environment is not meeting our needs leads us to take action to correct the problem. It is through comparison of actual and desired conditions that we decide what to do to reconcile a need. Design and construction aim at the transformation of actual conditions toward a more desirable condition.

Both actual and desired conditions change continuously throughout the process of designing and making a building (Simon 1984). The range of possible solutions to any design problem is almost unlimited. Rigid sequencing and hierarchical structures of design decision-making are suspect because problem definition, synthesis and evaluation are continuously changing and influencing each other throughout the design process. Rather than try to imagine all the indescribable details of construction in advance, the integrated approach engages the architect's direct experience of existing conditions in the process of comparison. The real form of the building

becomes an ingredient in the comparison of actual and desired conditions much earlier here than in the sequential model (Figure 6). Through procedures for continuous on-site design improvement, much of the design development may occur in small steps in direct response to existing conditions.

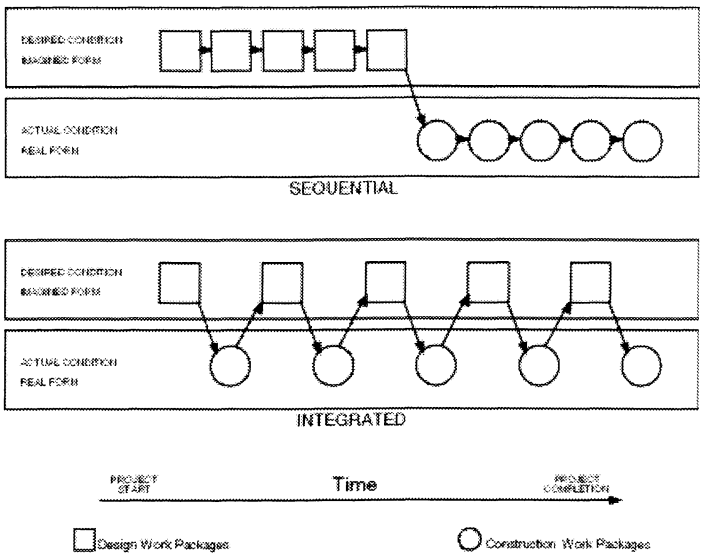


Figure 5. Relationship between design and construction work packages.

In the iterative, feedback-loop process of integrated design and construction, continuous comparison of actual and desired conditions forms the basis of each successive sub-transformation of actual conditions. The real condition of the building under construction is compared to the (current) definition of the desired end, and the next design-construction move is made based on that comparison. Many process models, on the other hand, depict comparison as concluding with the commitment to a plan (Rittel and Webber 1973). In these models, existing conditions are observed at the outset of the project in order to form a definition of actual conditions. This definition is then generally held static as design proceeds, despite the fact that actual conditions may change significantly during the months or years between a project's inception and its completion. In the alternative model, comparison is a continuous process, rather than a static decision-point. The project team is constantly comparing actual and desired conditions and redefining both.

EXPLORATION

The design problem is the discrepancy between actual and desired conditions. Exploration is the search for possible resolutions to that discrepancy. Approaches to exploration may vary greatly. At one extreme, exploration may be defined as the systematic investigation of carefully defined design variables (Ashby 1961). At the other extreme is the dictionary definition of exploration – "to search into or range over for the purpose of discovery" – an informal, open-ended approach to seeking solutions. The exploration of design alternatives is a search constrained by budget, schedule, technology, user needs, and a myriad of other considerations that act as a boundary to the area searched or problem space ranged over. An innovative solution may lead to redefinition of the desired condition - a remapping of the problem space.

Exploration in the sequential model tends toward two extremes, an "all-or-nothing" proposition. Initially, the designer explores an open problem space and is free within the limits of program and budget to return at any time to a previously resolved question and reopen it. Rittel calls this "epistemic freedom". However, once plans are complete and construction begins, the opposite extreme holds – design problems are no longer open. The design is considered complete, and the search for solutions terminated. This is not only due to the fact that commitment to construction makes redesign and rework expensive. The entire organizational and procedural structure of the system strongly discourages change to the architect's plans. Thus the two extremes – an almost entirely open problem space before construction begins, and an almost entirely closed one thereafter.

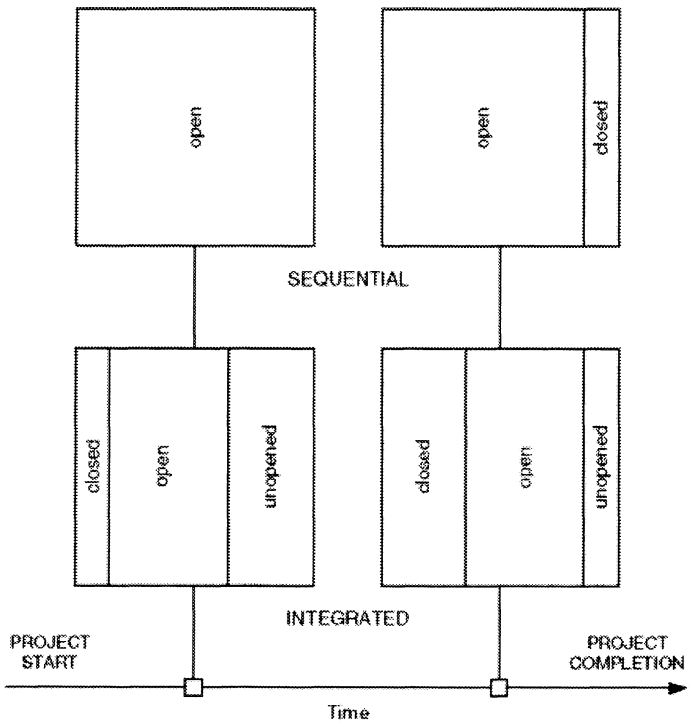


Figure 6. The "all-or-nothing" problem space of sequential process and the "mobile" problem space of integrative process

In contrast, the integrated model offers a more consistent problem space throughout the life of the project (Figure 7). Portions of the problem space close sooner due to the early commitment to construction. The footprint of the building, for example, is extremely unlikely to change once the footings are poured. With the early start of construction many design details remain unresolved, their problem space as yet unopened. As design-construction progresses, this smaller problem space shifts toward smaller details with more

design decisions closed by construction and fewer questions remaining unopened.

In the sequential model, exploration is an internal operation used by the designer. Herbert Simon, for example, describes how designers break ill-structured problems down into a series of smaller well-structured problems and move between problem spaces via "noticing and evoking mechanisms," a technique Donald Schön calls "surfacing" (Simon 1984, Schön 1983). In the integrative model, an architect working on site during construction could develop these noticing and evoking skills in order to explore design options directly on site, engaging in what Jones calls "research actions" (Jones 1984). The real structure of the building then becomes an element within the problem space and can be used as a basis for design decisions. Jones cites the problem of cost and time associated with research actions, costs not normally structured into an architect's standard fees. Research actions such as direct exploration could, however, significantly reduce the billions of dollars spent every year on change orders and rework.

DECISION

In order to move the process of transformation forward from idea to object, it is necessary to close the exploration of alternatives with a decision to commit to one plan at the exclusion of others. Decision is the commitment to a plan of action. Decisions and actions are separated into disciplines of design, construction and management in most process models. This model examines decision as an interdisciplinary process recurring throughout all phases of the project. It is important to maintain a holistic perspective on the decision-making process because decisions affecting change in one part of the project affect change in others as well.

Decision makers in an integrated process face a dilemma: since design is not complete when construction begins, some building decisions must be cast in concrete before all questions can be answered about desired conditions. The usual strategy recommended for dealing with uncertainty is to answer as many questions as possible in advance. But all the questions cannot be answered in advance, as Rittel, Schön, Simon and others have shown that desired conditions are in constant flux and can never be completely defined. Studies have found this to be the case in practice as well, where 80% of all capital projects have "significant end uncertainty" at the start of construction (Laufer 1997). Successful transformation depends on the sequence and hierarchy of decisions throughout the entire design-construction process. The essential question for transformation becomes, "Which activities must be closed when?" Leaving some design decisions open poses many challenges, but may also offer rewards.

The alternative model of transformation breaks away from the myth that all planning questions can be answered prior to the start of construction. As Forrester points out, "Symptom, action, and solution are not isolated in a linear cause-to-effect relationship, but exist in a nest of circular and interlocking structures." (Forrester 1994). The alternative model employs a feedback structure that acknowledges the interrelationship and simultaneity of many design and construction decisions. In this view, each decision point is more like a node in a matrix than a point in a line. Here, certain problem spaces are closed by construction while many others remain open. Commitment to one alternative is likely to impact other nodes in the network, resulting in redefinition of desired conditions and constraints. The gradual realization of the design idea in built form creates new information that interacts with future design decisions. In this approach, the information that results from a particular decision becomes an input to the next decision.

Continuous, as opposed to predetermined, design decision-making opens up the opportunity for on-site design decision-making during construction. It brings the decision point as close as possible to the information source for that decision. Viewed in terms of Schön's analysis of design as a conversation with the situation, the integrated approach places the designer in the same situation as the user (the building), rather than in a simulation of the user's situation (drawings). Users often have difficulty making decisions based on plans and drawings. Here, the designer's mode of experience is more in harmony with the user's.

Agreement among project teammates is greatly facilitated when dealing with actuality on site, rather than abstract representations. In *The Logic of Architecture* (1990), William Mitchell describes the different languages used by architects, builders and owners, along with the different modes of representation employed by each. Collaborative decision making (on site whenever possible) reduces reliance on intermediary media and discussion revolves around the actual structure.

INSTRUCTION

Decision is the conversion of information into action; information is the input to decision. An instruction is a defined, sharable collection of information transmitted by one party that guides the actions of another party toward a goal. It may be as simple as a "yes" or "no", or as complex as to encompass details of method, material, organization and reasoning. Instruction identifies what is to be done, who is to do it, when, where, and with what.

The nature of instruction may shift as team collocation and team work on site increase. Conventional plans and specifications are intermediary modes of representation needed to embody the architectural idea and instruct the contractor on the desired condition of finished form. In the integrated model, however, the emerging form of the building begins to play a role in the design decision system and may serve in many cases as the actual, rather than representational, basis of future instruction.

In their study of project information flows, Nicoletti and Nicolò (1998) make an important distinction between dynamic and static information flows. Static information flows clearly define inputs and outputs for precedence relationships between activities thoroughly planned in advance (as in a typical Critical Path Method diagram). Dynamic flows acknowledge the interaction of project

activities (as when activity Z cannot be entirely planned until activity Y is complete). Concurrent design and construction creates dynamic information flows. Instructions governing a particular action are likely to be based on information not available until shortly before the start of that action.

While activities cannot always be planned in advance, the architect should be able to identify dependencies between activities and prepare strategies for gathering information and disseminating instruction. Instruction for one activity may be dependent on information from another, and these information links must be prioritized and planned for. Early involvement of downstream information users helps to identify the information requirements for project activities. Finally, the size of information batches may change in the future. In contrast to the complete set of drawings handed "over-the-wall" in traditional project delivery methods, we may soon see more sets of instructions each containing less information changing hands more frequently throughout the design-construction lifecycle.

The involvement of downstream information users early in the process represents a more iterative back-and-forth flow of information and instruction than what we are accustomed to in the over-the-wall method. The question, "Who needs to know what when?" has a very different answer in a collaborative, fast-track project than in its traditional counterpart. One of the biggest problems facing the integrated project team is the diversity of disciplines that need to communicate clearly and frequently in this approach. Differences in values, goals, purposes and methods among disciplines make instruction difficult. Differences of style within each profession, and even among different positions in the same firm complicate communication even further.

TRANSFORMATION

Transformation is the directed alteration of form. Transformation of the design idea into built reality is the aim of the design-construction process. It is the crucial missing link in many design theories and methods (recall Rittel's definition that "design ends with commitment to a plan.") A comprehensive model that embodies the real-world characteristics of today's concurrently designed and built projects must incorporate the physical transformation of resources into a built object.

In sequential design-bid-build project delivery, construction can be seen as a process of conformation (to drawings and specifications laid out in advance by the architect). The model presented here is one of transformation, in which an integrated design-construction team fine-tunes the design details during construction in order to continuously improve the building. In contrast to the sequential model, which seeks to fix design details in advance and then make countless changes during construction, this alternative model of transformation can be seen as a gradual focusing of design intent based on the actual experience of the evolving structure and space on site.

A collaborative approach to transformation must address the problem of specialization. Transformation of idea into object has traditionally been the role of the contractor. In an iterative design-construction process, the architect must understand the material and method implications of design decisions. In a standard architectural contract the architect is not permitted to engage in the means and methods of construction. But as Schön (1983).points out in his analysis of reflection-in-action, true practice requires that ends and means merge in a continuous, iterative cycle.

NOTES

Christopher Alexander, "The Nature of Order," unpublished manuscript (Berkeley, CA: University of California at Berkeley, 1995).

American Institute of Architects, *The Architect's Handbook of Professional Practice* (Washington DC: AIA Press, 1985).

W. R. Ashby, *An Introduction to Cybernetics* (New York: Wiley and Sons, 1961).

John Barth, *Once Upon a Time*, (London: Hodder and Stoughton, 1994).

Jesus de la Garza et. al., "Value of Concurrent Engineering for A/E/C Industry," *Journal of Management in Engineering* May/June (1994: 46-55.

W. Edwards Deming, *Quality, Productivity, and Competitive Position* (Cambridge, MA: Center for Advanced Engineering Study, MIT, 1982).

J. Forrester, "Policies, Decisions, and Information Sources for Modeling," *Modeling for Learning Organizations*, J. M. Sterman, ed., (Productivity Press, 1994).

HBE Blueprint. "Design-Build Continues to Grow in Popularity." Volume 1, Number 1.

C. William Ibbs, "Quantitative Impacts of Project Change: Size Issues," *Journal of Construction Engineering and Management* 123(3) (1997): 308-311.

John Chris Jones, *Design Methods: Seeds of Human Futures* (New York: John Wiley and Sons, 1980).

A. Laufer, *Simultaneous Management: Managing Projects in a Dynamic Environment* (New York: American Management Association, 1997).

William J. Mitchell, *The Logic of Architecture* (Cambridge MA: MIT Press, 1990).

S. Nicoletti and F. Nicolo, "A Concurrent Engineering Decision Model: Mangement of the Project Activities Information Flows," *International Journal of Production Economics* 54 (1998): 115-127.

M. S. Puddicombe, "Designers and Contractors: Impediments to Integration," *Journal of Construction Engineering and Management* 123(3) (1997): 245-252.

Horst W. Rittel, and M. M. Webber, "Dilemmas in a General Theory of Planning," *Policy Sciences* 4 (1973): 155-169.

Donald Schön, *The Reflective Practitioner* (New York: Basic Books, 1983).

Herbert A. Simon, "The Structure of Ill-structured Problems," *Developments in Design Methodologies*, N. Cross, ed. (New York: John Wiley and Sons, 1984).

PEDAGOGY

Moderator: Patricia Kucker, University of Virginia

A Case for Pedagogical Praxis

PHOEBE CRISMAN
University of Virginia

Learning to Forget:

Architectural Recreation, Spatial Visualization, and Imaging the Unseen

EUGENIA VICTORIA ELLIS
Drexel University

Pedagogy Plus Practice:

Engaging Boston's Housing Crisis in the Design Studio

PETER H. WIEDERSPAHN
Northeastern University

Beyond the Edge:

Design Projects & Pedagogy that Encourages Students to Become Actively Engaged with the Environment Surrounding Their Project

BRIAN KLINKHAMMER
JAMES V. STRUEBER
Tuskegee University

A Case for Pedagogical Praxis

PHOEBE CRISMAN
University of Virginia

Writing from the position of both architectural practitioner and educator, I will approach the session theme of praxis on two fronts. An initial analysis of the relationship between changing conceptions of both architectural education and practice will locate my own position on praxis. Although this specific understanding of praxis does not match the standard dictionary definition, it is certainly shared by many in the architectural discipline.[1] The current usage of "architectural praxis" commonly refers to a practice *informed* by theory, rather than merely "the practice of a technical subject or art, as opposed to or arising out of the theory of it."[2] By expanding this one-way relationship into one that is reciprocal, theory is considered as a basis for action, and action is examined as a theory-producing act. Through my own pedagogical praxis—the design of two "theory" courses—I have applied a theoretical position on architectural praxis, which insists that theoretical and applied knowledge are inextricably linked and should be taught as such. Thus, students enrolled in these Architecture Theory courses both read texts and studied projects frequently created by the same architect. Given the current backlash against an increasing autonomous and singular version of theory, these courses seek to open a discussion within the academy on the role of contingent and even useful architectural theory as an integral navigational component in architectural education and ultimately professional practice.

ARCHITECTURE: EDUCATION + PRACTICE

An appropriate means by which to analyze the link between education and practice might be through a series of difficult questions. The Praxis session statement posed the pointed query, "What must an architect learn in order to practice the craft, *however it may be defined?*"[3] A response to this question requires a definition of disciplinary boundaries both inside and outside the academy—limits that are constantly shifting due to complex societal changes. These ongoing modifications, sometimes termed an "architectural identity crisis," are part of a current re-evaluation of architecture in all its manifestations. While some analyses are judicious in tone, such as Robert Gutman's *Architectural Practice: A Critical View*,[4] and the "*Boyer Report*,"[5] many articles in the popular press, such as "Can this Profession be Saved?,"[6] portray a truly alarming state of affairs. Is there actually a disciplinary crisis in architecture, or is the "crisis" more media hype and architectural pessimism? Are these publications symptomatic of a serious condition, or are they merely fabricating an exquisite corpse for dissection? Undoubtedly our social referents and frames are rapidly changing, and architecture is changing as well. Although radical shifts are also occurring in most professions, within the university disciplinary structure, and in society in general, the ongoing changes in architecture are frequently discussed as problematic and particular to the discipline. Perhaps this is a result of the common view that architecture exists outside of the global and local economic, political, and socio-cultural structures.

This perceived architectural autonomy creates a two-fold problem. Architects are assumed to have the power to radically transform the profession and the built environment, if only they were committed to "building community" and promoting the public good. Unfortunately, as much as architects might champion these noble goals, their effectiveness is limited without the simultaneous commitment of clients, citizens and governmental agencies. Public education that promotes a heightened awareness of architectural and environmental issues promotes positive change in this regard. On the other hand, architecture students and practitioners are often inadequately informed about broader issues such as ecological impact, political and economic power structures, and costs and benefits to society. Rather than view change as problematic, we should encourage forms of practice, pedagogy and theoretical research that embrace new potentials for creative collaborations.

If both education and practice must be open to change, how might this impact their relationship–one that has recently been discussed as fragmented, unclear and even oppositional. Two common positions in this regard oppose architectural education as the study of the discipline of architecture, with architectural education as practical training for future professional architects.[7] The most extreme manifestations would either transform professional education into a lengthily liberal arts degree or a technical school curriculum.[8] As always there is a difficult balance between specific content (knowing what) and applied knowledge (knowing how). Rather than falling back on an outmoded dialectic and agonizing over the theoretical/applied knowledge balance, however, a more complex concept of praxis might address this issue.

Just as the academy prepares students to manage the "practical" complexities of architectural practice, students should also be introduced to an integrated conception of practice that includes theory and ethics as essential components—not theory as an inflexible grand narrative, but knowledge of how others have grounded their work, and a critical self-awareness of their own bases for action. Architectural theory courses are an ideal means to develop students' cultural awareness, critical thinking abilities, and a sense of responsibility for the physical environment. In as much as architecture is a social and political act, however, it is also the tectonic act of making a precise artifact. A high level of specialized knowledge and technique is necessary in order to conceptualize and implement a precise physical condition. Peter Rowe has described this particular combination of problem solving and "tectonic imagining"—the capacity to see a project and place it somewhere, as "design thinking."[9] Informed by theory, design thinking is the method that architects employ to cope with the rapidly changing and diverse knowledge required in practice, where each project involves a new set of variables—such as evolving construction technology, unprecedented building types, and diverse climatic conditions. The *Boyer Report* asserts that architects are excellent "life-long learners"—this by necessity as well as desire. Perhaps it is the ability for informed and creative learning, the praxis of exploration, which ultimately distinguishes architectural education and practice.

A convergence of recent societal trends, three in particular, has placed architecture in a powerful position to influence positive change through design insight—an insight that should be fostered in the academy and practiced professionally. Greater public concern and ethical responsibility for the environment, sustainability as an organizing concept for this concern, and the increasing importance of images in communication, together create a favorable situation for design innovation. Architects and educators are well placed to act as advocates for public environmental concern, especially given that "the public demand for environmental improvement is consistently ahead of governmental, business and regulatory response."[10] Private sector clients, even if not personally committed, will begin to respond to the demand for sustainable architectural environments. Just as there was widespread public concern at the turn of the century for public health and related urban and architectural innovations, contemporary environmental issues could be a similar impetus for change. Architects must meet the challenge with creativity, a strong theoretical basis, and technical expertise. Unfortunately, many architecture programs do not adequately engage these environmental concerns. Theory courses, in concert with professional practice, technology and design studio classes, must collaborate to address these pressing issues.

In addition to the above two intertwined subjects, the third potential lies in the architect's role as image-maker. The last ten years have seen a powerful shift to more images and fewer words within our culture. Rather than lament this increasing image dependency, Andrew Saint suggests, "the long-term challenge for the architectural profession...is to ride this exciting, undisciplined, licentious, and dangerous beast, to control this irresponsible lust for image that pervades our culture. Architecture is a visual thing, and cannot fail to benefit from that unstoppable urge."[11] The potential for new image-based media in design and representation, even production techniques, should be embraced in both theory and practice. In addition, theory is one of the most powerful means within the architectural curriculum to critically examine the limitations and dangers of the image.[12]

In summary, these three major societal changes could give architects stronger support in their role of shaping the physical environment. Architects' skill in creative vision and visual communication position them well in an increasingly image-based society. To this end, architectural education must promote both theoretically informed critical insight, and the practical ability to conceive and make visions real. This requires that architectural education broaden its horizons to provide students with a theoretical understanding of the interdependent disciplines of landscape, urbanism and architecture, and related ethical, social, political and environmental issues. All this theoretical learning is necessary, while still emphasizing the specific architectural design skills that ultimately define the architect's discipline, since a theoretical apprehension of the world and its critical application to architecture is one of the architect's most powerful means to conceptualize the unbuilt. Most important, however, is that the reciprocity between theoretical and applied knowledge is constantly discussed and demonstrated across the curriculum, lest students proceed into professional practice with a polarized understanding of our richly interwoven discipline.

PRAXIS: THEORY + PRACTICE

These thoughts on architectural education and practice have supported specific pedagogical strategies to engage praxis in the architecture curriculum. Although the synthetic role of studio pedagogy is frequently cited, the crucial role of architectural theory is rarely discussed. Currently many architecture departments are negatively reacting to theory in general, based on a particularly prevalent, but singular strain of linguistically based, continental theory. Given this backlash against an architectural theory increasingly autonomous from architectural design and practice, my objective is to redefine and reposition theory within the architecture curriculum. This proposed conception of praxis requires moving architectural theory from self-imposed exile into an integrated position. If the design studio (in education) and the architectural project (in practice) occupies the central position of synthesis, then architectural theory would form a permeable layer immediately surrounding this core. The multiple spheres of knowledge that inform the core would filter through this theoretical layer–*in both directions*. If one were to make a planetary analogy, an atmosphere of architectural thinking and a stratosphere of architectural theory would surround the earth—the site of action. This integral conception of "praxis" has guided the structure and content of two "theory" courses that I have developed and taught in the last three years. These courses seek to open a discussion within the school on the crucial role of theory in architectural education, and emphasize the importance of establishing a reciprocal relationship between theory and design practice.

At this moment, others are also working to bridge the gap between theory and practice–a particularly wide gap in North American architecture culture. For example, a recent periodical brochure proclaims, "*UME* gets behind the image to where the ideas are."[13] The first editorial statement for the newly founded journal *Praxis* identifies the aforementioned gap. "As students recently immersed in academic culture, we discovered that the majority of American architectural publications represented contemporary work either through theoretical texts, with an often tenuous relation to built or buildable projects, or through unsubstantiated images with little critical or conceptual discussion. We wondered why architectural writing and building were presented as independent investigations when we understood them as co-dependent."[14] This false dichotomy is largely due to the desire for validation by, and the importation of research method from, other disciplines. A concise statement of this problem is found in Mark Linder's essay, "Architectural Theory is No Discipline." "As it is usually understood, architectural theory is not a theory that is architectural, but is an attempt to make architecture theoretical. But it seems that being theoretical means to borrow the 'discipline' of the scientist or the philosopher, and while this may be enlightening or potentially very sophisticated, it ignores the fact that architecture does not share all the features of philosophy or science."[15] For those engaged in architectural research, this divide between architecture and science is a condition of which we are well aware. Rather than lamenting the disconnected state of architectural theory, I have attempted to make a case for praxis–to put my theory into practice–in the design and teaching of the following courses.

PEDAGOGICAL PRAXIS: 2 THEORY COURSES

An elective graduate seminar taught at the University of Wisconsin in the 1999 and 2000 spring semesters, entitled *Architecture + Urbanism: Theory + Practice*, considered the two interrelated issues of disciplinary boundaries and praxis. We questioned the boundaries of architectonic activity within the city, probed architecture's potential to shape public and private urban spaces, and examined how theories and practices coexist. As a basis for these investigations, we studied significant architectural and urban theories, practice strategies, and design projects developed from the 1960's to the present. Students were extremely enthusiastic about the investigation and creative in their individual speculations and projects. While the seminar format was a perfect venue for this inquiry, a greater pedagogical challenge and perhaps more significant curricular impact occurred while introducing similar issues in the redesign of a large enrollment Theory course.

Architectural Theory and Analysis, a required lecture course for third-year students in the Bachelor of Science in Architectural Studies program, has had a long and varied history in the University of Virginia curriculum. A previous manifestation was organized around major philosophical movements that only tangentially related to the making of architecture. As stated in the objectives of that course, "architectural theory acts as a critical discourse *parallel* to practice, as its conscience and provocation."[16] Although the course was challenging and diverse in content, departmental faculty were concerned with the difficulty that students experienced in linking this parallel discourse with other aspects of the architecture curriculum. The restructuring of the Fall 2000 course format questioned how complex theoretical issues might be considered *within* the discipline of architecture. The concept of praxis—in the sense of practice informed by theory, and theory informed by practice–became the central focus.

We began with Vittorio Gregotti's proposal that, "...one must insist on theoretical research as a direct foundation for action. This means, in our case, as material for the artistic practice of architecture."[17] Rather than chronologically structuring the course around major philosophical or cultural theory positions, specific architectural concepts were examined and related to theoretical positions. Theories of site, the place of use: relations between form and function, and tectonics and making are a few lecture examples. Exemplary projects were examined not to "illustrate theories,"[18] but as a grounding for discussion and analysis. Initial lectures and readings introduced diverse and clearly articulated positions on the relationship of theory and practice. Concurrently, students were asked to "propose your own Architectural Manifesto, which concisely states the main intentions, values and goals of your current architecture position." Given only one day and one 11"x17" page, students produced a rich array of positions, including a complete rejection of theory, "An Entirely Noncommittal Manifesto," a call for "Acceptable Ambiguity," an argument for environmental sustainability in "Natural Archishelter," and "A Manifesto on the Virtue of a Messy Desk: Begin with Abundance." Through a class review of the sixty-five manifestos and the assigned readings, students debated and proposed a range of possibilities for praxis. For example, they were intrigued by Bernard Tschumi's statement that, "in architecture, concepts can either precede or follow projects or buildings. In other words, a theoretical concept may be either *applied* to a project or *derived* from it. Quite often this distinction cannot be made so clearly."[19] The students were particularly interested in theoretical writing by practitioners that emphasized the reciprocity between design and ideas. For instance, while reflecting on her dual role as architect and theoretician in *Architecture from Without*, Diana Agrest posited that architects could work in both the critical and normative registers. "Criticism is developed from questions for which we have no answers, from a first how to a why, a why that makes us bridge those two kinds of discourses."[20] During the course of our investigation, we also sought to proceed from the "why" back again to the "how." A series of lectures under the heading, *Making: building specificity*, investigated theories emerging *from* the "how" of architecture. The work of Carlo Scarpa, Steven Holl and a number of contemporary Swiss architects were examined. Peter Zumthor's buildings and writings were considered in light of his statement that "there are no ideas except in things."[21] Thus, theory was not only presented as a search for truth or epistemological answers, but as operative and contingent on the specifics of architectural making.

Ultimately, the students enthusiastically confronted the creative possibilities inherent in the relationship between theoretical speculation and the apparent constraints of architectural design and

practice. Weekly discussion sections were subdivided along studio lines, so that studio and theory conversations would overlap, and they did. In addition to leading discussion sessions, Graduate Teaching Assistants also participated in their students' studio reviews. Studio instructors frequently mentioned the significant impact that theory readings and lectures were having on studio discussion and design work, and the reverse was certainly true for the theory sections. Thus, the reciprocal relationship that I sought to foster was taking effect, even if many students initially rejected the possibility or even desirability of "praxis." By the end of the semester, students voiced and conveyed opinions in course evaluations that communicated the connectedness of theory to their design thinking, studio work and other classes. One student wrote that "the class was very helpful in learning how to understand theory and how to translate ideas from concepts to built form. It has clarified the need for theory and the nature of architecture in general...I especially feel that it has helped me in other classes as well." Others commented on their changed understanding of the relationship between theory and practice. For instance, "this course did a good job at explaining architecture theories and explaining how they correspond to buildings. It has helped to clarify what these theories mean to the practice of architecture."[22] Rather than willingly perpetuate the tired dialectic between theory and practice, students speculated on the reconceptualization of architectural praxis.

This new understanding of praxis is informing the students' work in my current studio, whose members all participated in the previous *Architectural Theory and Analysis* class. Our discussions in reviews and individual desk critiques may now draw on specific theoretical knowledge and speculative ability. We are using two important written devices, the statement of intent and review response, to clarify conceptual intentions and reflect upon the individual process of design thinking and making. Based on my experience with these methods in past studios, students have consistently improved their conceptual project investigations and critical abilities. An initial reluctance to engage in simultaneous written and visual studio investigations disappears as students develop confidence in their design intentions, and their multiple means of communicating intentions. In the course of studio discussions, we also observed how theoretical concepts were addressed in the project review process. Although critics never literally proclaimed, "What is your theory?" questions such as "What's your big idea?" or "Why are you doing what you're doing?" were definitely searching for the underlying theoretical basis of a project. Until our discussions, most students had not understood such inquiries as having anything to do with "theory." Although this point seems absurdly obvious, I believe it exemplifies the problem of a "parallel" theoretical discourse. I am not suggesting that the sophistication of a third-year student's design intentions can be equated with the complexity of our theory class readings; however, the reservation of the word "theory" for only rarified epistemological arguments precludes the generation of truly architectural theories. If theory is necessary as a means of providing frameworks for understanding and acting within the world, we cannot impose tight limitations that disregard the value of working and contingent theories of architecture.

CONCLUSION

Designing and teaching these courses have permitted me to both "put into practice" my emerging theory of praxis, and observe the results within the broader architecture curriculum. The establishment of a reciprocal relationship between theoretical and applied knowledge, a condition that many support but rarely engender in the academy, appears to be a feasible means for bridging the gap, or even removing the distinction, between these frequently opposed forms of knowledge. The concept of praxis would be carried with students beyond the academy and into professional practice. Thus, they would be better prepared to critically engage societal changes and ethical considerations, and finally to formulate their own clearly articulated theory for action.

NOTES

[1]This is evident in many recent publications, such as the title and intentions of Bernard Tschumi's 1994 book, *Event-Cities (Praxis)*. In his introduction, Tschumi states that the book "is about 'praxis' insofar as it documents the elaboration of a conceptual process that is inseparable from the actual making of architecture." Stan Allen uses the term "project" with similar meaning in his essay, "Practice vs Project," *Praxis*, issue 0, vol.1 (Fall 1999): 112-123.

[2]First definition from *The New Shorter Oxford English Dictionary* (Oxford: Clarendon Press, 1993).

[3]Emphasis added to quotation.

[4]For a statistically based sociological study of the state of the US architecture profession in the late 1980's, see Robert Gutman, *Architectural Practice: A Critical View* (Princeton: Princeton Architectural Press, 1988).

[5]Ernest Boyer and Lee Mitgang, *Building Community: A New Future for Architectural Education and Practice* (Princeton: Carnegie Foundation for the Advancement of Teaching, 1996). This study was commissioned by five national architecture organizations: ACSA, NAAB, NCARB, AIA, and AIAS. For an insightful critique of the Boyer Report and counter-proposal, see Robert Segrest, "The Architecture of Architectural Education," *Assemblage* 33 (August 1997): 76-80.

[6]Thomas Fisher, "Can this profession be saved?" *Progressive Architecture* (February 1994): 44-49. Also see Michael J. Crosbie, "The Schools: How They're Failing the Profession," *Progressive Architecture* (September 1995).

[7]For an insightful examination of the concept of the architectural discipline, see Carol Burns, "Professional Education and Practice. The Current Crisis: an Approach to Alignment," *GSD News* (Winter/Spring 1996): 4-6.

[8]This position has many facets, with some concerned about the perceived inward focus of architecture, while others question the dominance of studio. Critiques of studio pedagogy as inherently gender-biased, and concerns about the "hidden curriculum" challenge the model of integrative learning highly praised by the "Boyer Report," Donald Schön, and others. For an examination of the "hidden curriculum," see Thomas A. Dutton, "The Hidden Curriculum and the Design Studio," *Voices in Architectural Education* (New York: Bergin and Garvey, 1991): 167. Donald Schön discusses the highly positive aspects of the studio model in his essay, "The Architectural Studio as an Exemplar of Education for Reflection-in-Action," *JAE* 38/1 (Fall 1994): 2-8.

[9]Peter Rowe, *Design Thinking* (Cambridge: The MIT Press, 1987).

[10]Boyer: 21.

[11]Andrew Saint, "Architecture as Image: Can We Rein In this New Beast?" in William S. Saunders (ed.), *Reflections on Architectural Practices in the Nineties* (New York: Princeton Architectural Press, 1996): 19.

[12]For a discussion of potential threats to architecture by the image, see Neil Leach, *The Anaesthetics of Architecture* (Cambridge: The MIT Press, 1999).

[13]Quote taken from *UME*'s subscription brochure. *UME* edited and published by Haig Beck and Jackie Cooper at The University of Melbourne, Australia.

[14]Amanda Reeser and Ashley Schafer (eds.), "Defining Praxis," *Praxis*, issue 0, vol.1 (Fall 1999): 6.

[15]Mark Linder, "Architectural Theory is No Discipline," *Strategies in Architectural Thinking*. John Whiteman, Jeffrey Kipnis, Richard Burdett (eds.), (Cambridge: The MIT Press, 1992): 167.

[16]"Parallel" italics added. Excerpt from ARCH 308: *Architectural Theory and Ethics* syllabus 1997 taught by Kate Nesbitt at the University of Virginia.

[17]Vittorio Gregotti, "The Necessity of Theory," *Casabella* 494 (September 1983): 13.

[18]See Bernard Tschumi's discussion of "one of the great characteristics of architectural work: you can also think through it." *Architecture and Disjunction* (Cambridge: The MIT Press, 1996): 18.

[19]Tschumi: 19.

[20]Diana Agrest, *Architecture from Without: Theoretical Framings for a Critical Practice* (Cambridge: The MIT Press, 1991): 1.

[21]Peter Zumthor, "The Hard Core of Beauty," *Thinking Architecture* (Basel: Birkhauser, 1999): 34.

[22]Anonymous student evaluation comments from the Fall 2000 semester. The following are a few other examples of this shift. "This course was very relevant toward my design thinking, especially in the ideas I gained from the various designs I was exposed to. The course also taught me to think more clearly in the area of architectural theory, and added a new dimension to my architectural understanding." "This course was very relevant. I feel that my design process was enriched a great deal because of the ideas and works that were presented."

Learning to Forget:
Architectural Recreation, Spatial Visualization, and Imaging the Unseen

EUGENIA VICTORIA ELLIS
Drexel University

LEARNING THROUGH PLAY AND RE-CREATION

> *The subject of this article is a very ordinary hobby horse... It is satisfied with its broomstick body and its crudely carved head which just indicates the upper end and serves as a holder for the reins... The hobby horse does not portray our idea of horse... The "first" hobby horse was probably no image [of a horse] at all. Just a stick which qualified as a horse because one could ride on it... It needed two conditions, then, to turn a stick into our hobby horse: first, that its form made it just possible to ride on it; secondly—and perhaps decisively—that riding mattered.*
>
> *—E. H. Gombrich, "Meditations on a Hobby Horse or the Roots of Artistic Form"*

Does the architecture student in the Age of Information need to learn to draw, make models, or even visit sites of significant works of architecture? That is the question facing architectural educators globally. After all, the world is at our fingertips visually at the touch of a computer keyboard and the click of a mouse. Since nearly all information is accessible to everyone, would it not be possible for students to learn all they needed to know about architecture and design through accessing and manipulating the visual output of the computer screen?

A similar question faces educators at all levels of learning, beginning with the early childhood years. The answers teachers at the early childhood level are finding is that the development of the child's motor skills directly affect the development of a child's cognitive skills, and vice versa, which is why so much emphasis is placed on indoor space that can provide for a variety of activities, playground equipment that can explore the workings of the world, and outdoor space to accommodate different forms of bodily movement (walking, running, bike riding). It has also been discovered that the foundations for learning at this level provide the platform for future learning, referred to by Jean Piaget as "schemas."

Architectural knowledge, too, is acquired on several different levels through the experiential: drawing, modeling and visiting notable works of architecture, for example. The following will be a discussion of an architectural pedagogy in the light of the experience of several different early childhood educators. This studio teaching is based on design as a transformative *process*, as opposed to design as a product, or end result. This process emphasizes skills building and the craft of making drawings and models in order to provide the foundation for the design of future projects, very similar in intent to Piaget's schemas. This design teaching methodology can be compared to child's play and is based upon a type of architectural recreation that teaches students to forget, to leave behind what they already know, in order to develop the skills that will allow them to visualize spatially and imagine constructions they have never seen before.

Children learn through play, through re-creating situations and events. While playing, children forget themselves, time is suspended, and mind, body and emotions work together simultaneously in the child's re-creations. The child at play creates his or her own intelligence by puzzling out the differences between what the child already knows with the reality of everyday living. The child constantly updates what is known by hanging new information on previous pieces of knowledge, building a framework of mental hooks that combines to form the child's cognitive structure. The bigger the mental scaffolding and the stronger the hooks, the more that can be remembered with each new experience. Schemas can be explained, but without personal experience the words will fall off the incomplete mental hooks.[1]

Patterns are key to learning. In order to pattern information, new information needs to be organized and attached to previously developed mental hooks. Instruction passively received and automatic learning such as memorization, are less effective tools for learning than creating patterns of meaning through experiential activities. For example, dance or carpentry are kinesthetic types of learning that can only be acquired through practice, or repetition, which involves the imitation of the movements themselves by moving the body through the complete range of motion required for the activity to be learned. This type of kinesthetic knowledge cannot be intellectualized by observation alone and then become an embodied knowledge of physical movement. The same logic applies to the relationship between drawing and seeing.

The moving body lays the neural path in the brain.[2] This has been demonstrated in laboratory studies with animals. For example, in one study two identical twin kittens were raised together in a box that had an apparatus rigged to stimulate their developing visual

systems. One kitten pulled the other kitten around in a cart. They both received the same visual stimulus, however, the active kitten developed more neural connections.[3]

It is true that we begin losing brain cells from the moment we are born, however it is not the number of brain cells lost that counts, but the quality of the cell itself. Brain cells grow in two ways: 1) as neurons are stimulated, synapses grow stronger and the dendrites receiving their messages branch out, growing larger and heavier; 2) the long axons over which these messages travel develop protective coatings of myelin, making chemical transmission more efficient. The immature neuron at birth has little myelin present, and not until twenty or thirty years is the process finished. The brain develops from the base of the skull at the cerebellum where the occipital lobe (seat of vision) is, moving forward to the pre-frontal cortex where higher level thinking occurs, which is also the last part of the brain to fully develop.[4]

The cerebral cortex is the key to meaningful memory because it receives incoming information and associates it with previous experience. There are two types of memory: 1) implicit memory, which happens without conscious attention and is particularly useful for storing background information about space and time; and 2) explicit memory, which requires conscious attention and is associated with more specific learning experiences. As skills are learned and practiced through explicit, conscious learning, they may become more implicit or automatic, freeing up the working memory for new learning. Implicit, automatic memory appears to be facilitated by the sensory and motor systems of the brain, which probably explains why teaching that engages many senses works better than a primarily abstract approach through the sense of vision alone. Motor memory pathways are built by repeating patterns of bodily movement. The most effective method of remembering is to associate new information with previous knowledge; however, it requires a cognitive framework with many "hooks," which are acquired only through active thinking and learning about the world.[5]

The imaginative play of re-creation can best be explained through the analogy of E. H. Gombrich's "hobby horse." The hobby horse is not an image of a horse: it is a horse's head on a stick. In play, the child does not confuse the hobby horse with a real horse; it merely acts as a substitute for a horse in that it fulfills the child's desire to *ride*. In representing a horse, the hobby horse is not imitating a horse by reproducing its exact image, but is allowing for the function of riding.[6] Mimetic imitation is a play of imagination, in the sense of to *show* or to demonstrate, and is not an attempt to approach an original by copying its image. When children *play* at being someone else, they re-create, they imitate an action; they do not see themselves as a substitute for, but as a re-presentation of the subject of their imitation.[7] In re-creating situations and events, the child actively learns about the world and builds a cognitive framework for future learning endeavors.

RATIONAL MIND / METAPHORIC MIND

> *Imagination does not merely* schematize *the predicative assimilation between terms by its synthetic insight into similarities nor does it merely* picture *the sense thanks to the display of images aroused and controlled by the cognitive process. Rather, it contributes concretely to the* epoché *of ordinary reference and to the* projection *of new possibilities of redescribing the world.*
>
> —*Paul Ricoeur, "The Metaphorical Process as Cognition, Imagination, and Feeling"*

Drawing is recreation, a re-creation of what is seen through the eyes of its creator, and carries with it its maker's interpretation of what has been seen. In his book, the *Natural Way to Draw*, Kimon Nicolaïdes, teaches drawing through the notion of touching with the eye. In re-creating what is seen through drawing, Nicolaïdes emphasizes the experiential and emotive aspects of re-presenting what is seen with the eye by fusing visuality with embodiment. He identifies two types of drawing, the contour and the gesture (figure 3). In contour drawing, one draws by imagining the point of the pencil actually touching the model and, without looking at the paper, moving the pencil along the paper at the same rate as the eye travels along the model's contour. While drawing, one maintains the conviction that the pencil point is actually *touching* the contour. In this instance, Nicolaïdes' contour drawing is produced by an optical type of vision that merges with the haptic by visually reaching out and touching the drawing's subject.

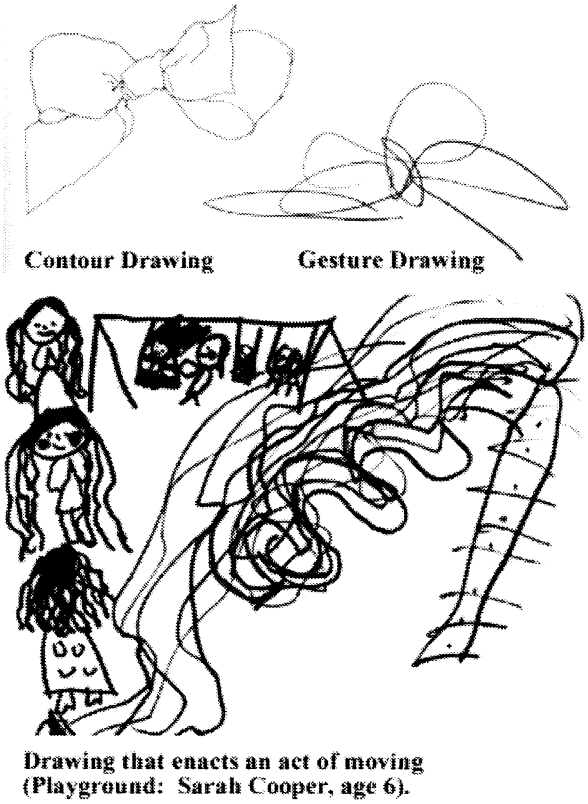


Figure 1. The Contour Drawing, the Gesture Drawing and Drawing that enacts an act of moving (Playground: Sarah Cooper, age 6).

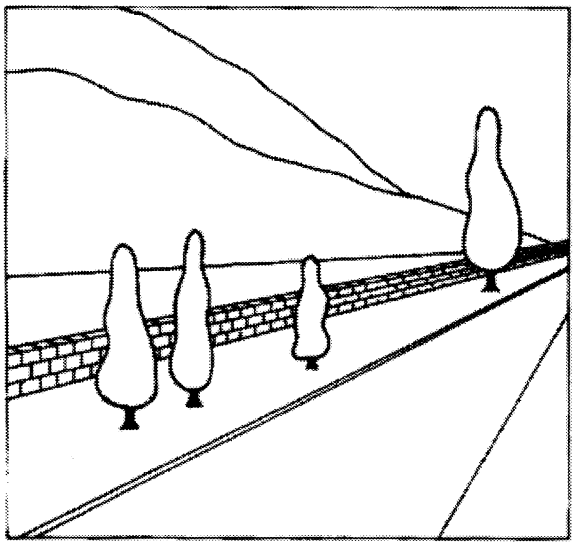
On the other hand, gesture drawing is a mimetic imitation that draws not what the thing looks like, nor even what it is, but what it is doing. In order to accomplish this, the artist must have an empathetic response with the subject in order to be able to *see* the gesture: the gesture must be *felt* within the artist's own body. In contour drawing the eye touches the outlines of the model, in gesture drawing the movement of the form itself becomes embodied within the artist.[9] One type of drawing outlines its subject, the other captures its essence. One type of drawing is the drawing of a blind person, an imagination based upon touching; the other is analogous to child's play, an imaginative re-creation based upon mimetic imitation.

Betty Edwards is an artist and an art teacher who always wondered why so many adults draw like ten-year-olds. In answer to her question, she ventured into a study of the growth and development of the human brain. She discovered that although both hemispheres of the brain develop equally, each side of the brain allows us to "think" in a different way (figure 4).[10] The left side is the rational mind; it is logical and linear and allows us to identify things through *naming* the parts. The right side is the metaphoric mind; it is intuitive and spatial and allows us to visualize things through *imaging* the whole. The left side keeps track of the passage of time and allows for sequencing, whereas the right side suspends time and allows for the simultaneity found in a child's recreations.[11] In our culture, the left side of the brain seems to dominate and by the age of ten the mind's symbolic and logic structures have become so fully developed as to begin to override conceptual and analogical thinking.

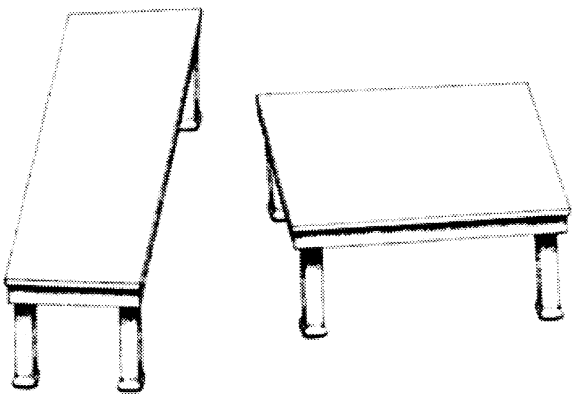
In analyzing drawings of her students from all age groups, Betty Edwards discovered that young artists before the age of ten composed their drawings to fill the whole sheet of paper. These drawings were experiential and generally were about capturing an event or activity (figure 1). However, she discovered that after about the age of ten, young artists were more concerned with drawing things as they "really are." Their drawings generally were composed with a single image set squarely in the middle of the paper. However, because of the maturation of their symbolic and logic structures that tell them what things *should* look like, some young artists were unable to really "see" things as they were, and, therefore, unable to draw what they really saw. Frustrated, these artists would give up and pursue other interests.

The consolidation of specific functions into one hemisphere of the brain or the other progresses gradually through the childhood years, paralleling the acquisition of language skills and the symbols of childhood art. By age ten the verbal left hemisphere is dominant and names and symbols begin to overpower spatial, holistic perception.[12] In *Drawing on the Right Side of the Brain*, Betty Edwards demonstrates techniques that allow students to leave the rational mind of the verbal left hemisphere behind in order to develop the potential of the metaphoric mind of the analogical right hemisphere.

The left hemisphere of the brain has a penchant for recognizing, naming and categorizing things.[13] The right hemisphere is specialized for the recognition of faces.[14] For example, an upside-down image of a face is unrecognizable. The dominant left side of the brain will search and search for recognition by looking at the image's individual attributes in an attempt to piece together the whole, like words comprising a sentence, and unable to do so, gives up. When the image is reoriented, the face becomes immediately recognizable. Her techniques teach students how to forget and how to leave behind those formal logic structures, which are cultivated in an educational system that neglects the nonverbal form of the intellect in favor of verbal, rational, on-time modes of thinking.[15] She teaches students not to name the parts as they draw and how to become so absorbed in their work that they lose track of time, like a child at play. The type of drawing she teaches is "by hand" and not the mechanical type. Linear perspective, for example, is left-brained because it relies on a left-brained type of processing: analysis, counting, logical cogitation, propositional thinking, mental calculations.[16] Because perspective fits into a symbolic structure, drawings like those in Figure 2 "fool the eye:" actually the two large trees and the two table tops are the same size. Again, the truth is revealed by turning the figures upside-down; or for the truly rational-minded non-believer, tracing one image and placing it on top of the other.



Place of Proportion



Turning the Tables

Figure 2. The Place of Proportion and Turning the Tables.

In his book, *The Metaphoric Mind*, Bob Samples identifies the two hemispheres of the brain as the rational mind and the metaphoric mind. He has found that the reason each hemisphere has become specialized is the result of the process of acculturation, with language having the dominating influence in affecting the workings of the rational mind.[17] He distinguishes between these two types of minds through the allegory of the Hopi Indian, whose language is cyclical, and the English-speaking person, whose language is linear. They both are watching someone running. When the person is no longer in sight, the English speaking person says "He ran away." The Hopi says, "He runs in my memory."[18]

According to Samples, language affects mind function. If language operates cyclically, then it is more metaphoric in intent and more likely to nurture the functioning of the metaphoric mind. If the language has a built-in bias toward abstraction, then the rational mind will be favored.[19] Samples has identified four metaphoric modes: symbolic, synergic-comparative, inventive and integrative. The symbolic metaphor exists whenever a symbol, either abstract or visual, is substituted for some object, process, or condition. Abstract symbols include letters of the alphabet, numerals, and mathematical symbols, whereas visual symbols would be trademarks, road signs, and logos. Both categories have a visual component, but the abstract is primarily processed in the left hemisphere and the visual is more compatible with the right hemisphere.[20]

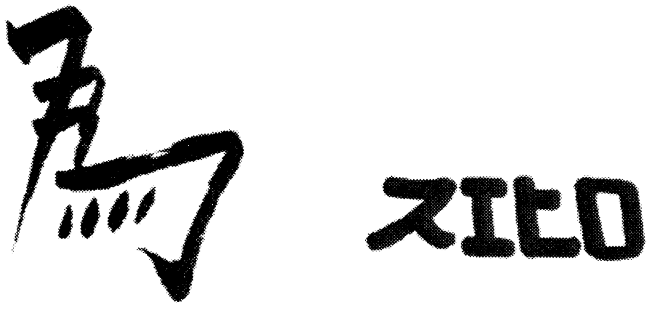


Figure 3. Kanji Ideogram and Katakana Symbols.

For example, the original Japanese language is written by using Kanji ideograms (figure 3). These visual symbolic Kanji metaphors are portraits of ideas that give no clues as to how they should be pronounced. Thus to learn them one must use the entire image as a holistic cue system which portrays the meaning. The psychological process is similar to the way people recognize a face. They see the whole face and do not concentrate on the parts. The Japanese developed Katakana in order to more easily communicate technical and scientific terms (figure 3). It is an abstract language form that creates abstract images of sounds. The Katakana symbols do not represent things, but the collection of sounds they portray is understood as the label of an object, process or condition. Left hemisphere stroke victims often survive with aphasia, or the inability to read or write. In Japanese-speaking people, the inability to read or write was only with the Katakana alphabet, the abstract symbolic alphabet, but survivors could still read and write in Kanji, the visual symbolic system.

Synergic-comparative metaphors always extend the network of possibilities in thinking and in this mode the mind discovers relationships in situations external to itself. This is the mind's most objective mode.

The integrative metaphoric mode occurs when the physical and psychic attributes of the person involved extend into direct experience with objects, processes, and conditions outside themselves. One's entire body—mind, emotions, sexuality—transcends the rational compartmentalization of objective states and approaches a meditative state whereby the thought process is entirely absorbed in the object, process or condition. This occurs when one is lost in thought, or a child is playing. The integrative metaphoric mode tends to get people into a much higher awareness level than any rational mode accomplishes.

The inventive metaphoric mode is an action that occurs whenever a person creates a new level of awareness of knowing as the result of self-initiated exploration of objects, processes, or conditions. When the inventive qualities of the metaphoric mind are operative, all the formal and informal knowings of both the left and right cerebral hemispheres are engaged. When the inventive mode is functioning, a total synergic kind of knowing evolves. Exploration has the quality of a dream.[21]

Humans use the entire body as a medium of experience to apprehend the world around themselves. The world is most often experienced objectively and rationally, two levels at a time—either emotionally and intellectually, sexually and emotionally, or sexually and intellectually. If one were to imagine the triad of intellectuality, emotionality and sexuality as the base of a tetrahedron, then the plane of human experience would generally occur on one of its faces. When lost in thought, when vision is turned inward and becomes blind to the world outside, one's entire body—intellect, soul and sexuality—transcends the rational and approaches a meditative state where intellectuality, emotionality, and sexuality are merged into an inseparable unity. Imagine the triangular base of the tetrahedron moving upward towards its vertex: the process of which is a four-dimensional movement toward the tetrahedron's point of unity.

According to Samples the fourth dimension is when intellectuality, emotionality, and sexuality merge into a unity that defies separation. This is when the metaphoric mind is acknowledged, accepted, and celebrated, and there is no longer a distinction between rational and metaphoric minds, there is only mind. This kind of sensation is spiritual. And spirituality is the fourth dimension of the emotional, intellectual, sexual triad.[22] This state of mind is intuitional: sensations lose their individuality and cannot be named, however, together they can be imagined in a new light by looking inward through a window into the fourth dimension of space, a type of spatial visualization that is born out of intuition and insight.

WORLD OF THE WONDROUS

> Intuition *deals with life directly, and introduces us into life's own domain: it is related to reason as flame is related to heat. All of the great discoveries in science, all of the great solutions in mathematics, have been the result of a* flash *of intuition, after long brooding in the mind.* Intuition illumines. *Intuition is therefore the light which must guide us into that undiscovered country conceded by mathematics, questioned by science, denied by common sense*—The Fourth Dimension of Space.
>
> —Claude Bragdon, *Four Dimensional Vistas*

Visual-spatial insights are frequently reported to have arisen through dreams, twilight states, or reveries: four-dimensional states of mind. This type of mental free-play tends to occur when simultaneously the mind is both stimulated, aroused and active and also freed from sensory distractions and/or mental calculations involving sequential and linguistic operations. For example, Einstein's theory of relativity came about by his imagining himself traveling along with a wave of light at 186,000 miles per second. He was confronted with a paradox that could only be resolved by a total restructuring of the then-known concepts of space and time. Einstein rarely thought in words: his inventive abilities did not lie in mathematical calculation, but in "visualizing effects, consequences and possibilities." Einstein indicated that visualizing for him consisted primarily of more or less clear images that could be voluntarily reproduced and combined. Another example is Watson and Crick's decifering of the double-helix structure of DNA. Watson came upon Crick flipping cardboard models of the base pairs about an imaginary central line. This inspired Watson to continue Crick's actions through his own process of mental rotation and spatial transformation of the models, which opened his imagination to new possibilities of redescribing the structure of DNA.[23]

The mental rotation and spatial transformation of objects is an analogical process because the intermediate points in the rotation can be visualized in the mind's eye but cannot be *named*, or calculated. Specific points can be described, however analogically successively further rotated orientations cannot be calculated because no one-to-one relationship can be described for the intermediate stages of rotation. For example, pigment can be added to pink incrementally until the color becomes orange. An orangish pink can be described and a pinkish orange can be described, however all colors in the successive stages in between pink and orange cannot be named. The nonanalogical, or rational, process would be the ability to categorize infinitely each stage of pink to orange.[24] The mental rotation and spatial transformation of objects is an operation suitable for the metaphoric mind that would only be stymied by the rational mind calculating, naming or interrupting the rotation and transformation infinitely at each imagined point.

While playing, children forget themselves, time is suspended, and mind, body and emotions work together simultaneously in the child's re-creations. This happens to grown-ups, too. Oftentimes, one is awoken as though in a deep sleep while driving down the road with the realization that thirty miles have passed without there being a memory of the distance traveled or the places traversed. One becomes blind, so to speak, to the outside world. One's vision has drawn inwards to the depths of the mind in imaginative re-creation, opening the window to the world of the wondrous that looks toward the fourth dimension of space. Architectural imagination is a type of spatial visualization that relies on mental images and their transformations, that relies on the continuity possible with the analogical thought process.

It is our responsibility as architectural educators to provide our students with a key that enables them to unlock the door that leads to the world of the wondrous. The door that when opened suspends time and allows entry into the fourth dimension of space, thereby freeing up their architectural imaginations and providing them with the ability to *image* the never-before-seen. One way to unlock the door into the metaphoric mind is through exercises based on the mental operations of the metaphorical construction. The metaphorical construction is a type of stereoscopic vision that through analogy allows us to entertain two different points of view at the same time. This imaginary construction is a type of spatial visualization that suspends ordinary reference and allows for the projection of new possibilities of redescribing the world, which is similar to the four-dimensional suspension of time children experience in their playful re-creations. This is not a mere *picturing* of the ordinary world which solely re-presents what has already been seen, but a mental rotation and transformation that opens the imagination to new architectural possibilities.[25]

The metaphorical construction project is an architectural re-creation of a kinesthetic activity: generally an activity of making that through its act carves out space and impacts this space in a three-dimensional and sensorial way. The metaphorical construction project can be derived solely from an imagined activity, or can be inspired by an image of an activity, among other methods. In the past I have experimented with Gottfried Semper's technical skills of man as a starting point: metalworks, carpentry, masonry works and weaving.[26] Through a series of transformative exercises, the students began with constructing maquettes that were architectural re-creations of the kinesthetic activities required by these technical skills and ended by designing a live-work environment for the maker. For example, one student's imagination of the sound and sparks produced by the act of the hammering of metal by a smithy is metaphorically transformed and expressed by tiny maquettes. The final project is a live-work environment for a blacksmith (figure 4).

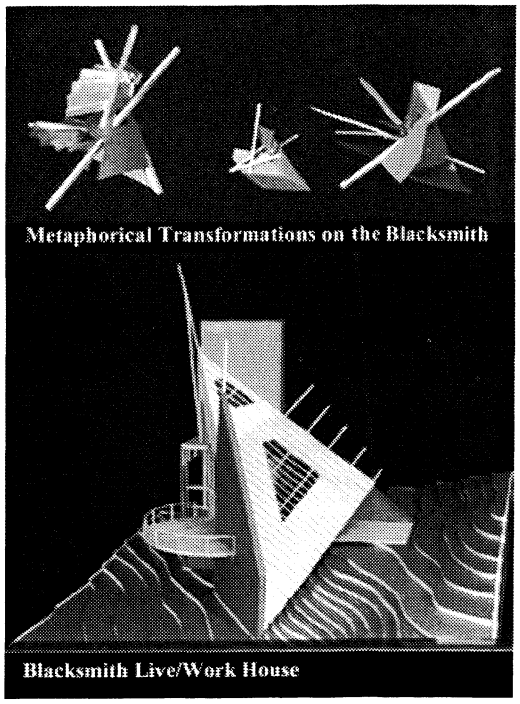


Figure 4. Blacksmith Live/Work House. Kendall S. Wilcox, student. University of Idaho. 1993.

Once a student has a three-dimensional object in hand, the student can mentally project into the space of the model and begin inhabiting that space. The student then has an object to provide inspiration for the mental rotation and spatial transformation required by the analogical thought process. This model allows the mind to free itself of the inherent symbolic and logic structures of the rational mind in order to open up to the metaphoric mind's architectural imagination to create never-been-seen-before projects.

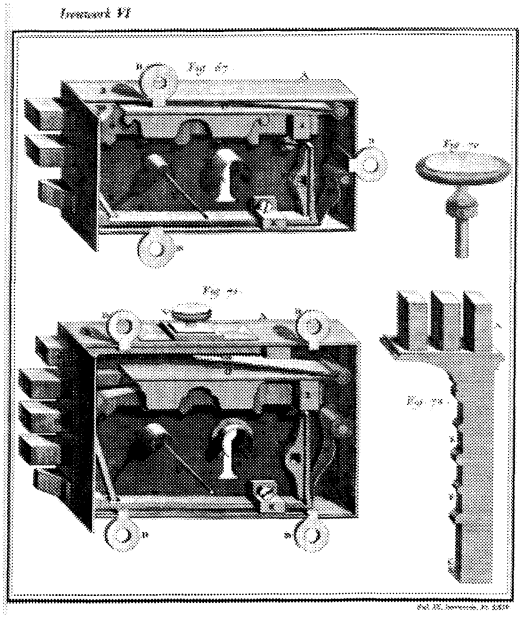


Figure 5. Plate 170 Ironwork VI. Denis Diderot. A Diderot Pictorial Encyclopedia of Trades and Industry

Another method is to use an image of an activity, such as is demonstrated in Denis Diderot's *Pictorial Encyclopedia of Trades and Industry*.[27] For example, as the point of departure one student took inspiration from *Plate 170 Ironwork VI* (figure 5) which depicts locksmithing. The essence of the lock and its tumblers is captured in the maquettes shown in figure 6. These architectural re-creations are then used as structural metaphors, which after a series of transformations of additional maquettes inspire the design of a three-dimensional space that becomes the locksmith's house (figure 7).

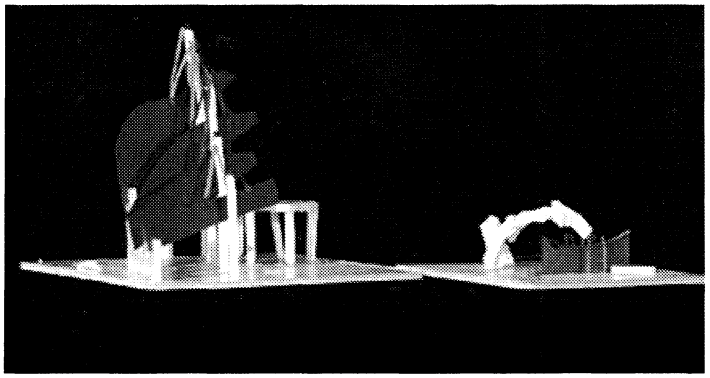


Figure 6. Metaphorical Transformations on the Workings of a Lock. Grant Getz, student. University of Idaho. 1995.

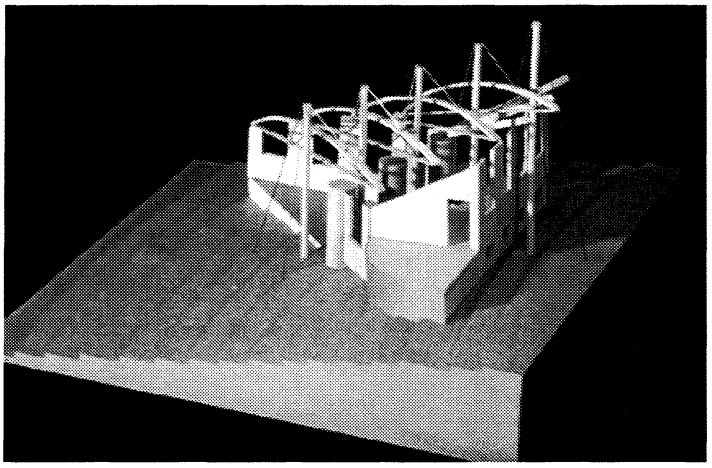


Figure 7. Locksmith Live/Work House, model. Grant Getz, student. University of Idaho. 1995.

The metaphorical construction project always begins with a transformative series of maquettes that are used both as structural metaphors and as objects to provide inspiration for the process of mental rotation and spatial transformation. The final model is constructed out of bass wood, chipboard and architectural metals and is completed prior to the construction of the drawing. The drawing is a collaged *analytique* based on the final model, which includes the site plan, floor plan, exploded axonometric and significant details that are not present in the model. Through the technique of collage, the drawing itself is a metaphorical construction that requires the reader to become an architect in its reading, because through

reading the different layers one mentally constructs the project in the mind's eye. This type of drawing can only be read by the trained eye and the reading itself becomes a process of spatial visualization (figure 8). In the process of constructing the drawing, the student's eye becomes trained to be able to visualize spatially when reading others' drawings.

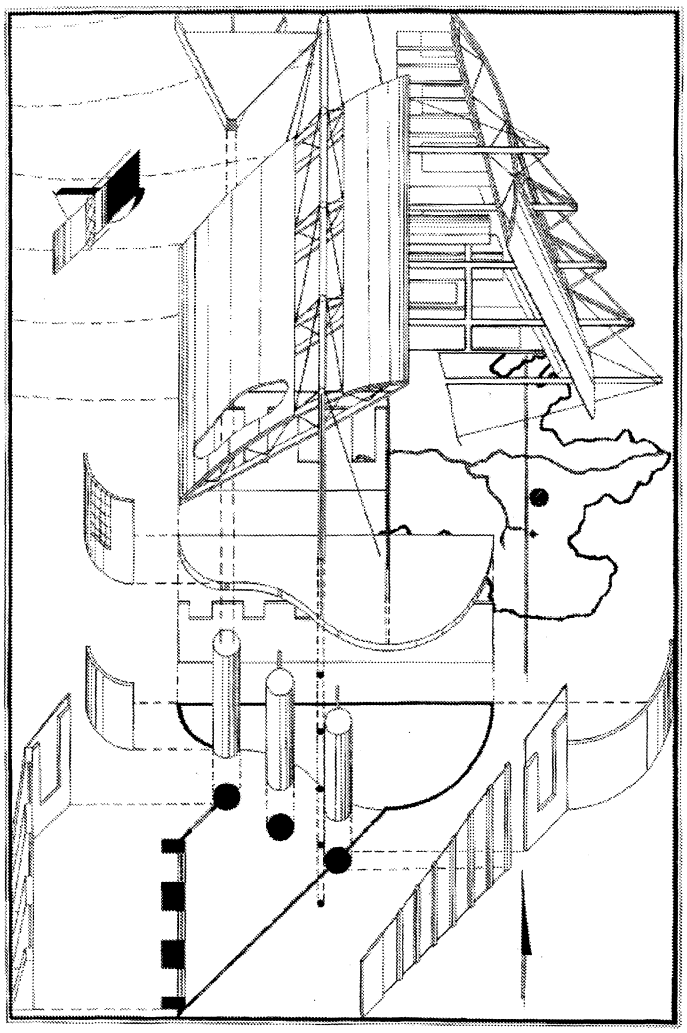


Figure 8. Locksmith Live/Work House. drawing. Grant Getz. student. University of Idaho. 1995.

An architectural project is the projection of a future building. Plan, section and elevation are projections of one to the other. When architects design, they manipulate form. In manipulating form we rotate objects in space. In entertaining the dialogue of the metaphorical construction we are provided with concrete images with which to project new forms. Our imaginations are filled in our architectural recreations. With the abstract notion of the rational mind and without metaphor, the vessel we manipulate is empty and we have to work much harder to fill it with meaning.

There is a relationship between drawing and spatial visualization, making models and the architectural imagination: through the practice of drawing and making models, the student develops the ability to visualize spatially and imagine architecturally. Through this activity of making, the student acquires the ability to internalize movement in a metaphorical thought process that rotates objects in order to suspend ordinary reference and project new possibilities of re-describing the world. It is possible for objects to be rotated and displayed on the computer screen, however in order to fully activate the student's architectural imagination, this process must derive from an embodied action and occur in the mind's eye *first.* Were this imaginative recreation to be generated from the space of the computer, our students would be left with incomplete imaginations. The computer logic most commonly used today relies on a formal symbolic code modeled after perspective and the notational systems of the rational mind, which reinforces a rational thought process. As architectural educators, we need to teach our students how to forget, how to draw upon their metaphoric minds in order to leave behind their inherent symbolic and logic structures that would have them *name* things, so that they may develop their abilities to visualize spatially and *image* the unseen.

NOTES

[1]Jane M. Healy, *Your Child's Growing Mind: A Guide to Learning and Brain Development from Birth to Adolescence.* New York, Doubleday, 1994, p. 44 (1987).

[2]Healy, *Your Child's Growing Mind.* pp. 49-51.

[3]Healy, *Your Child's Growing Mind.* p. 22.

[4]Healy, *Your Child's Growing Mind.* p. 75.

[5]Healy, *Your Child's Growing Mind.* pp. 203-207.

[6]E. H. Gombrich, "Meditations on a Hobby Horse or the Roots of Artistic Form," in Lancelot Law Whyte (ed.), *Aspects of Form,* Bloomington, Indiana University Press, 1951, pp. 209-228.

[7]Hans-Georg Gadamer, "The Play of Art," *The Relevance of the Beautiful and Other Essays,* New York, Cambridge University Press, 1986, pp. 123-130.

[8]Claude Gandelman, *Reading Pictures. Viewing Texts.* Bloomington, Indiana University Press, 1991, p. 5.

[9]Kimon Nicolaïdes, *The Natural Way to Draw.* Boston, Houghton Mifflin Company, 1969, pp. 10-16.

[10]Betty Edwards, *Drawing on the Right Side of the Brain.* Los Angeles, J. P. Tarcher, 1979, p. 28.

[11]Edwards, *Drawing on the Right Side of the Brain.* p. 40.

[12]Edwards, *Drawing on the Right Side of the Brain.* p. 59.

[13]Edwards, *Drawing on the Right Side of the Brain.* p. 119.

[14]Edwards, *Drawing on the Right Side of the Brain.* p. 138.

[15]Edwards, *Drawing on the Right Side of the Brain.* p. 29.

[16]Edwards, *Drawing on the Right Side of the Brain.* p. 119.

[17]Bob Samples, *The Metaphoric Mind.* Reading, MA, Addison-Wesley Publishing Company, 1976, p. 24.

[18]Samples, *The Metaphoric Mind.* p. 45.

[19]Samples, *The Metaphoric Mind.* pp. 47-48.

[20]Samples, *The Metaphoric Mind.* p. 85.

[21]Samples, *The Metaphoric Mind.* pp. 86-100.

[22]Samples, *The Metaphoric Mind*. pp. 166-171.

[23]Roger N. Shepard and Lynn A. Cooper, *Mental Images and Their Transformations*. Cambridge, MA, The MIT Press, 1982, pp. 6-7.

[24]Shepard and Cooper, *Mental Images and Their Transformations*. pp. 12-13.

[25]Paul Ricoeur, "The Metaphorical Process as Cognition, Imagination, and Feeling," *Critical Inquiry* 5, 1 (August 1978): 143-159.

[26]Gottfried Semper, "The Four Elements of Architecture," *The Four Elements of Architecture*. New York, Cambridge University Press, 1989, pp. 102-103.

Pedagogy Plus Practice:
Engaging Boston's Housing Crisis in the Design Studio

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To bridge the gap between an architectural education and the realities of practice, architecture students must, at some point in their academic experience, engage the full complexity of issues that come to bear on real building projects. A design studio that focuses on urban housing evokes a broad range of issues that extend beyond architectural design, including urban planning, economics, demographics, zoning and building codes, and politics. By incorporating these issues of practice into the studio program, the architecture student will become cognizant of the multi-faceted nature of the building process. I am not, however, advocating a design studio that subjugates design for practical considerations; design remains the architect's prerogative. To best equip architectural students with the tools to support their design capabilities, I believe that they should first confront within the academic context the most difficult questions that face the profession, so that they will be better prepared to facilitate good design in the profession.

At Northeastern University, I have initiated an Urban Housing Design Studio that culminates the studio sequence and prepares students for the broad range of issues to be addressed in their independent research during their subsequent thesis year. The topic of housing is critical to Boston because the city is suffering from a dire housing shortage that threatens the quality of life and economic stability of the region. While many Bostonians are benefiting from the economic expansion of the 1990s, moderate income families are forced out of their neighborhoods due to an extremely low housing supply and an extraordinarily high demand. This crisis is affecting more than the ever-vulnerable lower income groups; middle income groups are also being priced out of neighborhoods that had been home for generations to Boston's working families.

This paper will first provide a brief synopsis of the housing crisis in Boston, including the origins of the crisis and its effect on the contemporary city. Second, I will describe how the urban housing design studio at Northeastern University analyzes the physical, financial, legal, and the social issues inherent in the production of housing in Boston. Finally, I will explain how this inclusive criteria educates the architecture student in design and civic responsibility.

AN ANATOMY OF BOSTON'S HOUSING CRISIS

The current cause of the housing crisis in Boston is the confluence of low supply and high demand. The demand for housing in the Metro-Boston area is created by people seeking the wealth of employment opportunities, the many desirable urban and cultural amenities, and the plethora of educational institutions. Students, for example, are willing to borrow money now to pay high rents in order to study at Boston's renowned universities as an investment in their future. Students are also generally willing to pay high rents for units that in other cities would be considered less desirable living conditions. This trend absorbs many units that would otherwise be available to modest income groups. The students of the sixty or more universities in the Metro-Boston area that seek off-campus apartments exert an intense demand for housing throughout the city and the entire region.

Zoning regulations implemented during Mayor Ray Flynn's administration in the 1970s have prevented a greater density of housing to be built for the last twenty years. These obsolete regulations were instituted by the Boston Redevelopment Authority under Mayor Flynn to placate various neighborhood groups concerned that new housing construction would gentrify their communities and make them unaffordable. This strategy, unfortunately, has back-fired: housing costs in these communities have risen sharply because of the resulting lack of supply. More recently, in 1995, rent control was repealed so landowners can now charge what the inflated market will bear. Naturally, the lower income groups increasingly can no longer afford to live within or near the city. The supply is being consumed by the few who can afford it.

Currently, a low supply of housing is maintained by the difficult and dense web of bureaucratic and political hurdles a developer must overcome in order to build housing in the city. Similarly, Boston's zoning mandates a strict separation between land uses such as residential and commercial buildings. If a lot is underutilized, but has been zoned for a commercial use, residential development can not be built there unless the developer chooses to engage in the costly process of changing the localized zoning. The separation of land uses mandated in Boston's current zoning negates the possibility of emulating an urban fabric that makes his-

toric Boston so desirable: mixed-use buildings with residences on top of street-level retail.

The lack of housing supply has reached a dangerous level that not only affects the lower income groups by making housing unaffordable, but also it affects the middle and upper income groups comprising the work force that fuels Boston's sophisticated financial markets and technology-driven economy. These industries have blossomed during the past decade, and therefore, people from around the world are attracted to the area. If satisfactory housing for all these groups is unavailable, the work force will be alienated from the region, thereby eventually destroying Boston's desirability and economic stability. This housing crisis, therefore, is affecting all economic groups and all scales of business; it is not just a problem for an unfortunate few of modest means.

AFFORDABLE HOUSING VERSUS MARKET-RATE HOUSING

The cost of planning and construction of affordable housing is equal to the cost of market-rate housing. The quality of affordable housing has to be as good, if not better than, market-rate housing because it must withstand years of rental tenants versus owner-occupied units. The downsides to financing affordable housing are twofold. First, one cannot charge as much for the units, so the profit margins for affordable housing are much lower. Second, most affordable units are rental properties, so the return on the investment occurs over a long period of time instead of immediately after construction upon the sale of a condominium unit. These two points are critical because there are diminishing subsidies from the government for affordable housing. This leaves only developers to finance the majority of housing construction.

The gap between the developer's motivation towards maximum profit and the communities' desire not to displace members of modest income is often bridged by designating a certain percentage of the units as affordable, or below-market-rate units. This economic and political compromise, called "linkage," has been instituted by Mayor Thomas Menino for all new housing in Boston. The city, therefore, could use the leverage of the tremendous development opportunities that would be generated under a plan of greater housing density to insure that new housing will not displace any community members of modest incomes. In fact, not only would a greater density of housing reduce the overall demand, but also it would significantly increase the number of designated affordable units under the Mayor's plan.

The Urban Housing Design Studio does not, therefore, propose "affordable" housing per se. Instead, this studio focuses on market-rate housing to increase the overall housing stock within the city. This proposal would produce more affordable, available housing by moderating the supply-and-demand ratio throughout the city. This studio also considers diverse housing configurations in response to the diverse social and familial types, including a couple with children, a single parent with children, couples with no children, extended families living under one roof, single occupants, and roommate units.

BOSTON'S URBAN MORPHOLOGY AND HISTORY

Boston's urban morphology is a radial pattern of main streets that emanate from the historic center, or "hub." These major radiating streets mark the development of the city in the nineteenth century as it expanded out from the downtown along these primary arterial boulevards, or "spokes." The main streets became a continuous thread stretching from the hub out to the surrounding open land that was ideal for more development. These streets were defined by four-to-five story row houses with commercial spaces at grade and residences above. The consistent row house pattern was periodically interrupted by civic and religious buildings that were also typically located along the main streets. The zones between the radiating spokes developed as residential areas with detached multi-family homes and a plethora of open space. The main streets served the interstitial neighborhoods with their commercial amenities, civic centers, and religious institutions. They also provided the mass-transportation and vehicular routes back into the downtown.

These new neighborhoods were deemed the emerging communities of the city. It was a place in which immigrants would aspire to live and ultimately occupy after fulfilling their American dream of prosperity. During the first half of the twentieth century, these neighborhood continued to flourish as the immigrant class transformed itself into a burgeoning middle-class. Main streets such as Washington Street extend from downtown Boston, through Roxbury, Jamaica Plain, Forest Hills, and beyond to the west. Dorchester Avenue starts in South Boston and interconnects many of the neighborhoods of Dorchester at points to the south. Commonwealth Avenue starts in the Back Bay, and extends out through the Allston and Brighton sections of Boston. Together, these neighborhoods created a para-urban periphery around the hub that had many of the urban amenities of the downtown, but not the urban congestion associated with the city center.

After World War II, development no longer followed the pattern of the hub and its radiating boulevards. New super highways and a commuter-train network stepped over the semi-urban main streets in favor of semi-autonomous suburban communities isolated by countryside. The towns of Boston immediately surrounding the hub, including Dorchester, Mattapan, Roxbury, Jamaica Plain, Allston, and Brighton, became the repository of the urban poor. Businesses began to suffer and the housing began to deteriorate as the middle-class wealth fled for the suburbs. A vicious downward spiral of dis-investment ensued and led to properties being abandoned and/or burned down, creating a zone of post-urban decline in its wake. This mid-century suburban flight was exacerbated by the racial tensions of the 1960s and 1970s. The physical pattern and the social fabric of these communities was in decline.

Today, the main streets that interconnect the city's neighborhoods are typically unattractive, under-utilized, and lack a clear urban

integrity. Because these main streets still serve as regional transportation arteries, people from all over the Metro-Boston area travel along these routes going to or coming from downtown. These streets constitute the primary identity of their neighborhood, and collectively, they become the image of the city. Although the main streets are not developed to their capacity and they project an image of despair, there is no comprehensive strategy to address the condition of Boston's main streets. Ironically, the neighborhoods that exist along these major thoroughfares are also the areas most adversely affected by the housing crisis.

URBAN HOUSING DESIGN STUDIO: STRUCTURE

Unique to the Urban Housing Design Studio is its team structure. Students work in teams of four to five students, and there are typically three to four teams working on the same site during the term. Each team first must decide how to organize its internal management. Some teams agree on an urban plan and zoning rules, then each individual member designs his/her own buildings needed to fulfill the plan. Other teams designate specific tasks or topics to the members. For example, one member may be in charge of the urban plan, another member may be in charge of the design of the housing units themselves, and yet another member may be responsible for designing the exterior spaces such as roadways, sidewalks, parking, and green spaces. The team structure is a political microcosm where the students must learn to adapt their personal agendas in order to benefit the project. Working in collaboration with other people with a diverse set of ideas is intrinsic to the production of urban housing.

The first phase of the urban housing studio is a rigorous analysis of urban form. Students identify desirable urban types that exist in Boston, such as the Back Bay, the South End, or urban campuses. The elements of each type are then extracted and catalogued for future reference, such as row houses, triple-decker houses, storefronts, and street wall. Also, the dimensions of buildings, sidewalks, roads, and open spaces are documented to calculate the density of each neighborhood type. The next phase is an analysis of the building codes to determine what construction types are possible and what configurations are legally allowable for the housing units. Here, dimensional requirements are determined, i.e., minimal dimensions of rooms and ceiling heights, required maximum distances from kitchens to windows, and the requirements for exit stairs and hallways. The students also meet with architects who are involved with urban housing in Boston to get a comprehensive view of the design process. Finally, the students learn about the financial criteria necessary to determine if a developer will be willing to invest in a project. At this point, they meet with developers to learn about all the financial factors considered in a large scale housing project in the city. The students accumulate a substantial body of information before they plan and design their housing projects.

URBAN HOUSING DESIGN STUDIO: LOCATION

Once the team structures are in place, and the all the factors that have an impact on the design of urban housing are understood, the students then focus on the specific site chosen for the studio. Sites are located along the radiating main streets of Boston where the continuity of the urban fabric has been interrupted by neglect, destruction, incompatible development, or infrastructural intervention. Because these streets currently consist of an interrupted urban street wall, one-story retail buildings, light industrial buildings in poor condition, and under-utilized vacant lots, they are an ideal location for new housing and related neighborhood amenities, such as parking, retail stores, medical facilities, and day care. Development along Boston's main streets would not only ameliorate the housing crisis, but also it would reconstitute the urban fabric, repair the street wall, induce more pedestrian vitality, and improve the city's image and livability.

Reusing land that has already been built upon and subsequently abandoned is a form of "sustainable" development. Building housing with a greater density within the city's boundaries and mixing uses together so residential neighborhoods have amenities and services close by would eliminate traveling long distances between the home and businesses. It would reduce the time one spends in the automobile, it would reduce pollution, and it would preserve more of the natural surroundings beyond the city limits. If travel is necessary, mass transportation already exists along the main streets, thus further reducing the automobile's impact on the city.

The post-war middle-class migration to the suburbs runs directly counter to the ideals of sustainability due to the lack of population density and the lack of proximate diverse use-groups. In the suburban model, single-family detached-home developments devour the environment with inefficient land use, and great distances exist between the residential communities and the commercial centers. These separate districts are connected by congested highways which add pollution, use more natural territory, and occupy great amounts of a commuter's valuable time. We can help curtail suburban sprawl by developing under-utilized areas within the city with a greater residential density and more programmatic diversity.

The site chosen for the Urban Housing Design Studio Spring term of 2000 was on Washington Street, beyond Roxbury and Jamaica Plain, in an area called Forest Hills. A twelve acre parcel across Washington Street from the Forest Hills "T" station lies vacant with the exception of a single-story garage building owned by the regional transportation organization known as the MBTA. The site is surrounded by other vacant lots, gas stations, and other single-story retail buildings, and yet it is within view of the Prudential and Hancock towers in the Back Bay. The scale of the structures adjacent to the site vary considerably: one edge of the site is bounded by a raised highway called the Arborway, while the housing that constitutes the neighborhood behind Washington Street is typical detached, triple-decker, three family homes. The students were asked to consider the impact on the existing community when planning their new housing.

URBAN HOUSING DESIGN STUDIO: DESIGN

Using the accumulated information from the analytic phases, the teams established design goals for density ratios and percentage of unit types, such as three, two, or one bedroom units. Also, the teams had to decide for themselves what other use-groups to include in their design proposals to create a desirable environment. These uses included large retail stores such as super markets, small "mom-and-pop" stores and services, market places, day care, and medical facilities. Another critical consideration was the amount and type of vehicular parking. It became clear from the beginning of the planning and design phase that not only were the students proposing new housing on Washington Street, but also that they were creating a whole new community. A "community" should include enough amenities and services so people can live comfortably without having to travel far for the basic necessities, such as groceries, restaurants, and transportation links. It should also have a cohesive urban and architectural identity and be sympathetic to the surrounding existing neighborhoods.

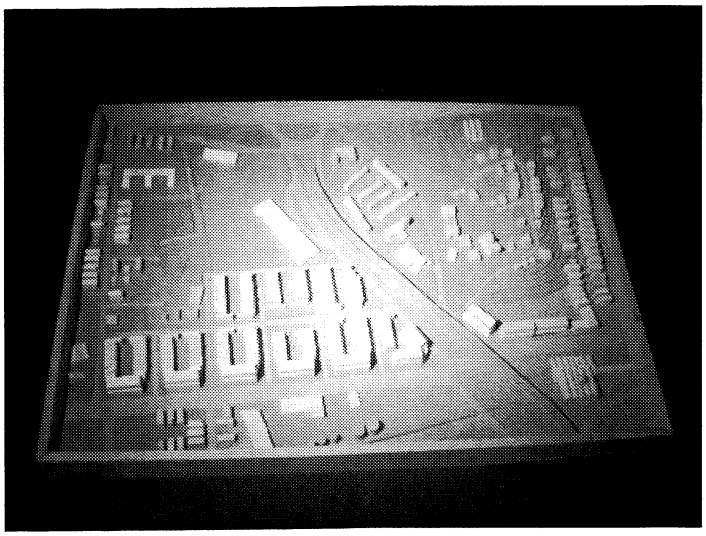

Fig. 1. Project 1.

The first project is based on a repeated street pattern that blankets the site. Seven story units face onto Washington Street with retail at the sidewalk level. This creates an animated urban edge along the major thoroughfare, and it is periodically interrupted by the perpendicular side streets. The height mandates that steel frame construction be used. Seven stories is the maximum height before one must conform to more stringent high-rise building codes that create an economic and architectural threshold developers do not want to exceed. The row houses on the side streets are just four stories; this allows for less expensive wood frame construction. A third type of street with a low profile is introduced through the center of the site parallel to Washington Street. This becomes a quieter, slower promenade with sporadic retail stores and public green spaces along its length. The density of this scheme, 70 units per acre, is comparable to areas of Boston's Back Bay. The clear and overriding planning strategy is the result of task-specific team structure.

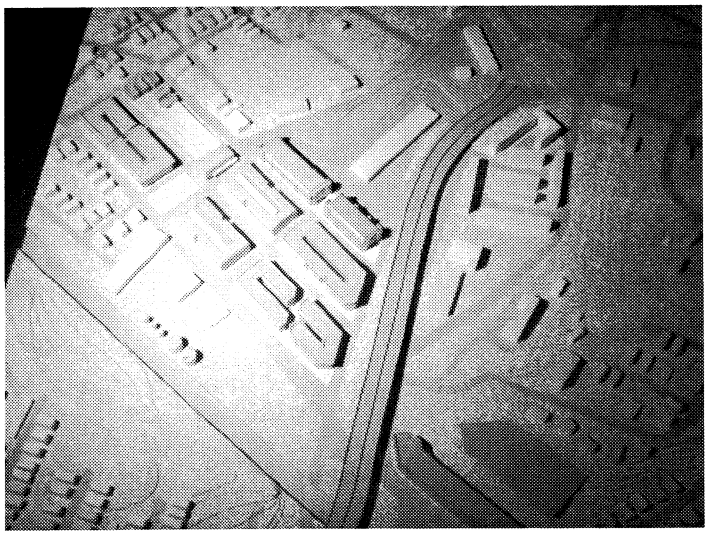

Fig. 2. Project 2.

The second project is based on long buildings running parallel to Washington Street creating highly defined street spaces. These buildings are unique to Boston typologically: they are just one unit deep with a common corridor that surrounds an open courtyard. The Washington Street edge is comprised of seven story buildings, and the scale of the buildings gets smaller the farther they are into the site. At the edge of the site where the new massing abuts the existing neighborhood fabric, the housing is just three stories tall. Unlike the first project, the team for this project first declared a master plan, then they designed individual buildings for separate parcels. This project achieved a density of 65 units per acre.

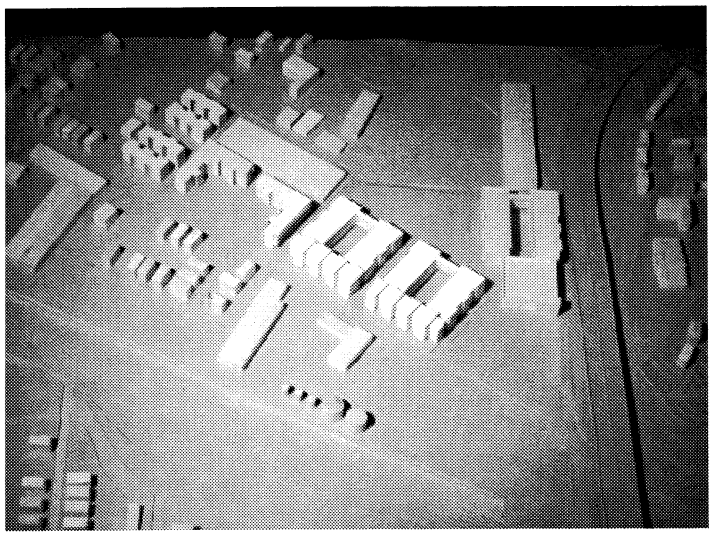

Fig. 3. Project 3.

The third project emphasizes open space over density and street wall definition. A large plaza of retail and market spaces faces onto Washington Street inviting more than just the local inhabitants into the new community. There are also open spaces embedded within the new community fabric, as well. The organizational struc-

ture of this team fluctuated as the scheme evolved and resulted in a true mix of housing types, including double-loaded corridor buildings, single-loaded corridor buildings, row houses, and triple-deckers. Here, an erratic team structure is reflected in its heterogeneous plan. This scheme creates a density of 55 units per acre.

CONCLUSION

The city agencies that control zoning and building in Boston are restricted from proposing bold initiatives to resolve the housing crisis because of conflicting political pressures and a lack of leadership. Community groups that are interested in improving their neighborhoods have little resources or political power to bring about change. The political progress towards more housing is relatively static, but the crisis is dynamic: it worsens every day. The students' design projects serve as concrete recommendations to the City of Boston for configuring density, building heights, street-wall definition, allowable mixed-uses, parking requirements, and public spaces. In the Spring of 2000 after the Urban Housing Design Studio concluded, the students presented their work to the Boston Society of Architects Housing Committee. This committee is coordinating with various city agencies and neighborhood groups to educate the public about the profound housing crisis that faces Boston. The students' design work contributes to this city-wide dialogue by offering concrete solutions.

The design of housing is particularly complex due to the range of knowledge and skill required to generate meaningful and practical architectural proposals. Students must learn to consider carefully the design of domestic space, innovative and cost-effective construction, environmental and urban impact, and the creation of urban communities. The fundamental criteria for the production of any large scale urban intervention should not be considered beneath the dignity of the academic design studio. To best prepare our students to shape the myriad external factors that influence architectural design, they must learn that proper research and the careful accumulation of knowledge through analysis creates the foundation for creative insight.

Beyond the Edge

Design Projects & Pedagogy that Encourages Students to Become Actively Engaged with the Environment Surrounding Their Project

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INTRODUCTION

It is the authors' experience that projects where each student's 'building' is part of a larger project that the class is designing appears to force the student to consider how things outside their own property limits can and do effect their designs. This cogitation is usually strongest when models are used as part of the design process and usually appears when the models are first assembled as a whole project. The usual first response is "can the instructor do something to stop the adjoining projects from ruining my project." The instructor can easily develop this initial response into an investigation of zoning, covenants and building codes and thus demonstrate how the urban fabric is developed, formed and modified.

This phenomenon was first experienced when the class was given a row house to design and during the first crit the models were assembled to create a street. This phenomenon again appeared much stronger in a later class when the problem was to design the housing units for a small subdivision with each student assigned a separate lot. Again it appeared when the preliminary models were assembled to form the subdivision. It also appeared when students were assigned the same site and the models were placed along side each other as if they were on adjacent sites.

THE PEDAGOGY FOLLOWED

In developing these studio exercises the following principles were followed. The tools for practicing architecture, construction management and planning are rapidly changing, as is the form of practice. The authors do not use the "tools of the trade" that was taught in school, nor is the form of practice the same. It is likely that the students will have to function in a world that bears little resemblance to what we now experience. While, we need to teach the principles, methods, theories and "tools" currently in use, we must also teach concepts and methods of approaching the built environment that allows the student not only to grow and change with the profession, but have the ability to develop new ways of approaching changing technological, social, and environmental issues.

Designing *(and learning)* is an iterative process, therefore, the classroom environment is developed where the students are encouraged, not to wait for the great idea or correct solution, but, to develop and grow their ideas into the 'great solution'. In this process, the students need to be encouraged to consider the implications of their decisions and enticed to do a great deal of technological and philosophical research, writing, and analysis to assist them in developing a rationale to support their work. The students are asked to examine both traditional and innovative solutions and participate in active discussions of current topics relevant to the work are strongly encouraged as part of the process.

Additionally the studio environment is structured around "problem based learning" techniques as described by researchers such as: D. A. Schon, in Educating the Reflective Practitioner, D. A. Kolb in Experiential Learning, P. Little in Educational Change Through Problem Based Learning, and D. Boud in Problem-Based Learning in Education for the Professions. The assignments given do not have a predetermined correct result. Rather they give a direction for investigation that leads toward a number of possible solutions. In organizing the courses, the recommendations of R. S. Zais in Curriculum Principles and Foundation are followed. He suggests first to determine what the purpose of the education is, then develop a course plan and method of teaching that produces that result. The style of teaching followed is that of a coach and learning manager modeled after techniques for teaching technical

subjects described by Lee Harrisberg in Education for the Professions.

Assignments usually are divided into many segments, each with its own due dates, similar to the way work is scheduled in a professional environment. This scheduling is normally developed with the whole class participating. This appears to have several benefits. The students learn how to negotiate and organize a workable schedule. The total student workload *(including their other classes)* is spread more evenly across the available time. Breaking projects into a series of smaller steps allows the students to deal with many complex issues. They have less of a tendency develop "mental blocks" that arise from trying to do the whole project at one time. It also provides the opportunity for many small public successes, which in this process appears to encourage the students to work harder. The authors always try to create a supportive class environment where the students assist each other in the class, in research, and most importantly in learning.

EXAMPLES

The first example is the major assignment for a second year design studio taught at Texas A&M University. Traditionally a single-family house design was the major assignment for this course. The assignment was modified in two major ways. The first was to give each student a separate lot in a subdivision designed to accentuate the problems with adjoining sites to encourage the development of discussions on the need for convents, setbacks and other design constraints and guidelines. The other adjustments were to restructure the problem to fit the principles of problem-based learning. An important and somewhat unexpected benefit of this particular assignment was that the students seemed to be much more engaged in what was happening outside the boundaries of their project than was normal for students at this level.

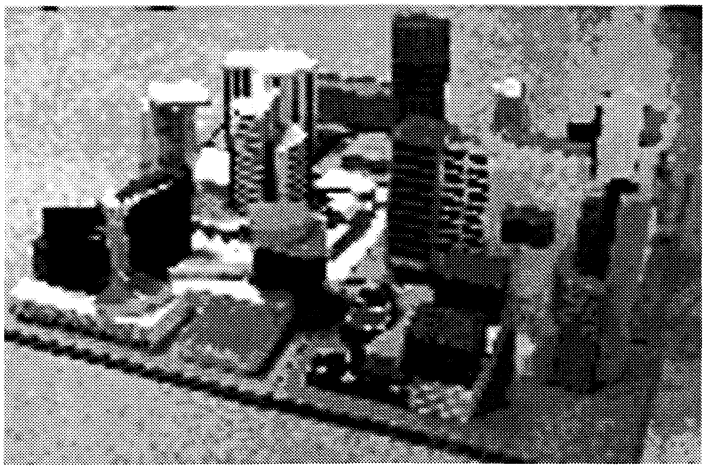
Using problem-based learning principles the project was restructured to change the focus of the question. Rather than giving the students the usual brief; the students were asked to determine if it was possible to mold the built environment to the inhabitants; instead of the usual situation, where the inhabitants mold themselves to the built environment. An iterative process was followed. The students were to first determine what activities' people desired to do in a home and design a structure(s) that would allow these activities to happen. Teams were formed to write short "plays" about people *(including themselves as they were to be a resident of the house)* doing everyday activities in a home environment. These plays were mapped *(acted through drawings or models to scale on a specific site)*. The sites were adjoining lots in a community designed to expose many design problems. Once a week the individual models *(homes)* were assembled into the complete community. It appears that when the individual models were arranged into the complete development is where the students' cognized the most about what environmental design could be.

This mapping was first developed in 2-dimensions then progressed to 3-dimensional buildable objects. As with real life, the plays *(the site activities)* were dynamic, always changing as the experience level of the participants grew. Therefore, the actual form and content of the built object *(the home)* continuously changed as the students developed the activities. At first all activities were to occur at the best possible location without regard to any other activity, however, as time progressed it became apparent that some activities conflicted with others and that there were natural groupings of activities. The students also became very aware that activities on one site could seriously conflict with what was happening on other sites. So meetings between groups were held to settle differences, agreements made, and rules were invented. These conflicts allowed zoning, building regulations, laws, etc., to be discussed in a meaningful way.

The students being engaged in what was going on outside the boundaries of their sites was an entirely unexpected benefit of the having students working on adjacent sites. This was the most successful, easiest, and least painful attempt that one of the authors had up to that time in getting the students become aware on how the surroundings effect architectural works and how architectural works effect it's surroundings.

The project produced a very detailed model of what most would call a 'community'. Although each student and student group built only a part of the model, they all felt that they contributed to the whole and that the entire community was theirs. The student reaction to this project was at first was guarded, but as the assignment progressed the work became real. It was no longer just an assignment to complete, but grew into a real experience, a part of their life. It seemed to develop a life of it's own.

Picture One – In Process Model. 2nd Year Design Studio. Texas A&M



Picture Two – In Process Model. 4th Year Design Studio. Tuskegee University

The second example is the work from a fourth year urban design studio taught at the University of Melbourne, Australia. Again, problem-based learning principles were followed. In this example the students had to first design a major subdivision including a community center with facilities for shopping, schools, medical center, police, fire and other related community service facilities. All of the fourth year design studios participated in this project (5 sections, 75 students). In the first phase, teams of five students, design a development plan for the new community. Then one of the designs was selected to use as the development plan and each student was assigned an area to design the buildings for. Some students ended up with single-family residential units, others multi-family or part of the community center.

At first the students were very hesitant about the project and came up with all sorts of reasons against the project. Including what happens to the overall project when someone does not complete their work and they didn't want the work of some of the other students to be next to theirs. However, almost all doubts were replaced with enthusiasm when the overall model first went together. The sight of the large overall model was breathtaking, as it was almost 20 feet wide by 40 feet long.

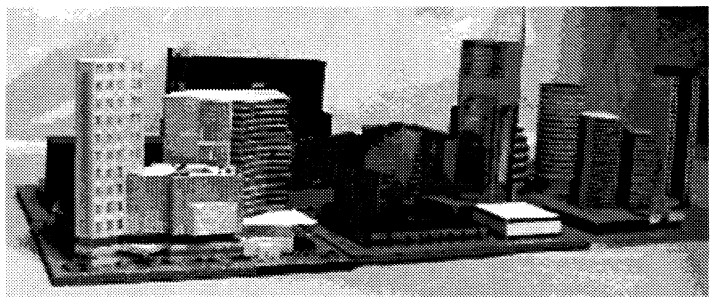
At this time the students became very, aware that activities on nearby sites could seriously conflict with what was happening on their site. Their response was the typical "can the instructor do something to stop the adjoining designs from ruining my design" assertion. Lectures and productive discussions were held about codes, regulations, restrictive covenants and other devices that communities and governments use to control the built environment. The students also became engaged in discussions on the moral responsibly of the architect to consider the effects their designs may have on the communities. The concern on how unfinished projects would affect the overall model vanished as it just looked like real community with vacant lots or unfinished building projects. Again having the students design using models on adjacent sites proved to be a very successful, easy and rather painless way to have the students become aware and engaged on how the surroundings effect architectural works and how architectural works effect it's surroundings.

The students' interest level remained high throughout the project and became very excited whenever the model went together. They were very proud of the whole project not just their own work. It really became something beyond just another assignment to complete but grew into a real experience.

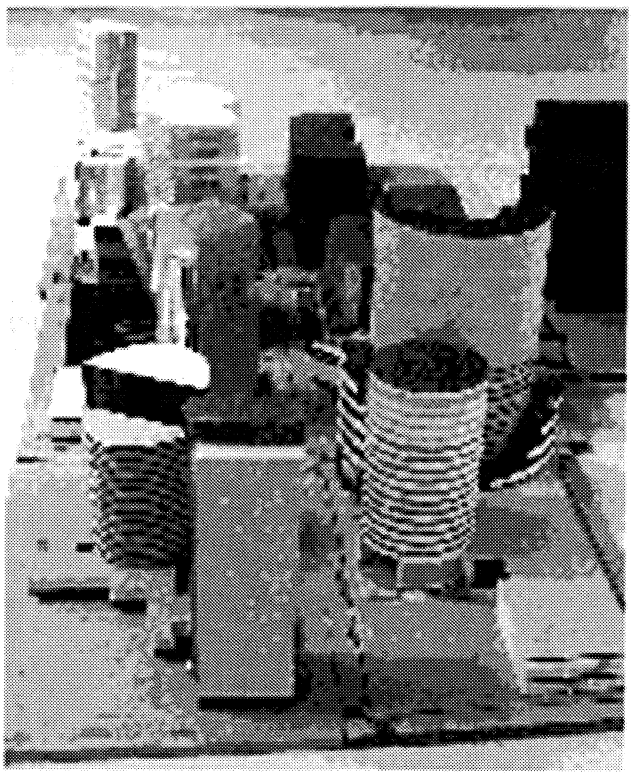
The third example a fourth year design project at Tuskegee University. It is a very large mixed-use high-rise complex in the center of the CBD, where all the students were been given the same site, a large urban block. Each team had to build their models from center of the street to center of street so that the models could be assembled into a developed section of the CBD.

Though each design was very well articulated and appeared to work well in context as well, if not better than, the previous examples, however the interest in off site influences was much less pronounced than in the other projects. The students were as in the other examples required to design using models as a starting point rather than drawings and work thorough a series of 'sketch' models starting with basic form models gradually developing each following model into more detail designs. Each week the models were assembled together into the 'CBD'. There was noticeable change to the designs after each time they were assembled that appeared to in response to the other students models, however it was less than what was expected and there were fewer discussions on codes and zoning requirements than normal.

It appears that the reasons for this lowered interest in off-site influences is the effect of a lower apparent density for the buildings in context than in the previous projects. The project, because of where it was located in the CBD and the wide street right of way caused it to appear less dense than the other ones described in the other examples even though the density was actually much higher. There was just too much of an open feeling to the project to cause the students to become engaged in how the surroundings were affecting their project. See Pictures below.



Picture Three – Final Model. 4th Year Design Studio. Tuskegee University



Picture Four – Final Model. 4th Year Design Studio. Tuskegee University

Picture Five – Final Model. 4th Year Design Studio. Tuskegee University

IN SUMMARY

It appears that students if required to develop their designs through building a series of physical models will tend to develop more articulated designs especially if each project is on an adjacent site with an high enough apparent density and if the models are placed together frequently enough. In addition the students will develop an interest in how the adjacent projects are conflicting with their design. With this increased awareness that activities and buildings on one site could seriously conflict with what was happening on theirs and other sites gives the instructor an opportunity to effectively discuss context, zoning, building regulations, laws, etc., in a meaningful way.

The students being engaged in the context of what was going on outside the boundaries of their sites is a benefit of the having students designing projects on adjacent sites. It is the most successful, easiest, and least painful way the authors have used to getting students to become aware and engaged on how the surroundings effect architectural works and how architectural works effect it's surroundings.

REFERENCES

[1]Lee Harrisberger, "Curricular and Teaching Methods in Engineering Education", in Sinclare Goodlad, *Education for the Professions: Quis custodiet....?*. SRHE & NFER-NELSON, 133-140, (1984)

[2]Robert S. Zais, *Curriculum: Principles and Foundations*, Thomas Y Crowell Company, Inc (1976)

[3]D. A. Schon, *Educating the Reflective Practitioner*, Jossey-Bass, SF Higher Education Series (1990)

[4]D. A. Kolb, *Experiential Learning*, Experiences, The Source of Learning Development, Prentice-Hall (1984)

[5]P. Little, & G Ryan, *Educational Change through Problem Based Learning*, Australian Journal of Advance Nursing, 31-35, (March 1988)

[6]D. Boud, *Problem-Based Learning in Education for the Professions*, HERSA, Higher Education Research & Development Society of Australia, Sydney Australia, 43-57 (1985)

Disciplinary Thresholds

Moderator: Rebecca Williamson, University of Illinois, Urbana-Champaign

Preparing for Leadership:
The Case for Leadership Education in Architecture Schools

DAVID W. HINSON
Auburn University

Beginnings outside the Realm of Objects

CHRISTOPHER MONSON
Mississippi State University

Architectural Education:
Towards the Purpose of Existence

S. GANESH NAYAK
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Navigating with an Ethical Rudder

GREGORY S. PALERMO, FAIA
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Preparing for Leadership:
The Case for Leadership Education in Architecture Schools

DAVID W. HINSON
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INTRODUCTION

"Perhaps never in history have the talents, skills, the broad vision and the ideals of architecture been more urgently needed"
—Ernest Boyer and Lee Mitgang [1]

*"It's a challenge to all of us as AIA members to boldly vision a better future for ourselves and our profession in the 21st century. "Better" in the sense of better education, better preparation to act effectively, better partners, better citizens. A constant focus (*of the 1999 AIA Convention speakers*) was the potential – indeed the obligation – for us as architects to expand our influence by* ***embracing the call and responsibility of leadership****".*
—Michael J. Stanton, FAIA [2]

*"**The habit of leadership begins in school**...we must breed a culture of engagement with our communities rather than foster the reclusive role that architects seem to play. There can be no reclusiveness for a profession that designs the environments for human activity."* —Ronald Altoon, FAIA [3]

As the profession of architecture endeavors to "redefine" itself [4], many are calling for architects to act as leaders in a broad spectrum of venues, from our relationship with others in the design and construction industry to the civic/political arena. Many of these calls to leadership include a plea for more leadership skill development in schools of architecture; however, these calls often fail to articulate a clear distinction of what skills are required, or even a clear definition of "leadership" within the context of architectural practice. Perhaps more significantly, we have not tackled the toughest question of all, which is "leadership to what end?". Are we improving our leadership skills as a means to more power and authority or as a means to more effective practice and service?

Can we develop insights into the leadership approaches most appropriate to the broad spectrum of private and public spheres we hope and dream of influencing? Contemporary leadership studies suggest that leadership skills and style are not a one-size-fits-all solution and that inappropriate approaches to leadership (and followership) can undermine the plans of those with the best of intentions.[5] If Ronald Altoon is right, that "the habit of leadership begins in school", how do educators begin to cultivate an ethic of leadership and engagement in future practitioners? What training do we need to offer our students to foster the sea change in self-perception that the leaders of our profession are calling for? To effect positive change in any of our targeted arenas we (practitioners and educators) must first articulate a vision of our leadership goals, and identify the approach to leadership most effective in those settings.

This paper will look at the models of leadership which might be effective in some of the settings where architects find opportunities to lead, and will explore how these leadership skills might be developed inside students' academic experience.

REFRAMING THE ARCHITECT'S ROLE

Throughout our history, the profession of architecture has struggled with competing (and often conflicting) visions of our relationship to our clients, to collaborators within the design and construction industry, and with the larger society.[6] As with other professions, our attitudes towards each of these groups have evolved in response to shifts in the economy and structure of the construction industry, shifts in the legal framework of practice (particularly our view of risk and liability), and shifts in the relationship between professions and society in general. In the last twenty years in particular, architects have seen significant erosion in their power and authority relative to other participants in the design and construction process. The response to these phenomena has been varied, but in general it seems that the profession is dismayed by the loss and anxious to halt it.[7] In response the AIA, the architectural press, and to some degree our professional schools have sought to encourage architects to (re) assert "leadership" within the design and construction industry and to expand their sphere of influence in the civic and political arenas that influence the physical environment. Advocates for this "engagement" initiative cite a range of reasons for the urgency of their call. Leading practitioners, educators, politicians and theorists have gone as far as to assert that the future of our profession and our communities hinges on our ability to reframe the architect's leadership role.

These calls to leadership highlight the conflict between our desire to exercise more power and authority as a profession, and the ser-

vice ethic engrained in our oldest professional ideals. An example of these competing motivations can be found in the AIA's current "Livable Communities Initiative", intended to effect much needed positive change in our communities and to position the profession as a powerful "player" in the emerging public discourse over growth and sprawl. The "enlightened self-interest" inherent in this example is not a bad thing; however, it illustrates the confusion surrounding the term *leadership*, a confusion we must address before we can prepare students to be truly effective leaders.

Since the Second World War, leadership has emerged as a field of study within many academic settings and other research institutions. Examples include public policy leadership programs such as the Kennedy School of Government, the Hubert Humphrey Institute of Public Affairs, and efforts by private foundations such as the W.K. Kellogg Foundation and the Kettering Foundation to support leadership development through fellowships and grant making. As a result of five decades of study and reflection, a complex and nuanced understanding of leadership has emerged, along with an awareness that leadership is *context sensitive* – the way one leads is highly contingent on the situation. Popular views of leadership, however, are largely shaped by observation of leaders in politics, private enterprise, and hierarchtical organizations.[8] This view centers on the expectation that leaders will be heroes - men or women of passion and vision and the courage to act on these qualities. This view seems to exert strong influence over architects as well, and plays to our deeply held values regarding the transformative power of design and designers. This traditional view of leadership relies heavily on the belief in personal characteristics as a determinant of leadership success - that one is mysteriously anointed with leadership qualities, or learns them at the knee of an inspiring mentor.[9] The qualities that characterize this view of leadership include decisiveness, persuasiveness, assertiveness, commitment, and courage. Our system of educating architects encourages and cultivates some of these traits (commitment to design quality for example), but has acknowledged weakness regarding others (such as verbal and written communication – key tools of persuasion).[10] This view of leadership has undoubtedly motivated many architects to remarkable accomplishments, however it also has the unfortunate consequence of relegating those who don't see themselves as "anointed" to the sidelines (and off the hook).

ORGANIZATIONAL LEADERSHIP

Another influence on our understanding of leadership and its requisite skills comes from a focus on leadership in corporate and institutional settings. The decade of the 1980's saw a remarkable expansion in leadership research. Practicing architects, like their peers across the spectrum of American businesses, have become fascinated with organizational leadership theory. As one could expect given the hierarchical management structure of most firms and the significant growth in the size of architectural practices, much of the focus has been on the roles of firm principles and senior managers as organizational leaders. Organizational leadership theory, although still strongly tied to a focus on setting objectives (immortalized as "the vision thing" in the 1992 US presidential election), has moved away from the notion of a single form of leadership and has developed a heightened sensitivity to the relationship between leaders and followers and the overall context within which leaders act. At the forefront of this move towards understanding the role of leadership within architectural practice in the past two decades were groups such as The Coxe Group, David Maister, Jim Franklin, and others, who stressed the influence of the values and goals of principals on the shape of individual practices. This effort to understand how successful practices work has also resulted in an interest in the interpersonal skills that principals and mid-level managers must master to be effective at leading their growing practices. This has led to an increased interest in the cultivation of leadership skills, evidenced by the number of workshops, seminars and programs geared towards this topic at professional gatherings in the last two decades.[11] A growing sense that the profession faces major pressures to adapt to the impact of information technology and to shifts in project delivery methods keep the interest in leadership methods and theory high. Characteristic of this interest are the essays of Richard Hobbs found in the monthly AIA newspaper, the ***AIArchitect***. Hobbs, leader of the AIA's Professional Practice Group regularly offers synopses of current business leadership theory, ranging from Peter Drucker to ***Wired*** magazine.[12]

Insight into the demands of collaborative process - either within the context of increasingly larger architectural practices or in dealings with clients, builders and the hosts of supporting participants to the design and construction process - is key to preparing students for the challenge of leadership in this time of "redefinition". As educators, we must balance our traditional emphasis on the individual designer with an understanding of the inherently social dimension of design, and help our students develop the skills to successfully lead in collaborative endeavors. This skill set includes the foundation skills of speaking and writing with clarity as well as facilitation, mediation and negotiation skills, what Franklin calls "groupwork".[13] Research centered on the dynamics of leading innovative teams by Helga Hohn suggests that groups engaged in creative work (unique, non-routine) move through two distinctive modes of work – *generative modes* and *focussing modes* – which require different approaches to leadership if they are to be successful. Hohn suggests that leaders of creative teams must be equally skilled at the management of both processes and must know how to effectively combine the "process concerns" key to the generative mode with the "task concerns"[14] essential to the focussing mode.

Students should also be introduced to the notion of transforming leadership – the view of leadership that emphasizes the leader as *servant*, supporting and empowering others to help achieve a common goal. James MacGregor Burns' vision of servant leadership calls on architects to look beyond the transactional nature of most exchanges in practice settings and to envision an elevated purpose to the practice of architecture. This model requires one to give up much of what we traditionally associate with power and authority – the autonomy to make decisions alone. This shift in perspective is especially important and challenging for architects because it is in conflict with our culture of individualism and our desire for design authority and autonomy. This notion of the leader as servant to the

group of followers is where the profession's conflicts between power and service must be addressed. As we come to understand more about leadership – especially leadership of creative processes, the paradigm of leadership as a means to power and authority is increasingly challenged.

PERIPHERAL VISION

"The profession does very little to prepare would-be architects for the crowds of participants who will want a say in their projects"[15]

In addition to developing the skills required to work more effectively with colleagues, architecture students must develop greater insight into the complex web of forces that shape design in the context of practice: clients, consultants and other design professionals, public agencies, community groups, city councils, financiers, etc. This can only be accomplished by designing curricula with opportunities to study and understand the interests and approaches of other disciplines that shape the environment, including other design disciplines (i.e. planning, landscape architecture, interior architecture, and engineering, as well as building construction, development and finance). To have the effect of expanding students' leadership potential, however, these efforts to expand our "peripheral vision" must be brought back into the design studio. Students must be challenged to integrate these often-contradictory viewpoints into their work, and to expand their understanding of design to include effective leadership of this ever-growing team of collaborators.

Interdisciplinary collaboration presents a distinct set of leadership challenges which are at odds with the way most schools prepare architects. Christopher Barlow of the Graduate School of Business at IIT[16] notes that in this interdisciplinary setting "a new kind of complexity comes into play", in which the "truths" of different perspectives conflict with each other. In these contexts differences in cognitive style, cultural backgrounds, personality and values can destroy all hopes of collaboration. Barlow also notes that in our intensive efforts to teach students to understand a certain perspective, we generally only expose them to problems that can be solved in that perspective. The more success a student realizes in solving these "single domain" problems, the more likely they will encounter problems applying their knowledge in the complex and messy "multiple domain" context of the real world. I believe this challenge is particularly relevant for graduates of architecture schools, where as Dana Cuff notes students are most often exposed to "pure design" divorced from the dynamic context of practice.[17] The result, according to Cuff, is a skewed understanding of design, and a missed opportunity to teach students the "social arts" essential to leadership in intra- and interdisciplinary collaborations.

LEADERSHIP IN THE CIVIC ARENA

"There is so little involvement by architects in community organizations," an Indianapolis architect told us. "You just don't see it in our profession. We need to get the profession back to the status of community leaders"[18]

The call to leadership in the community arena resonates deeply with the professional ideal of service to society codified in our ethical codes and taught in our professional schools. Over the last two decades in particular, leaders of the profession have been urging architects to become more directly involved in civic leadership, through public service on planning boards and in elected offices, as well as in advocacy roles related to community design and planning. While many of the leadership skills developed in practice settings will serve them well in this arena (i.e. collaborative process skills) other business-based approaches may fail to serve as effective means to positive results. The civic arena is different in many key ways from the leadership challenges of the professional office and collegial institutions, and architects must become sensitive to the differences to succeed as community leaders.

One key example of the difference between private and civic arenas can be found in the dispersal of decision-making power, or perhaps more significantly, the power to oppose decisions. Within the last thirty years, most U.S. cities have seen power shift from a small group of business and political leaders to a widely dispersed network of groups advocating for their "special interests", thus "fragmenting power and political will".[19] This dispersal of power is readily evident in disputes over planning and development, where there seem to be an endless number of groups who can say "no", but few empowered to find a way to say "yes". When architects do wade into the civic arena, it is often as an advocate for one of the aforementioned "special interests, a role framed too often by a transactional approach which makes it difficult to act (or at least to be seen as acting) in the broader public interest.

Leadership in the civic realm also requires a shift away from project-based thinking to broader systemic approaches to the challenges faced by many of our communities. Using Hohn's perspective on leading creative efforts, leadership in many contemporary community settings requires more focus on process-centered skills ("have we created new ideas?") than the task-centered leadership skills commonly developed in management settings ("have we solved the problem?")[20] Sharon Sutton characterizes this as a shift from a "how-to", vertical, discipline-bound thinking to a lateral thinking, "why-to" approach that can articulate ways to transcend the narrowly focussed self-interests that dominate debate over the physical environment.[21]

PREPARING FOR CIVIC LEADERSHIP

So how do we prepare architecture students for leadership skills in the civic realm?

As noted earlier, I believe one of the most effective places to begin is in the design studio. We must manage to broaden the framework of design projects in ways designed to help students understand the broad spectrum of interests that come into play - on even the

smallest of projects, public or private - and we must help them develop the collaborative leadership skills to work effectively in these settings. For the past eight years, Auburn University's Rural Studio program has allowed 5th Year students to program, design, and construct projects ranging from a small smokehouse adjacent to a private residence to several community centers. In addition to the technical challenges of constructing their designs, students must engage real clients, the economics of the project, and the full spectrum of civic groups, public agencies, funding sources, subcontractors and material vendors in an inclusive and inherently collaborative design process. As remarkable as the final structures are, the insight gained in the "making" of these mostly public projects is the real measure of their success. The experience of engaging the full spectrum of issues and problems involved in these projects has helped to prepare these students for leadership in their professional life in a unique and transforming way.

> *"As designers of the environment, architects' intellectual leadership is needed.... to help clarify the personal and political actions that will preserve the nation's quality of life in the twenty-first century."*[22]

We must also help our students see beyond the narrow vision of the architect as steward of "good taste" to a vision of the architect as *steward of the public interest in the physical realm.* Connecting back to Burn's view of transformative leadership, Sharon Sutton challenges architects to break out of a discipline-bound view of our role and to "unravel the dilemmas associated with place – to reconceive it as a collective, rather than private, property".[23] This "redefinition" of the architect's civic role is perhaps the most critical challenge we face as educators. We must help students see that our most valuable contribution is our ability to help communities envision the physical consequences of civic decisions, inserting into public discourse a perspective most often left off the table.

We can cultivate this focus on *envisioning the public interest* in the design studio by the projects we choose. Rather than focussing on "test tube" projects and assignments devoid of consequences beyond technical and/or formal concerns, we can design studio assignments that allow students to consider issues from the front lines of community debate over the physical realm. As a by-product of this pedagogical objective, the students' work is often helpful in illustrating to political and community stakeholders the physical ramifications of the positions they're advocating. It also provides communities with sets of possibilities they often never envisioned as possible.

As architectural educators we can involve students in the task of cultivating greater public awareness of the designed environment through participation in physical environmental education initiatives in grades K-12. These educational opportunities, along with other public education and awareness programs, increase a community's understanding that almost every physical setting of their lives is the consequence of choices made in both the private and public realm.

> *"Perhaps more than any other time, it is during the college years that those qualities of competence, caring, and character should be cultivated."*[24]

We can also have a tremendous impact on students' vision of the architect's role in society by the values and actions we model for them during their academic careers. Dana Cuff, echoed by Altoon, notes that "the ethos of the profession is born in schools" and that faculty are commonly the first professional architects students encounter in the socialization process of architecture school. Students form their first and often lasting perceptions of the behavior and beliefs that frame professional life based on the tacit and explicit values modeled by their faculty mentors. If we desire to cultivate a more "engaged profession", architecture curricula *and architecture faculty* must embrace an ethic of community outreach and engagement.

CONCLUSION

The tools we need to prepare for the challenge of leadership, the curriculum examples, studio formats and outreach programs, are already in existence at many schools of architecture. Community design centers, social issues studios, and public education initiatives have been a staple of architecture schools for decades. Many have established a strong culture of community service at the schools that utilize these tools. What we must do, however, is elevate leadership and service issues within the critical discourse of our professional schools and professional societies. This critical discourse must include both educators and practitioners in a collaborative examination of what we wish to accomplish through leadership, as well as how we can cultivate a culture of leadership within the profession of Architecture.

If the scholarship of leadership is a relative new comer to the academic scene, it is younger still when applied to our calling. Programs which engage in a critical discourse about the changing context of the architect's role in practice and in society, such as the Center for the Study of Practice at the University of Cincinnati, are essential to the development of a deeper understanding of how leadership is applied to the context of practice. However, further research is urgently needed and our schools can provide an essential service to the profession by examining successful approaches to leadership within, and outside of, our discipline. I believe this examination will lend support to those among us calling for a re-examination of the "design culture"[25] which architecture schools have stubbornly adhered to since the profession emerged from its formative years in the late 19th Century.

Dana Cuff notes that Architecture's professional ethos is built around design quality - that we assign design the status of a "master value".[26] Cultivation of this ethos begins on the first day of design studio and is reinforced through our professional lives. I believe that architecture students must hear and participate in critical discussions of leadership and service from the beginning of their professional training as well as throughout their internship and professional careers if we are to cultivate leadership as a *master*

value within the profession. This will require a broadening of our skill sets, a broadening of our perspectives, and an examination of our motivations and professional culture – key steps to take if we are to meaningfully "embrace the call and responsibility of leadership".[27]

NOTES

[1]Boyer, Ernest and Mitgang, Lee *Building Community: A new Future for Architecture and Education*, The Carnegie Foundation for the Advancement of Teaching, 1996, p 129.

[2]Stanton, Michael J. "Bold Vision for a Better Future" in the *AIArchitect*, June 1999.

[3]Altoon, Ronald A. "The Legacy of Dreams, Trust, and Courage" in the *AIArchitect*, July 1998

[4]Over the course of 1995 & 1996, the AIA's Practice and Prosperity Task Force conducted a series of meetings and workshops intended to develop a "framework for a redefined profession". The findings of this effort were published in the *AIArchitect* and presented as a video entitled "*Redefining the Architecture Profession*". A transcript of this video may be found on the AIA web site at www.e-architect.com/pia/redifprof/p&pvideo.asp

[5]Chrislip, David E. and Larson, Carl E. *Collaborative Leadership: how citizens and civic leaders can make a difference*, Jossey-Bass, 1994

[6]Cuff, Dana Architecture, The Story of Practice, MIT Press, 1991, Chapter 2: "Beliefs and Practice"

[7]Fisher, Thomas, "Architects and Power" in *Progressive Architecture*, February 1992, pp. 47-51.

[8]Grint, Keith, Ed. *Leadership: Classical. Contemporary and Critical Approaches*, Oxford University Press, 1997, Chapter 2 "Traditional Leadership" pp. 83-88.

[9]Ibid.

[10]Boyer and Mitgang, pp.83-88, & p. 136

[11]The American Institute of Architects Annual Convention is one of numerous venues for professional development training and continuing education for practitioners. For at least a decade continuing education workshops at the Convention have focused on leadership and organizational management skills. At the 2000 Convention in Philadelphia there were over twenty workshops on this theme. A good example was a workshop entitled "Manager's Boot Camp: Coaching Skills for the Leadership Advantage", led by Elliott Jaffa, EdD.

[12]Richard Hobbs, head of the Professional Practice Group at the national office of the AIA, writes a regular series of articles on current topics in architectural practice for the *AIArchitect.*

[13]Franklin, James R., *Architect's Professional Practice Manual*, McGraw Hill, 2000, Chapter 10:"Groupwork".

[14]Hohn, Helga D. "Social Dynamics and the Paradox of Leading an Innovative Team". A paper presented at the "Collaborating Across Professional Boundaries" conference at IIT in November, 2000

[15]Cuff, p. 74

[16]Barlow, Christopher M., "Creativity and Complexity in Cross Functional Teams" A paper presented at the "Collaborating Across Professional Boundaries" conference at IIT in November, 2000

[17]Cuff, p. 66

[18]Boyer and Mitgang, p. 149

[19]Chrislip and Larson, p. 20-21

[20]Hohn, Helga D. "Social Dynamics and the Paradox of Leading an Innovative Team"

[21]Sutton, Sharon "Power, Knowledge, and the Art of Leadership", in Progressive Architecture, May, 1992, pp. 65-68

[22]Sutton, Sharon "Architecture as the Practice of Intellectual Leadership", *Practices 5/6*, Center for the Study of Practice, 1997, pp. 30-31

[23]Ibid., p. 30

[24]Boyer and Mitgang, p.150

[25]Fisher, Thomas R., "Critiquing the Design Culture", *In the Scheme of Things*, University of Minnesota Press, 2000

[26]Cuff, p. 21

[27]Stanton, Michael J. "Bold Vision for a Better Future" in the *AIArchitect*, June 1999

Beginnings outside the Realm of Objects

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Architecture and its education are wedded to form, to the object. But when considered in all of its complexity, architecture today appears to find its possibilities in realms outside of the object; outside of the formal, material, and aesthetic questions which have largely defined the discipline and professional education for a very long time. This notion becomes apparent when the relationships between issues fundamental to architecture are thought of together as a whole, as a "grounding diagram." Inasmuch as contemporary trends appear to support this assertion, the study leads us to a polemic question: what might beginning design instruction be if it was outside the realm of objects?

GROUNDING DIAGRAM OF ARCHITECTURAL ISSUES

To pursue these possibilities, we must first conceptualize architecture as a system of issues and relationships. The diagram here (Figure 1) proposes seven broad categories within the discipline, and binds them in their interdependence and interrelationships. Every category can be found to relate to every other category in some way. Though inherently reductive, this conceptual grounding diagram provides a way to illuminate content issues within the profession, architectural education, and form itself.

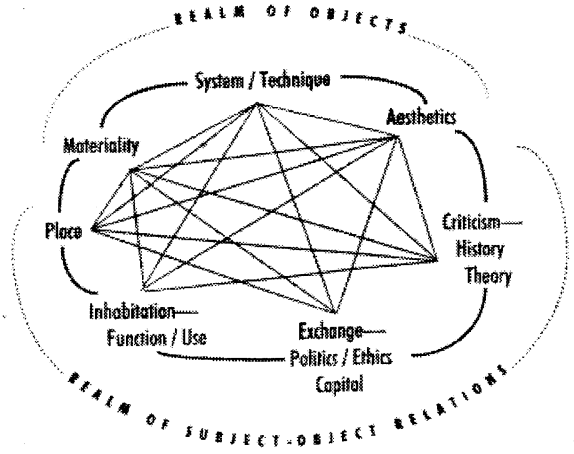

Figure 1.

The organization of categories around the grounding diagram is not completely random. Categories are placed immediately next to other categories with which they share a close affinity in context and content. From this placement larger groupings tend to occur, involving the distinction "object/subject-object relation." The categories "materiality," "system/technique," and "aesthetics" could be said to be more in the "realm of the object," while "place," "inhabitation," "exchange," and "criticism" could be said to be more in the "realm of subject-object relations."

Though these comparisons appear to be clear through the abstraction of the diagram, it is not intended that the ambiguity of the interrelationships between categories be denied. It is more useful and appropriate to note the *tendencies* for these categories to be find themselves within the larger groupings.

THE OBJECT, SUBJECT-OBJECT RELATIONS, AND BEGINNING DESIGN

The definitions for these two groupings—"realm of the object" and "realm of subject-object relations"—are relatively straightforward and dependent upon their differences through comparison. The "realm of the object" is where the content of categories is bounded more within objects themselves, through both the method and manifestation of form, and exterior to humankind. The "realm of subject-object relations" is where the content of categories is more evident within the conscious act of subject-object interrelationship; where form, human intention, and social structures mix in varying degrees for varying purposes.

The historic focus of beginning design studies has been aimed within the realm of the object. This generalization may initially seem to be a superficial reading of the breadth of possibilities within an architectural curriculum, but it is perhaps best borne out by seeing what every curriculum expects at its end—a professional understanding of how architecture is both a manifestation and method of subject- object interaction. This understanding is demonstrated in the usual "capstone project" or "thesis" of a professional education, and it is the presumed complexity of this content which creates its kind of logarithmic trajectory in most curriculums; little subject-object complexity in the beginning, increas-

ingly more at the end. Studio education in architecture typically becomes more interested in the difficulties of subject-object relations after it has been grounded in more formal and/or material considerations, the logic being that students can then manipulate objects within an ever widening set of social, economic, and cultural issues.

TRAJECTORIES OF CONTEMPORARY ISSUES

How does the logic of this normative architectural pedagogy compare to contemporary trends in the discipline and its relationship to society? To the extent that the grounding diagram of architectural issues has value, it appears that we may be able to use its structure to assess these questions. For this to be possible, we first assume the familiar position that architecture, in all its complexity, is an inherently "positive" act (flowing from past to present to future) and thus is most significantly realized when embedded in conditions of action; of analysis, judgment, and creation. This "positive" characteristic necessarily premiates situations which ask transformative questions, and it is these situations we must look for.

It may be possible to assert that—on the whole—the issues on the top half of the grounding diagram are generally more static than those on the bottom half; that the issues within the "realm of subject-object relations" are under more question today than those within the "realm of the object." Though such a proof is beyond demonstration, we can illuminate some examples which manifest contemporary trends. Considering each of the issues within the realm of subject-object relations, it would appear that:

- *"place"*—the disassociative effects of globalism and communication technologies upon normative notions of place will tend to increase rather than decrease.
- *"inhabitation"*—the success of human development and its burgeoning ability to satisfy both wants and needs will tend to increase rather than decrease.
- *"exchange"*—the advance of liberal democracy through capitalist systems of exchange and individualism will tend to increase rather than decrease.
- *"criticism"*—the atomization of social identity and devolution of group history will tend to increase rather than decrease.

Among the many other examples to consider, these trajectories are, on the whole, manifesting increasing change and instability. More and more thematic questions within and about architecture are bound to these issues as contemporary life moves into the next millennium.

Opposed to this change is a second set of trajectories, the more static issues within the realm of the object. Considering each of these, it would also appear that:

- *"materiality"*—the contemporary implementation of technologies and materials within built form are, at this time, of an evolutionary rather than a revolutionary nature.
- *"system/technique"*—the basic systems of design process and the techniques within building science continue to be, on the whole, reactionary rather than progressive.
- *"aesthetics"*—the authority of the design professions to provide publicly accepted aesthetic logic is diminishing rather than expanding.

Again, among the many other examples to cite, the general trend within these issues is, on the whole, static rather than catalytic.

THE FABRICATED VERSUS THE REAL

What do we make of these general trends? Among the trajectories offered above, it is quite obvious that the immediacy and potential of the ideas in the first group (realm of subject-object relations) is much larger than the actuality of the second group (realm of the object). But the unrealized possibilities of the second group—"revolutionary," "progressive," "expanding"—give a claim which approximates the transformative reality of the first group. That is to say, even though the first group is embedded in significant transformative capability, the second group can appear that way by fabricated intention.

This is a major assertion, and a uniquely contemporary problem. *It could be argued that to base architecture today upon the study of objects is to be based upon fabricated—and unrealizable—intentions within the realm of objects.*

To see this assertion in action in the studio is not rational, it is emotional. It is the sadness in the student when she asks when she'll get a studio project with a "client." It is the uncomfortable ache of watching a young African-American student play with a culturally meaningless palette of sticks and cubes. It is the palpable frustration in a team of students trying to design but lacking the skills to communicate and compromise. These examples stand for the way in which focusing upon the realm of objects often defeats any possibility of subject-object integration, and draws the life away from the "positivist" essence of architecture in the world.

Both architectural education and the profession make claims for the terms "revolutionary," "progressive," "expanding," but not in the set of relationships where today that kind of potential is realizable—the realm of subject-object relations.

Why it is that we are heirs to this problem is not the point of this study, but we should be reminded that the inertia of design practice and education has long been a force preoccupied with the object. From the aesthetic ideologies that produced the profession of architecture during the Renaissance, to the development of object-centered pedagogies within Beaux Arts and Bauhaus education, to the effective division of disciplines manifest in the modern University—all of these things have encouraged the continued

disciplinary emphasis upon understanding form as a separate concern removed from other content, other issues.

Seen in this longer history, it becomes natural to assess the conceptual ground which bounds this renewed significance of subject-object relations. The present argument is not the first to suggest such concern, in fact this question goes back to the ancient Greeks, to the fundamental differences in Platonic and Aristotelian philosophies. There are also threads of positivist, Marxist, and post-structuralist thinking here within the argument. But rather than building a theoretical lineage, it may be more useful to consider the kind of contemporary developments in practice and education which provide a more immediate reasoning to realign architecture in subject-object relations:

Contemporary developments facing the architectural profession:

- push toward interdisciplinary "team-based" problem solving
- broadening toward "life-cycle" kinds of client problem management
- skills of integrative thinking becoming more helpful in contemporary community problems
- possibilities in burgeoning information and knowledge management

Contemporary developments facing architectural education:

- desire for more rigorous liberal-arts preparation (as suggested by the Boyer Report)[1]
- renewed emphasis on interactive and collaborative learning
- shift from "faculty-centered" to "learning-centered" institutions[2]
- interdisciplinary emphasis mandated by universities
- increases in service learning, community-based outreach and education
- growing importance of "design-build" learning environments

BEGINNINGS OUTSIDE THE REALM OF OBJECTS

How do we start to think about a pedagogy of the beginning design studio outside the realm of objects? In the same manner that most object-centered instruction tangentially engages subject-object relations, this new curriculum might tangentially engage the object through rigorous investigations into subject-object relations.

On the face of it, this may appear to simply replace one questionable structure with its opposite. But there is something here which is not a simple inversion. In light of the potential that subject-object relations are the significant transformative force in contemporary form making, it seems more natural to "find" objects within the larger realm of subject-object relations. That is, this new construct would find objects within the larger subject-object set rather than trying to marry conceptual object-making skills—developed independently—with an external condition of subject-object relations.

In this new construct, the object—architecture—allies itself with "attestation" rather than "transcendence." It sees objects as they are within the larger realm within which they operate; never separately beyond that realm as in previous paradigms. If the old construct could be called the "transcendent object," the new condition would be the "situated object."

PEDAGOGY OF THE SITUATED OBJECT

What follows is a first attempt to define the parameters of a pedagogy for architectural education which arises from the "situated object," the "realm of subject-object relations." Within these parameters are a number of specific methodologies that could be used to explore content, and a reinvigorated set of content issues which flesh out the "subject-object relations" on the lower half of our original grounding diagram. Together, these methodologies and the new content hope to represent possibilities without being expressly formulaic.

To begin, it should be acknowledged that many educational methodologies could be useful to situated object study; the three proposed here attempt to broaden the field by being representative of strongly differing conceptual attitudes—from purely philosophical constructs to rigorous object creation. They are what will be called a "philosophical" methodology, a "situated study" methodology, and an "indexical" methodology.

"Philosophical" methodology—to illuminate the elemental and causal relationships between subjects and objects. To probe subject-object relations through a philosophical methodology is acutely appropriate, since it is so fundamental to the philosophical project itself, and the battle between subject and object been so central to the arguments of contemporary theorists. Mark Wigley makes this clear:

> *"Philosophical discourse is able to construct itself only inasmuch as our culture maintains a certain account of the architectural object. In other words, one can put theory in place only by employing a precise set of assumptions about the condition of objects . . . . We would [then] understand philosophy as a certain effect of architecture. That is to say, in the production of form, there is a side-effect known as philosophy which operates as a constrained discourse about certain limited qualities of form, a repressive discourse made possible by enigmatic qualities of form it cannot thematize."*[3]

• The "subject-object problem"—The relationship between humankind and the objective world was a philosophical construct first problematized by the ancient Greeks, but has come down to us through every subsequent Western philosophical development. The Greek thinkers stumbled onto a paradox; that "the individual is a physical object and an integral part of his/her surroundings, while also a subjective being standing outside his/her surroundings, observing and acting upon nature from which he/she is detached."[4]

Though not often adequately addressed within our discipline, the centrality of the subject-object problem to the making and manifestation of architecture is certainly obvious. Theorist Mark Gelernter expresses this feeling well:

> *"Although one intuitively feels that designing involves both sides of the equation, the logic of the [subject-object] duality makes it virtually impossible to link the two together. It makes the individual who knows, the individual who takes in information from the outside, an object in a larger system and a recipient of objective, transpersonal material; while it makes the individual who creates, the individual who generates ideas from within, an autonomous and subjective being who transcends the existing and even the shared. Given the logic of the duality, a shift in attention from the processes of knowledge to the processes of creation necessarily entails a change in the underlying conception of the individual and his or her relationship to the external world. The two processes cannot be related together within the logic of the system because they assume opposing world views."*[5]

Within our current discussion, what is compelling about this paradox is that it grounds the ambiguity of architecture's making and manifestation in a construct of age-old thinking; thinking which has yet to satisfactorily "solve" the subject-object problem, and whose work continues under various theoretical banners today. The explication of this problem—often overshadowed in architecture by repressive conceptual structures and narrow aesthetic concerns—looks to be a significant intellectual resource. These philosophical positions offer much toward addressing the integration of subject-object concerns in architecture.

"Situated-study" methodology—To study objects within their subject-object relationships. The situated or "case" study method is defined (in disciplines outside of design) as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.[6]

Though the case study format sounds familiar to most architectural educators (many of whom use real-world studies, programs, sites, clients, etc.), the reality of a high quality case-study and the manner of its exploration in the classroom is much more "complete" construction than we are generally familiar with. At its best, the case study needs to be "whole;" there are no short-cuts or edited issues, since it is the complexity of the problem which makes the exploration of the situated study so powerful. There are three potential ways to mold this methodology:

- Situated study as "issue grounding"—This construct works only to define the parameter of architectural issues through the exploration of case studies; specific examples of environmental form seen in their complete context of social, economic, physical, and conceptual issues. Students would use the examination as a definition of architectural issues and their relationships, not in ways which create analysis, interpretation, or new propositions. Clarifying each study only to illuminate the facts of its context allows comparative learning between studies. This kind of construct is quite elemental, and best seen at the earliest stages of design instruction. In their simplicity, these studies would be quite sympathetic to multi-media and other interactive instructional technologies, which would allow students to create their own "paths" through the given case study information.

- Situated study as "report"—This is a further development from the "issue grounding" above, pushing the exploration of the case study into full-fledged analysis. Of course, in the world of subject-object relations, we need to reinvigorate our object-centered architectural view of analysis to incorporate methods from other disciplines; sociology, economics, political science, history, etc. This entails a complete analytical mapping of the situation in terms of its subject-object relationships, where object analysis is a very discrete—and often minor—part.

- Situated study as "proposal"—This form is a synthetic inversion of the classical case study. Instead of studying the depth of a knowable real-world construct, this study would create the full complexity of a subject-object situation which has yet to exist, but comes from trajectories already in place. This work imagines subject-object relationships by demonstrating an understanding of how these relationships operate, and is thus a more sophisticated method than either the "grounding" or "analytical" types of situated study. Among other techniques, this study method could be assisted by many of the recent advances in computer modeling of complex, interactive structures.

"Indexical" methodology—To create objects as "maps" or "indices" of their subject-object relationships. This method incorporates the making of objects into the study of subject-object relations. However, the significant difference here compared to traditional object-making is that the object is thought of as a kind of "bi-product" from another conceptual procedure; it works only as a "map" or "index" of that other thinking process. The other thinking here, of course, is intended to illuminate subject-object relations.

The conceptual basis for this methodology is found within theories of post-structuralism, specifically deconstruction. From this theoretical work comes the notion that under all things lies a fundamental condition of differentiation, what Jacques Derrida famously called *"différence."* This idea of *différence* binds things through relationships first and foremost, as Derrida says:

"The world is a texture of traces which exist autonomously as 'things' only as they refer to or relate to each other . . . No entity has a unique being . . . apart from the web of relations and forces in which it is situated."[7]

The indexical methodology attempts to illuminate this fundamental condition of "relations" by processes of making which contain within them the marks of the relations which bind the object. Among others, there are initially two ways of developing this methodology:[8]

- "Principle of Complementation"—This process would investigate the creation of objects which are manifestations of diametrically opposed categories; sets such as "form–content," "utility–poetry," "originality–imitation," etc. The composition of such sets are known as "binary oppositions," one of the operative components of post-structuralist theory. The definition of such binary oppositions within a given condition is an intensely analytical and creative process, and as such a substantive demonstration of critical thinking. It is the collision of terms and the inescapable necessity for compromise which makes the problem of complementation fundamentally architectural.

- "Principle of Combination"—Another process linked to theoretical deconstruction, this method would work to create objects which bind categories, defeat hierarchies of embedded values, and confound systems of classification, especially the normative architectural systems like functional and formal typologies. This kind of thinking is demonstrated in architecture by a number of contemporary practitioners, among them Peter Eisenman.[9]

Though often criticized for a certain kind of willful avant-gardism, this process of combination is neither congenitally stylistic nor inherently nihilistic. By intentionally creating new things out of the fusing of old oppositions, much can be learned by the resultant "betweenness," by the newly created "eccentric third term." As Manfredo Tafuri points out, this process is about "breaking the relationships of the existing order in order to recover them at a higher and different level."[10] Objects created through such a thinking process would not necessarily be "practical" or "rational" in the traditional sense of making, but could manifest critical positions which exhibit a greater fidelity toward their elemental constituency, the content of their relationships.

CONTENT OF THE SITUATED OBJECT

If the range of potential situated object methodologies is broad, the content of instruction within these methodologies is broader still. Though it is nearly impossible to formulate a definitive listing of situated object content for the architectural studio, it is easier to see issues within the realm of subject-object relations which are typically ignored or glossed over in the traditional curriculum. Inasmuch as the familiar object-based instruction finds it difficult to deal with these issues, they may represent good points of departure.

- Content within "place"—One of the largest gulfs between the discipline of architecture and society at large is the forgotten semiological foundations—the language and symbolism—of place. This is one of the few conceptual areas in which beginning design students can adequately participate, since they (like every other person) have spent a lifetime navigating this human system. As the first citizens of the radically new forms of community birthed by our communications revolution, today's generation of beginning design students can also contribute toward the new ways in which form and place will relate in the future.

- Content within "inhabitation"—As the world economy develops its way out of the basest needs on Abraham Maslow's famous list, the burgeoning issue of consumption—of needs versus wants—will reprioritize architectural issues in ways almost unimaginable. At the moment, the discipline is still reticent to face the questions of consumerism and the evolution in human uses of space, preferring instead to cling to historic values and intentions in architecture in a highly reactionary way. Every beginning design student who still imagines a future with "their own name attached to their own building" is an heir to this faulty logic. We have to see that object-centered educational pedagogies are continuing this ignorance within the profession, and encouraging the growing marginalization of architecture in the larger public realm.

- Content within "exchange"—The significant issues within "exchange" are many, perhaps owing to the term's fundamental subject-object grounding. Political explorations, understanding and applying ethical considerations, knowledge about capitalist theory and process—these among many other exchange issues are topics increasingly central to professional practice and manifestly powerful in the creation of architectural form. But perhaps the most underrated and undeveloped topic in beginning design education is the ground for all others in the field of exchange; human interaction, group dynamics, management, and interpersonal communication. Though the scholarship and procedural development in these areas is highly developed in disciplines like business, sociology, education, etc., very rarely does that expertise find its way into the architectural curriculum in any rigorous way. A beginning student's first group work experience is more likely than not to be without any active instruction at all on how to do such a thing. Like much in architectural education, we expect experience to be the best teacher. In light of the body of work in other disciplines, our collective disinterest in interpersonal communication instruction is inept at best and injurious at worst.

- Content within "criticism"—In this subject-object relations content, architectural education has probably been more successful, at least in terms of the broad awareness of these issues advanced through courses in history, design method, and theory. But certainly more work can be done

in more synthetic and meaningful ways at the level of beginning design. Some issues within subject-object philosophies—especially as manifest in contemporary viewpoints like feminist theory and postmodern theory—are actually quite accessible to most beginning students, since a number of major tenets in these ideas have likely trickled down into their own lives and educations. Given opportunities to engage these experiences in the studio, subject-object relations find fertile and familiar ground for development.

CONCLUSIONS

In architectural education, shifting from object-centered instruction to one of subject-object relations is a potentially powerful contemporary pedagogy, and fully realizable at all levels of the curriculum—especially in beginning design.

Though there may be ample reason to find fault in object-based pedagogy on the pure basis of instructional theory, it is actually the shifting ground within the academy and its relationship to society which raises the potential benefits of subject-object instruction more forcefully. As we witness higher education broadening out into the world, as studio projects become "public" effort, as students work more collaboratively rather than individually, as the complexity of designing, building, and community are brought into the classroom, the efficacy of normative architectural pedagogy—beginning object studies leading toward the complexity of subject-object relations—becomes highly circumspect. It appears instead that fully engaging the wealth of possibility in subject-object relations—even in all of its ambiguity and complexity—is really the only path toward the reintegration of architecture within its larger human context.

NOTES

[1]See especially "A Connected Curriculum," Ernest L. Boyer and Lee D. Mitgang in *Building Community: A New Future for Architecture Education and Practice* (The Carnegie Foundation for the Advancement of Teaching, Princeton, NJ, 1996).

[2]An excellent introduction to these ideas is Robert Barr and John Tagg's "From Teaching to Learning: A New Paradigm for Undergraduate Education" in *Change*, Nov./Dec. 1995 (The American Association for Higher Education, Washington, D.C.).

[3]Mark Wigley, "The Architectural Displacement of Philosophy" in *Form, Being, Absence: Architecture and Philosophy* (Pratt Institute, Brooklyn, NY), pp. 6, 8, 95.

[4]Mark Gelernter, *Sources of architectural form: A critical history of Western design theory* (Manchester University Press, Manchester, 1995), p. 27.

[5]Gelernter, pp. 28–29.

[6]Robert K. Lin, *Case Study Research: Design and Methods* (Sage, Newbury Park, CA, 1984), p. 23.

[7]Jacques Derrida, *Margins of Philosophy* 1972 (tr. Bass, A., The Harvester Press, London, 1982), pp. 3ff., 14.

[8]These three concepts are indebted entirely to David Smith Capon's chapter on "General and Composite Theories" in *Architectural Theory Volume Two: Le Corbusier's Legacy* (John Wiley and Sons, New York, 1999).

[9]Peter Eisenman, "Blue Line Text" in A. Papadakis, et. al., *Deconstruction* (Academy Editions, London, 1989), p. 151.

[10]Manfredo Tafuri, *Architecture and Utopia: Design and Capitalist Development* (MIT Press, Cambridge, MA, 1976), p. 53.

Architectural Education:
Towards the Purpose of Existence

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This essay attempts to locate architectural education and practice within the broader framework of culture and existence. It proposes a new relationship between architectural education and practice. At the core of these arguments is the self. The culture that accommodates architectural practice and modes of architectural production has reduced the self to survival as opposed to liberated existence. I propose an architectural education that addresses larger questions of life in an arriere garde role vis-à-vis architectural practice to reinstate the self and reconcile it with the world in existence.

EXISTENCE AND SURVIVAL

Contemporary architectural practice, in the past few decades, has transformed to a large extent. This transformation, from my viewpoint, has been characterized by an increasing dichotomy between the modes of architectural production as controlled by capital, and the self. This has occurred in a time when the idea of progress is primarily derived from and molded by the free market economy. I will address this point, and some of its implications, later in this essay. One way to arrive at an understanding and description of contemporary architectural practice, and its relation to the self, is to overview the state of our built environment: the forces that shape it invariably affect the nature of practice itself.

The relationship between the self and the built environment – the city and its architecture – manifests in the public and the private realms. The market economic forces shaping the contemporary city have caused a steady erosion of the public realm. Michael Sorkin describes this erosion as he characterizes the contemporary city in three ways: first, the condition of placelessness, caused by the dissipation of relations to local physical and cultural geography; second, the obsession with surveillance through both technological means such as security cameras, physical boundaries such as the creation of segregated enclaves, and socio-economic factors bounding pockets of poverty at the urban core; and third, the city as simulation, an increasingly abstract entity controlled by global electronic technology.[1] The city's physicality is rapidly being reduced to the flatness of a screen onto which we project our desires. In this scenario, it is a challenge to establish a meaningful relationship with the city.

As with the public realm, so too with the private. Our idea of dwelling in an existential sense is in jeopardy: it is difficult to connote "home" in a sub-division thirty miles from the urban core where a hundred houses look exactly the same. The economics of home building have put the average homebuyer beyond where he or she can have control over home building. The high mobility of our post-industrial (or whatever label we may so choose) age does not ensure lasting relationships with either the home or the city; in other words, it becomes more difficult to dwell when one is constantly being uprooted and relocated. The interchangeability of labor along with the fact that jobs become increasingly dispensable – and reformulating constantly – in a global economy also adds to this apermanence. Dwelling in an existential sense very much obtains from the twin factors of place and permanence. So does its analog in the public realm, community.

The erosion of physical communities is being complemented by the spawning of virtual communities on the Internet. The cultural theorist Homi Bhabha however is skeptical of its value in fostering a perhaps authentic feeling of community: the instant connectivity and simultaneity, "drains life of its historical memory and its capacity to register the contentions of cultural differences."[2] It would be fallacious to assume that the smooth "cyberspace lifeworld" could approximate the complex and textured terrain of multicultural urban communities which are more than ever resembling global communities. Dealing with one's cultural identity is necessary if contentious part of knowledge of self.

Given this overview of the built environment, what, briefly, is the state of contemporary architectural practice? For a start, the architect increasingly sees his or her role marginalized, with decreasing control over the built environment. From master builder, the architect is reduced to the role of facilitator of large teams, with greatly reduced influence. The value of the architect and of architecture has diminished somewhat, for various reasons. Michael Benedikt addresses this in a recent essay.[3] The market economy has driven the speculative nature of built-up space in cities. These speculative buildings with their cheap materials and standard details undermine craft. The residential sector is still intransigent to archi-

tects' advances. A demanding marketplace asks for more and more to be done for less and less: the architect has to make do with a much smaller portion of the pie. Franchise agreements limit both the quality of work and the fee. The use of technology in practice, while having greatly reduced the time spent on projects by and large has neither enhanced the quality of design in those projects nor precipitated profits of the scale in other professions. The global economy, has opened other markets to architects; however, the limited involvement precludes them from overseeing the quality of the construction, besides raising some thorny cultural issues of power imbalances (such as engaging the foreign architects only in the back-end of the project such as the labor-laden construction document phase).

It can be argued that the effect of the environment on the self is one of alienation. Miming the islands of strip malls, parking lots and other spatial flotsam in the ageographia of our cities, we too are islands seeking meaningful relationships and connections with others and with our built environment, groping for the elusive community, our selves increasingly isolated from one another. I extend this predicament to the realm of practice too.

The very existence of the self is called into question: the self is subject to reductive *survival* as opposed to liberated *existence* that reinstates self and reconciles it with the world. Survival assumes taking narrow slices of life, on a day-to-day basis, and accumulating them in an effort to piece together a life; it is apparently difficult to derive much meaning out of such an assemblage. Existence, on the other hand, assumes a thorough knowing of the self (to the extent possible) and nourishing it with meaning throughout life. Knowledge of the self involves a rational approach, one of constant and rigorous questioning.[4] The critical stance also means being self-critical, constantly judging the critical distance the self maintains from the action of everyday life.

Knowledge of the self also means a knowledge and understanding of our cultural condition, which the self constantly interacts with and tries to derive meaning from.

ARCHITECTURE AS DERIVATIVE OF CULTURE

Architecture, as a derivative of society and culture, is fundamental to the description of our cultural condition, which is nowhere better manifest than in the urban realm. Conversely, interpretations of architecture can be formed by studying the culture that produced it. It is from the dialectics that structure our thought (which, one can argue, modernity sought to privilege one over the other) that, as Alan Colquhoun points out, the idea of cities – the distinction between the public and the private, individual and collective, "fundamental to the economy of cities,"[5] has risen. The idea of progress in the Modernist city derived from the belief in technology and adhered to a collective ideal. Our idea of progress is now primarily derived from and shaped by the market economy rather than any ideal.

In the contemporary city and architectural practice, the dichotomies such as public and private, and individual and collective are further ruptured by the forces of the market economy. It is this extreme disjunction, perhaps, that causes alienation and empties the relationship between the dichotomies of meaning. This disjunction manifests in many ways: perhaps literally, the increasing distance between urban cores and suburbs, the increasingly elusive idea of a collective, and the erosion of the public realm.

For the purposes of integrating architectural practice and education within the framework of this argument, I propose a dialectic that perhaps encapsulates the ideas already forwarded: that of *slowness/ speed.* Paul Virilio offers the thesis that the form of a city is based on heterogeneous speeds, by the difference between inertia and traffic.[6] His thesis serves up two central ideas: speed supplants place, equating place or stasis with powerlessness, and speed with power; and the effacement of boundaries, reducing form to an interface for exchange, a mere screen for communication, while abolishing the notion of physical distance. Power now resides with the flow of information in an increasingly abstract way. Global information flows imply that power now shifts, at the rate of flow of information, anywhere in the world. The economy of speed reduces the time for design and producing documents of buildings in architectural practice. Speed can be seen as a succession of instants, and a lifestyle engulfed in speed is drained of meaningful memory; it is analogous to survival.

On the other hand, slowness aligns with our traditional ideas of place, and traditional modes of architectural practice and production. Qualitative and intangible aspects such as the gradual accumulation of historical memory in a city, the creative act, craft, urban rituals, the act of dwelling through the realization of the self [7] reside under this rubric.

Hannah Arendt draws up an important distinction between labor and work, which relates directly to current architectural practice.[8] She defines labor as repetitive tasks of necessity that produces what can only be called a product in a measurable way. Work, however, is performed not out of necessity, but to make or construct a world. In other words, while labor strictly pertains to survival needs, work fulfills the existential needs of the self.

THE DILEMMA OF PRACTICE AND DIFFERING VALUE SYSTEMS

The dilemma of the practicing architect vis-a-vis the questions of survival and existence arises out of this argument. On the one hand she or he could completely pass the dominant market economy by and privilege work over labor, and uphold the virtues of craft and creativity. Such a practice, while possible, would be anachronistic and represents a clash between differing value systems rather than a resolution. Without engaging the unique cultural circumstances of the present, the influence of such a radically alternative practice on the mainstream is minimal. To explore the role of architectural education in resolving this dilemma to any extent, it is neces-

sary to understand the different value systems to which education and practice belong.

Here I adapt Gary Coates' analysis of the fable "Stone Soup" in which he identifies the gift economy and the market economy as the two complementary modes of community and dwelling to this discussion.[9] Architectural education derives from the gift economy, and architectural practice as described is generated by the market economy. The gift economy, the dominant form of material exchange among tribes, small agricultural communities and guilds, is premised on the ability to give, to transmit knowledge in this case, and make sure that this transmission of knowledge is in constant flow. In other words, in the gift economy, the distribution of the gift is equitable and its success depends on the ability to move, and not accumulate at places and hence create scarcities in others. This, of course, is in the best tradition of education. Contemporary architectural practice, as has been discussed earlier, is an operative of the market economy, where wealth accumulates at places, as does power. There is intense competition to effect a redistribution of resources, which in the current market economy is information-power (flowing, it may be added, at instantaneous speed).

One vital difference between the different value systems is the question of value itself. In the case of architectural education, the creation and accumulation of value is necessarily slow, perhaps constant, and intangible. Here it is analogous to the value attached to the creative act and that of craft, as also in place making and dwelling: the inherent value may not be realized at the moment of formation, but is slowly accumulated and released over time. The growth of cities is another example. In the case of contemporary architectural practice, as discussed earlier, the value of architects and architectural services has greatly diminished. Not only that, the value of buildings - products of practice - is volatile: instantly soaring or diminishing, dependent on market flows and trends. The value created is tangible and extrinsic: it depends on external factors that are at most times random, arcane and disconnected. Less depending on the materiality and craft of the building, its value becomes exchangeable and replaceable, factors that are antithetical to place-making.

ARCHITECTURAL EDUCATION AS ARRIERE GARDE FOR EXISTENCE

Having sketched out the different value systems that define architectural education and architectural practice, what is the potential for architectural education to assume an arriere garde position to the process of reinstating the self for existence vis-à-vis conventional practice? The arriere garde position, as opposed to the frontal, nihilistic characteristics of the avant-, is one of protection, conservation and defense. The following prescriptive approach derives from the hope that it is precisely these qualities found in the value system of architectural education that can provide a rearguard to the value system of current architectural production to realize the larger project of existence.

1. Location, location, location:

Architectural education should extend its philosophical bases and address three crucial questions of location that directly deal with existence: *the location of architectural knowledge* within a field of other knowledge; the *location of contemporary culture*, that in ways produce this knowledge, in a field of all cultures, and finally the *location of self* in culture. Essential to the knowledge of the self is establishing moorings in time and space, which these questions of location try to address.

An understanding of architectural knowledge is necessary to provide a lens to examine the current modes of architectural production and practice. Its location with respect to other knowledge helps constantly to seek alternate modes of practice whenever possible within the dominant value system, and to study other professions towards applying some desirable aspects to contemporary practice, while constantly evaluating the state of practice. Current practice tends more than ever towards narrow specialization, which is also one of the reasons for the decreasing value of architect as master builder who has a broad understanding of the building process and architectural services. Responding to such practice, education provides skill sets rather than generalized knowledge. Analogous to the slicing of life on a daily basis in survival is the narrow sectioning of knowledge. The generalization of knowledge with a liberal base as in the Renaissance ensures this continuum of different kinds of knowledge analogous to aspects of existence.

As with understanding of knowledge, so too with culture: as mentioned earlier, cities, architecture and its production are derivative of culture, and it becomes necessary, indeed critical, to understand one's cultural condition. The history of architecture and urbanism is intimately linked to the history of culture itself; a reconsidered treatment of the subject is one way towards such awareness.

This understanding of the cultural condition is one way towards knowing the self and locating the self in culture. This means assuming an intense, rational approach towards the self. The philosopher J. Krishnamurti illuminates the question of intense self-awareness at all times.[10] It is a rigorous approach of thinking critically, in a non-judgmental way, enabling one to create and maintain a critical distance to culture and everything contained in it. In this way, the self develops a critical resistance to the value system of the market economy, among others. It is this distance which separates existence from survival.

2. Complexity of things:

Architectural education should extend beyond Cartesian boundaries and emphasize the complex nature of things and contemporary knowledge that is in constant flux. The seeming randomness of the working of the market economy, the abstract, multilinear flows of information across the globe, the simultaneity of connections, etc imply the loss of the simple one-to-one correlation between things, and transformation of causal relationships. Deleuze and Guattari's model of the rhizome to deal with the multiple realities of the postmodern age is particularly relevant here: the philosophers

propose the rhizome as a metaphor for this complexity based on the principles of heterogeneity and multiple connectivities which supplant the linear hierarchical tap root model.[11] The rhizomatic model needs to be extended to architectural education too.[12] Identifying overlaps between the value systems could create new relationships between education and practice in ways which may benefit both.

The approach towards complexity also becomes relevant in dealing with diverse voices in the multicultural society and understanding issues of migration, minority cultures, and cultural identity, which are necessary towards knowledge of the self.

3. Shuttling:[13]

As corollary to recognizing the complexity of things, architectural education should emphasize the constant straddling between realms, the shuttling to and from between polarities that structure our cultural condition. This action represents the will of the self to mediate between the polarities in a conscious effort to reconcile them. Shuttling privileges the condition of simultaneity, of both/and over either/or. It throws different light on dialectic relationships such as craft and technology, education and practice, slowness and speed. The act of shuttling constantly sets these polarities in dynamic relationships that affect both. It becomes an effective way of dealing with the dominant entity in a way that is participatory and not exclusive. The act of shuttling constantly reverses the center and margin of a polarity.

Shuttling, however, needs to be a conscious act. The dialectic structures in themselves do not change through the act of shuttling; however, it is the relation of the self that does, in a way that liberates it from the dominant entity. It is the conscious nature of this liberating act that creates meaning for existence.

Architectural education, in this proposition, then broadens its base to accommodate these larger questions of existence. It may perhaps not be utopian to think that this educational model might be able to shed its arriere garde role in the future and directly partake in the creation of an architecture that has ceased for some time now to fulfill its vital role: allowing the self to dwell, and hence, exist.

NOTES

[1]Michael Sorkin, ed., *Variations On A Theme Park*. (New York, NY: The Noon Day Press, 1992), 30.

[2]Homi K. Bhabha, "Minority Culture and Creative Anxiety," www.oldbritcom.org/studies/stdsinv.htm. 1997

[3]Michael Benedikt, "Less for Less Yet: On Architecture's Value(s) in the Marketplace," *Harvard Design Magazine*. Winter/Spring (1999): 10-14.

[4]"Rational" is meant in a more general sense as commitment to reason as opposed to prejudice, judgment, or any other conviction which is considered irrational.

[5]Alan Coquhoun, *Essays in Architectural Criticism* (Cambridge, MA: The MIT Press, 1981), 95.

[6]Paul Virilio, *Speed and Politics: An Essay on Dromology* (1977). Translated by Mark Polizzotli. (New York, NY: Semiotext(e), 1996).

[7]Martin Heidegger, *Poetry Language Thought* (New York, NY: Harper and Row, 1971).

[8]Hannah Arendt, The Human Condition (Chicago, IL: The University of Chicago Press, 1958), 80.

[9]Gary Coates, "Stone Soup: Utopia, Gift Exchange and the Aesthetic of the Self-Consuming Artifact," unpublished paper.

[10]See, for example, J. Krishnamurti, *Talks and Dialogues*. (New York, NY: Avon Books, 1968).

[11]Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (Minneapolis, MN: University of Minnesota Press, 1994).

[12]Mahesh Senagala, "Towards Noosphere: Envisioning Wall-less Studios and Rhizomatic Pedagogy", presented at ACSA Rome Conference, 1999.

[13]I borrow this term from Jennifer Bloomer, *Architecture and the Text: The (S)crypts of Joyce and Piranesi*. (New Haven, CT: Yale University Press, 1993), 181.

Navigating with an Ethical Rudder

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A work of architecture . . is as much determined by the aim which it is to serve as by the place that it is to take up in a total spatial context. ... Through this dual ordering the building presents a true increase of being: it is a work of art. It is not a work of art if it simply stands anywhere, as a building that is a blot on the landscape, but only if it represents the solution of a building problem. ... A building is never primarily a work of art. Its purpose, through which it belongs in the context of life, cannot be separated from itself without losing some of its reality. If it has become merely an object of the aesthetic consciousness, then it has merely a shadowy reality and lives a distorted life only in the degenerate form of an object of interest to tourists, or a subject for photography.[1] —Hans-Georg Gadamer

ETHICS: A NAVIGATIONAL RUDDER FOR ARCHITECTURE

"Draw it for me — I need to think about it for a year!" This quote from a client collects three ideas fundamental to architecture. The first is our *human-ness*: our capacity to invent, envision and represent (*to Draw*), and our desire to reflect upon things in making decisions (*I Need To Think About It*). The second is *place*: the *It* of the quote in both locations is an expansion to a garden and house, a change intended for betterment of the home — both the concept of it and the real thing. The third is *time*: in this case, a *year*. Architecture takes place in time — time for thought and construction and inhabitation — and endures through time. Collectively taken: human-ness, place and time comprise an underlying foundation to architecture.

The commonly received discourse of architecture today includes many change oriented, new practices and demands – those of progress: global practices and network practices that enable greater reach and expanded capabilities for design firms; emergent capabilities of the computer to drive design and the related concepts of bio-informatics; the changing dynamics of construction materials and systems; the changing roles of the architect as form giver and process leader; the merits of sustainability and the share and nature of work that involves re-using existing buildings as opposed to creating new buildings; an expanding range of fields in which persons with an architectural background find themselves; and commentary upon the inroads being made into architecture by 'non-architects'. Yet, at the center of architecture remains *designing the environment we inhabit*, which, whatever its methods and results, for the foreseeable future demands human-ness, place and time for its validation.

Amid the progress dynamic that affects architectural practices and ideologies, these notes propose that a practice which has perhaps too infrequently been explicitly on the agenda of architects may be helpful in negotiating contemporary education and practice — the study of ethics as they may specially apply to architecture. While there may be no certain, fixed, unerring ethical truths, ethical reflection helps us to sharpen our focus in those endeavors that presumably address bettering the human condition — in the case here, architecture's efforts to design and build better places for inhabitation on earth. It is ethics that bridges architectural design and human intents regarding place and time.[2]

This paper explores the proposition that architectural ethics may be suspended between positions taken by Vitruvius and Immanuel Kant. The former asserts that *beauty* is as essential to architecture as are *utility* and *durability*, and the latter, that architecture finds its perfection in serving its social purposes and thus that beauty is contingent, compromising architecture as a fine art. This is a complex ethical matter — not to be quickly dismissed as a 'Beauty versus Function' subjective opinion debate or as a confusion between "aesthetics" and "ethics".

A developmental line for architectural ethics and aesthetics' position within it is sketched from Vitruvius' "firmness-commodity-delight" triad, through Medieval consideration of the ranking of knowledge and the arts, to architecture in Kant's *Critique of Judgment*, on to Hegel who also takes up the hierarchy of the arts including architecture, and then to Heidegger's *Building Dwelling Thinking*. Four Precepts are proposed which collectively constitute a framework for exploring architecture's special ethics, its 'navigational rudder': ? 1: Purposefulness; ? 2: Material Production; ?3: Aesthetic Virtue; ?4: Praxis. A concluding section proposes a course for continued development and case study exploration of the themes presented here, beyond the confines of this brief foundational paper.

TO BEGIN: VITRUVIUS TO HUME

We begin with a quote from the Morris Hicky Morgan translation of Vitruvius' *Ten Books on Architecture*:

> *All these [buildings of all sorts from fortifications to temples to baths, theatres and promenades] must be built with due reference to durability, convenience and beauty.*[3]

The later Granger translation is "strength, utility, grace."[4] Working backward in time from Morgan, Isaac Ware in his translation of Palladio's reference to Vitruvius used: "utility or convenience, duration and beauty."[5] Sir Henry Wotton, referring to, but not translating, Vitruvius uses: "commodity, firmness and delight."[6]

Vitruvius continues on to describe his meaning:

> *Durability will be assured when foundations are carried down to the solid ground and materials wisely and liberally selected; convenience, when the arrangement of the apartments is faultless and presents no hindrance to use, and when each class of building is assigned to its suitable and appropriate exposure; and beauty, when the appearance of the work is pleasing and in good taste, and when its members are in due proportion to correct principles of symmetry.*[7]

In the first quote, Vitruvius posits that it is *venustas* (beauty), that elevates mere construction and building to 'architecture,' and that it is architecture that is the proper order of building for public purposes. Thus, architecture includes an essential, intrinsic manifestation of beauty in conjunction with its human purposes to *be* 'architecture.' If there is a chance that this requirement is misread, Palladio makes it explicit that all three are simultaneously required for proper architecture:

> *That work* cannot be called perfect, *which should be useful and not durable, or durable and not useful, or having both these should be without beauty.*[8] *(italics mine)*

The translations have captured the central essence without fixedness of each of Vitruvius' three terms:

[having or possessing]	convenience commodity utility	durability firmness duration strength	beauty delight grace
[being]	useful commodious convenient	durable sound strong	beautiful delightful graceful

Utilitas is not interpreted as minimal functionality; there is a component of ampleness, of comfort; there are demands for appropriate disposition of parts, relationships of one place to another; of shade and rest and repose balancing minimal utility. Utility in this sense also includes the symbolic civic role that may attach to building 'type.'[9] *Firmitas* entails solid founding upon the earth, structural integrity and a capacity to 'endure' through time, to weather. This demands a certain quality of material, constructional method and engineering integrity. Beauty, *venustas*, which is a delight to the mind and senses, is defined in terms of harmony, symmetry, proportion of part to part, etc. Beauty is an aspect of art, and its appreciation an element of human well being or flourishing. For Vitruvius and Palladio (and for the generations that have studied architecture to the current day), the discipline of architecture entails knowledge and practices incorporating durability|firmness|soundness|strength, utility|commodity|convenience, and beauty|delight|grace.

Architecture cannot be '*good* architecture' without these qualities. Another quote from Palladio's discussion of houses:

> *That the houses may be commodious for the use of the family, without which they would be greatly* blameworthy, *far from being commendable, great care ought to be taken . .*[10] *(italics added)*

The context in Wotton's essay also speaks to doing things *well*, in a sense of *goodness*:

> *In architecture as in all other operative arts, the end must direct the operation. The end is to* build well. *Well building hath three conditions. Commodity, firmness and delight.*[11] *(italics added)*

In a non-architectural context discussing *moral* virtues and vices, employing architecture among other examples such as personal character and the written word, David Hume provides a view of the *independence* and *interdependence* of beauty, commodity, and durability as virtues:

> *... where any object, in all its parts, is fitted to attain any agreeable end, it naturally gives us pleasure and is esteemed beautiful, even though some external circumstances be wanting to render it altogether ineffectual. ...*
>
> *... A house that is contrived with great judgment for all the commodities of life pleases us upon that account, though [we sense] that no one will ever dwell in it. ...*
>
> *... A house may displease . . by being ill-contrived for the convenience of the owner . . When a building seems clumsy and tottering to the eye, it is ugly and disagreeable, though we may be fully assured of the solidity of the workmanship.*[12]

Linking Hume's observations, for a work of architecture to be whole, possessing virtue in the sense he is describing, beauty/pleasure (delight), commodity/convenience, and solidity of workmanship must simultaneously exist in the work.

This "rational reconstruction" and juxtaposition of these translations and perspectives through time, though limited in historical contextualization, illustrates the sustained interest in, persistence, and depth of Vitruvius' position, reifying it. The language of the authors is moral in tone: Thus, beauty cannot be separated from architecture's virtue for the Western mind. Architecture's *excellence/virtue* is dependent upon the *proper practice* of architecture in the virtue terms 'blameworthy', 'perfection', 'good', and 'blot' put forth from Vitruvius to Hume (and Gadamer).[13]

MEDIEVAL ORDER, KANT AND HEGEL

In contrast to architecture's claims for being an art through its beauty, there is a second lineage that positions architecture as a lesser, compromised art and science than sculpture, painting or poetry, mathematics and metaphysics, precisely because of its being craft and utility bound. In Medieval times, the branches of knowledge and education were divided in ascending hierarchy from the *ars mechanicae* (those associated with craft and making, material and functional purpose, i.e., architecture and engineering), to the *ars liberales* (the *trivium*: grammar, logic and rhetoric; the higher order *quadrivium*: geometry, astronomy, arithmetic and music), to the highest order, *scientiae* (those of theoretical speculation: physics, mathematics, religion and metaphysics).[14]

It is Immanuel Kant more than half a millennium later, building upon Baumgarten, who crystallizes the conception of aesthetics as a particular branch of knowledge rooted in art, art not in the classic mimetic or representational sense, but art existing as itself without additional purpose or function: 'pure' or 'fine' art: "Hence there can be purposiveness [as an art object] without purpose [a willed utility or function] ..."[15] He establishes a hierarchy with architecture inhabiting a lower rung of the fine arts, below the speech arts of poetry and rhetoric, and the art of painting: naming it, along with sculpture, a "*plastic* .. formative art."[16] (Kant's italics) Architecture occupies this rank because its essential being lies in purpose and use other than its beauty:

> Architecture *is the art of exhibiting concepts of things that are possible* only through art. *those things whose form does not have nature as its determining basis but instead has a chosen purpose, and of doing so in order to carry out that aim and yet also with aesthetic purposiveness. In architecture the main concern is what* use *is to be made of the artistic object ... temples, magnificent buildings for public gatherings, or again residences, triumphal arches, columns, cenotaphs, and so on, erected as honorary memorials, belong to architecture: ... For what is essential in a* work of architecture *is the product's adequacy for a certain use.*[17] *(Kant's italics)*

Architecture's beauty is thus adherent rather than its essence, its perfection lying in purpose:

> *... the beauty of a house or a building (such as a church, palace, armory, or summer house) does presuppose the concept of the purpose that determines what the thing is [meant] to be, and hence a concept of its perfection, and so it is merely adherent beauty. Now just as a connection of beauty, which properly only concerns form, with the agreeable (the sensation) prevented the judgment of taste from being pure, so does a connection of beauty with the good (i.e., as to how, in terms of the thing's purpose, the manifold is good for the thing itself), impair the purity of a judgment of taste.*[18]

While included as an art through which human expectations are met, the "good" of architecture, its virtue, stems primarily from purpose, and secondarily from beauty. Following Kant, Hegel grants architecture status as an art, but positions it as the lowest rung of the fine arts:

> *Such we may take to be the articulated totality of the particular arts, viz., the external art of architecture, the objective art of sculpture and the subjective art of painting, music and poetry [the highest art]. ...*[19]

> *... [The] material of architecture is matter itself . . mass subject to mechanical laws . . merely set in order in conformity of relations of the abstract understanding, i.e., with relations of symmetry. In this material and in such forms, the ideal as concrete spirituality does not admit of being realized.*[20]

From Medieval education and knowledge foundations, through Kant to Hegel, we see an interpretation of two modes — that of purpose or utility and that of matter/material/mechanics — both of which militate against architecture's capacity as a pure fine, or speculative, art. As Hegel puts it, when it transgresses its ground as intentional place ".. it has already overstepped its own boundary, and is leaning to sculpture, the phase *above* it."[21] (emphasis mine) In this view, while sculpture is above architecture as a fine art, for architecture to transgress into becoming sculpture is to lose its validity as architecture, just as for Kant, architecture demands for its perfection the perfection of its concept as place of inhabitation for human purpose.

It is this "lesser art" concept that Gadamer attempts to redress in the opening quote: architecture's art exists in the resolution of circumstance and intent.

CONVERGENCE AND HEIDEGGER

In this brief exposition, we arrive at a point where Kant/Hegel and Vitruvius/Palladio converge. For Vitruvius architecture is an art, a complex praxis (which he distinguishes from painting and sculpture which are also complex practices[22]) distinguished by its demands to serve human purpose, drawing together diverse bodies of knowledge to accomplish this objective, including those of geometry harmonics and beauty. For Kant and Hegel, the perfection of architecture lies not in its abstraction as beauty, or aesthetic art object, but in its first nature as serving human purposes. It may (and ought) to do so with artfulness, but its art is never independent of its utilitarian and material necessities; without these, it is something else.

Heidegger in his analysis of the linguistic and historic roots of building (*bauen*) and dwelling (*buan*) in *Building Dwelling Thinking*, arrives at a similar point: that building (architecture) has validation as construct(ed)ing dwelling (in the sense of *being* on earth). We make, are within, and are shaped by places made for dwelling:

> *... We attain to dwelling, so it seems, only by means of building. The latter, building, has the former, dwelling, as its goal. ...*

> ... Accordingly, spaces receive their essential being from locales *[built places; stemming from boundary, not as "that at which something stops." but at which "something* begins"*]* and not from *[undifferentiated]* 'space.' ...
>
> *... Building and thinking are, each in its own way, inescapable for dwelling so long as each busies itself with its own affairs in separation, instead of listening to the other. They are able to listen if both — building and thinking — belong to dwelling, if they remain within their limits and realize that the one as much as the other comes from the workshop of long experience and incessant practice.*[23] *(Heidegger's italics; material in [—] has been inserted from Heidegger's immediately preceding sentences to clarify sense of the quotes)*

Heidegger firmly anchors building as a praxis that entails dwelling and thinking. The title of his essay has no conjunctions that would create an opportunity or demand to inquire into 'and' 'of' 'within', etc., the three *are*. This Heideggerian thread is taken up by Norberg-Schulz and most recently by Karsten Harries.[24]

How do the positions outlined lead to the initial proposition in these notes that the essential threads of architectural ethics can be unraveled from them?

THE ETHICAL NATURE AND ACTION OF ARCHITECTURE

Ethics appears to be a wholly different field than architecture, concerned with such things as: How shall I live? What is the right thing to do? What is it to be or do well, to do good, to be just or fair? It is a field that is argued through conceptions of the positive beneficial results of actions (teleology, utility theory and, arguably, pragmatism); of the determination of how to act based upon moral principles (deontics); of how we ought to perform things well with respect to ourselves and others (virtue); and of how we can reach reasoned agreement without resorting to conflict as a means for coexisting so that we may each independently pursue our own ends relatively unencumbered (contract theory). It has its own meta-ethical world of argument which inquires into the nature of values, how we come to define or know 'good' or 'justice' for instance, and whether or not these values are permanent or relative or subjective, how we come to hold them, or how they could possibly have any binding force upon us for action.[25]

Ethics seems a wholly reflective business; that is, of course, until we have to choose to act — to decide upon such issues as: euthanasia, abortion, feeding the starving, helping the poor, invoking capital punishment, being truthful when to do so may be damaging, or expending public resources on various projects (such as building schools and courthouses, defense complexes, housing for the homeless, leisure space and parks, or a new downtown district) with the expectation that somehow they will benefit ourselves and society. It is this expectation of positive benefit that is at the heart of progress. The shaping of our environment through architecture, the use of public resources to do so, the private use of land and resources that affect the common good, etc., bring building and architecture into the realm of applied ethics. It is then that we turn to ethical thought for insight into a choice dilemma.

Architecture's specific ethical nature and actions, can be set within the larger field of ethics. The Vitruvius/Palladio/Kant/Hegel/Heidegger line and Gadamer in his essay, define architecture as a unity: purposeful•material•place• possessing/being art and thought. These are not additive aspects but simultaneously occurring and they are essential to the place made. They are the terms of architecture's *virtue*. In these terms, architecture is conceptualized as the study of, speculation about, design of, and construction of humanity's places of inhabitation. Those inhabitation's utilize resources, frame spaces for various uses, shelter us from the elements, and symbolize our institutions, e.g., religion, state, and education. Four Precepts are proposed through which to examine that ethical nature[26]:

1. *Purposefulness.* Architecture is grounded in human intention and purpose. It is therefore subject, as are other human affairs, to judgment with respect to its intentions: who and what purposes are served by those intentions, how well those intentions are met. These are not only practical or utilitarian judgments, but also ethical. For example, intentions and purposes may be beneficial or good (a day care center) or harmful or evil (a genocide machine). They may serve the interests of despots, dictators, military juntas, or democracies; they may serve the interests of powerful individuals against the public interest; and they may displace or marginalize the weak, or the discriminated against (ghettos still exist). Ethical judgment may need to be reached in evaluating architectural project intentions and purposes. Beyond intent and purpose, judgment of how well intentions and purposes are met through architecture is a measure of relative merit or goodness of the built result — 'goodness', in this sense, being the ethical virtue of the work.

2. *Material Production.* While the architectural discipline includes (indeed, would be impoverished without) speculative thought, architecture as experienced daily is a material production. The built inhabited landscape tends to be large and demands many resources for its accomplishment. Once having been built, even ephemeral portable architecture such as teepee's or yurts have a physical and enduring presence, even if only for a short period of time at any one place. Material production at all scales uses communal resources; those resources may be used well or wastefully (more than one society has made itself extinct due to desertification of its locale). Constructions may be built safely to endure winds and rain, and earthquakes, and gravity, or they may be constructed poorly endangering our lives (the penalty in Hammurabi's 17th-C BCE *Code*, Section 229, for building collapse killing someone was for the builder to be killed[27]). When designing and building, an ethical duty is incurred with respect to resources utilized

and sustainable conceptions of life, and with respect to personal physical safety.

3. *Aesthetic Virtue.* The third precept is that of aesthetics: architecture's relationship to art, its being an art, and its relationship to the philosophy of art and aesthetics, the beautiful and the sublime, and human flourishing. This may be the most debated issue of ethics in architecture, because for many it is the self-aware 'art'fulness of architecture, the desire to make 'beautiful' buildings, that differentiates 'architecture' from 'mere building'. In its role of giving form, appearance, image and meaning to societal expectations, aspirations or needs, we look to discern architecture's aesthetic virtue.

   Architecture, being a material production, results in things, artifacts. One might say that by its very existence and inhabitation, by its duration, even if brief, that a building's practical intents have been met. What differentiates buildings — architecture — as what differentiates other artifactual productions, then, is not the level of service but their aesthetic character, their beauty, aesthetics being: supportive of and/or essential to human well being and/or a discrete presentation of reality or being (depending upon the philosophical position being taken).

   In all cases, aesthetics and beauty matter: either as art per se, or as a beneficial contribution to happiness or flourishing in the Classical Greek concept of *eudaimonia.* Thus, a building's aesthetic embodiment is a part of its virtue, its ethical value. In the developmental line sketched in this paper, a building's perfection is interdependent upon purpose, material and aesthetic goodness in the ethical sense of virtue/excellence, *areté.*

4. *Praxis,* (action, practice; *spec.* the practice of a technical subject or art, as opp. to arising out of the theory of it;...[28]). Architecture is a practice, or a collection of practices, of art technics and conduct. As such, the practitioner is obliged to master the discipline: its history and theory, its technological foundations, its order of beauty and formal conception, the order of designing and speculation which is part of architecture, its impact on human well-being and the satisfaction of intended purpose, processes of involvement and contribution, and its representational and symbolizing capacity. To do otherwise is to not practice architecture well; to practice without virtue. Virtue is here used in the sense that MacIntyre has reactivated from Aristotle: that of the virtuous practice of a discipline which defines its content, quality and ends, and which therefore can be judged regarding its ethical merit. This applies to both the actions of practice and the resultant works of practice.

Many seemingly everyday events in architectural practices are ethical in their import: business and marketing choices (deciding on what projects to undertake, with whom to work, the values of each etc.); design deliberations and critiques (function, aesthetics, concepts); budgets (durability of architecture, value for expenditure); client and contractor interactions (honoring contracts, fairness, trust and advising); contracts (equitable conditions, value for service, mutual respect and duties); public presentations (who has the right to know and be advised about projects); and staff development and recognition. Embedded within theses events are ethical questions. Duties to self, the client, the general public, and to the discipline itself can clearly be traced. They are ethical, and demand an ethics. It is in the particular questions, in particular circumstances, that architecture's ethics are shaped. When we pull the threads on one of these everyday concerns what unravels are the deepest questions and premises of the discipline.

SUMMARY: TRACING ARCHITECTURAL ETHICAL DILEMMAS

The opening of these notes boldly asserted that the essential content of architectural ethics was embedded in the space between Vitruvian and Kantian starting points. And, that those ethics may serve as a "navigational rudder" for architecture in an era of progress that has paradoxical nature: "... where advances in one area seem to bring decline in others?"[29] The ensuing exploration included four architectural ethical Precepts: ?1-Purposefulness; ?2-Material Production; ?3-Aesthetic Virtue; ?4-Praxis. The Precepts define architecture's special ethical demands.

A test of this schema is its capacity to serve as an ethical key for dilemmas that arise in contemporary architectural practices. It is possible to envision a matrix with each of the four Precepts arrayed across fundamental ethical constructs: consequences/utility; principles/deontics; social contract; and virtue. Test cases, both analytical with respect to historical and contemporary practices (which are dynamic and changing), and conjectural based upon future modes of practices (emerging new practices), may be constructed to inform the assessment of, and choices to be made in, those practices. There is a need for a broad understanding of ethics and professionalism in conjunction with that of varying cultural/social/political circumstances within which architecture is practiced and taught.

While full development of the envisioned matrix and test cases, and their potential for case analysis in architectural education are beyond the reach of this brief paper, the outline of the central thesis establishes an initial position for continued development.

NOTES

[1]Hans-Georg Gadamer, "The Ontological Foundation of the Occasional and the Decorative," in *Rethinking Architecture: A Reader in Cultural Theory,* ed. Neil Leach (London and New York: Routledge, 1997), 134.

[2]While "Western" ethics is not the only ethical tradition at work in world, and while "design", "place", "inhabitation", and "betterment" and its implicit idea of the "good", are subjects of inquiry and argument, they share broad similarities in addressing the improvement of life. Consideration of 'improvement,' 'betterment,' and 'the good,' are among the classic concerns of Western ethics. Although significant critiques have been leveled against their formulation and the literature and reasoning that supports their debate, e.g., feminism and Continental philosophy, all

ethical quests including those of the critiques are concerned with what manner to live and act ethically. From that shared objective, these questions continue to have validity, and serve as the departure point for the remainder of these notes.

[3]Vitruvius, *The Ten Books on Architecture* (1st-C BCE), trans. Morris Hicky Morgan (Cambridge: Harvard University Press, 1914), reprint (New York: Dover Publications, 1960), Bk.I, Ch.III, ¶2, 17. The building types in [—] are listed by Vitruvius in the preceding ¶1.

[4]Vitruvius, *Vitruvius on Architecture* (1st-C BCE), Vol. I, Loeb Classical Library, Latin/English edition, *Harleian Manuscript 2767*, trans. Frank Granger (Cambridge: Harvard University Press, 1931), Bk.I, Ch.III, ¶2, 35.

[5]Andrea Palladio, *The Four Books of Architecture* (1570), trans. & pub. Isaac Ware (London, 1738), facsimile reprint: intro. Adolf K. Placzek (New York: Dover, 1965), Bk.I, Ch.I, 1.

[6]Sir Henry K. Wotton, *The Elements of Architecture* (1624), facsimile reprint of the *Reliquæ Wottonianæ* ed. (1651), (Springfield, MA: Bassette Company, 1897?), Pt.I, 201

[7]Vitruvius, op. cit. @ Note 4, Bk.I, Ch.III, ¶2, 17.

[8]Palladio, op. cit. @ Note 5, Bk.I, Ch.I, 1.

[9]Vitruvius, op. cit. @ Note 4, e.g., see Book V, where Vitruvius discusses the planning and design of public places and major public buildings by type.

[10]Palladio, op. cit. @ Note 5, Bk.II, Ch.II, 38.

[11]Wotton, op. cit. @ Note 6.

[12]David Hume, *A Treatise of Human Nature* (1739), selections, in *Hume: Moral and Political* Philosophy, ed. with intro. by Henry D. Aiken (New York: Haffner Press, c. 1948), Bk.III, Part III, Sect. I Of the Origin of the Natural Virtues and Vices, 139, 140, 141.

[13]A) For a brief exegesis of historiographical genres see David H. Hall, *Richard Roarty: Prophet and Poet of the New Pragmatism* (Albany: SUNY Press, 1994), 12-13; B) The compound term *excellence/virtue* has its roots in the Greek word *areté*. *Areté* embodies both the concepts of personal virtues such as generosity or steadfastness, and the concept of excellence. Excellence extends from personal behavior and one's practices, and also to qualities or attributes of those practices and of things. Thus, a knife blade may possess *areté* with regard to its strength and sharpness as a knife. In the remainder of the text, virtue will be used in this compound sense of excellence, that may apply to persons, objects, and practices. The knife example is from C. C. W. Taylor's definition of *areté* in *The Oxford Companion to Philosophy*, ed. Ted Honderich (Oxford/New York: Oxford University Press, 1995). This concept is a central issue in Alasdair MacIntyre's discussion of the nature of virtues in *After Virtue: A Study in Moral Philosophy*. 2nd. ed. (London: Duckworth, 1984), particularly Chapter 14 "The Nature of Virtues."

[14]Dalibor Vesely, "Architecture and the Question of Technology," in *Architecture Ethics and Technology*, ed. Louise Pelletier and Alberto Pérez-Gómez (Montreal & Kingston: McGill-Queens University Press, 1994), 37.

[15]Immanuel Kant, *Critique of Judgment* (1790), trans. Werner S. Pluhar (New York: Hackett Publishing, 1987). "Analytic of Aesthetic Judgment, Analytic of the Beautiful," § 10: Of Purposiveness in General, 65.

[16]Immanuel Kant, *Critique of the Faculty Judgment* (1790), trans. J. H. Bernard (London, 1892), in *Philosophies of Art and Beauty: Selected Readings in Aesthetics from Plato to Heidegger*, ed. Albert Hofstadter and Richard Kuhns (Chicago: University of Chicago Press, 1964, pbk. 1976). "Critique of the Faculty of Aesthetical Judgment, Analytic of the Sublime," § 51: Of the Division of the Beautiful [Fine] Arts, 325.

[17]Kant, op. cit. @ Note 15. "Analytic of Aesthetic Judgment, Analytic of the Sublime," § 51: On the Division of the Fine Arts," 191-192.

[18]Kant, op. cit. @ Note 15. § 16: A Judgment of Taste by Which We Declare an Object Beautiful under the Condition of a Determinate Concept Is Not Pure, 77.

[19]Georg W. F. Hegel, *Introductory Lectures on Aesthetics*. trans. Bernard Bosanquet (1886), ed. with an intro. and commentary by Michael Inwood (London: Penguin Books, 1993), 96.

[20]Hegel, ibid., 90.

[21]Hegel, op. cit., 91.

[22]Vitruvius, op. cit. @ Note 4, Bk.I, Ch.I, ¶11-13, 10-11.

[23]Martin Heidegger, "Building Dwelling Thinking," trans. Albert Hofstadter, in *Basic Writings*, 2nd., rev. & expanded edition, ed. David Farrell Krell (HarperSanFrancisco, 1992), 347, 356, 362.

[24]Norberg-Schulz and Karsten Harries pursue these themes in Christian Norberg-Schulz, *Existence, Space & Architecture* (New York: Praeger, 1971); and *Genius Loci: Towards a Phenomenology of Architecture* (New York: Rizzoli, 1980), in particular his note of debt to Heidegger, 5; Karsten Harries, *The Ethical Function of Architecture* (Cambridge: MIT, 1997), 4.

[25]Two brief thorough introductions to ethical concepts that cover ethical reasoning, relativism, egoism, utility and other consequentialist theories, Kantian and other deontic theories, virtue ethics and social contract theory are Louis P. Pojman's *Ethics: Discovering Right and Wrong*, 2nd ed. (Belmont, CA: Wadsworth Publishing Company, 1994), and James Rachels' *The Elements of Moral Philosophy*, 2nd ed. (New York: McGraw-Hill, Inc., 1993). A longer introduction that presents those ethical themes and additional themes of free will, autonomy, diversity and justice within a lively narrative dialogue is *Exploring Ethics: A Traveller's Tale*, Brenda Almond (Malden, MA: Blackwell Publishers, Inc., 1998). Best brief introduction to the course of Western ethical thought through time is *A Short History of Ethics: A history of moral philosophy from the Homeric Age to the twentieth century*, Alasdair MacIntyre (New York: Collier Books, Macmillan Publishing, c. 1966). Best single introductory source: Peter Singer, ed., *A Companion to Ethics*. Blackwell Companions to Philosophy (Cambridge, MA: Blackwell , c.1991, 1993). Beyond the themes in the already mentioned, it has sections on global ethical traditions, contemporary applied ethics concerns such as poverty, euthanasia, and environmentalism, and critiques of the Western tradition such as those launched by Marxism and feminism.

[26]Gregory Palermo. The four precepts outlined here have been adapted and condensed from material originally developed by Palermo for *Ethics and the Practice of Architecture*, Barry Wasserman, Patrick Sullivan and Gregory Palermo (New York: John Wiley & Sons, 2000), pp. 80-91.

[27]Hammurabi, King of Babylonia, *The Hammurabi Code and the Sinaitic Legislation*, trans. Chilperic Edwards, 1904; reprint, Port Washington, NY/London: Kennikat Press, 1971

[28]*New Shorter Oxford English Dictionary* (Oxford: Clarendon Press, 1993)

[29]89th ACSA Annual Meeting theme challenge: "Can we, in other words, improve the lives of people, the health of cites, the condition of the environment, and the quality of architecture without reductive, one-size-fits-all solutions of the past? Can we control the paradoxical nature of progress, where advances in one area seem to bring decline in others?..."

TECTONICS

Moderator: Peter MacKeith,
Washington University in St. Louis

The Means and Meanings of Dashed Lines

PAUL EMMONS
Virginia Polytechnic Institute and State University,
Washington/Alexandria Architecture Consortium

1:1 Constructed Historic Details

JORI ERDMAN
Clemson University

The Frame as a Catalyst for an Architecture

PATRICIA KUCKER
University of Virginia

Weaving as an Analogy for Architectural Design

CRAIG GRIFFEN
Philadelphia University

The Means and Meanings of Dashed Lines

PAUL EMMONS
Virginia Polytechnic Institute and State University,
Washington/Alexandria Architecture Consortium

The edges which form a part of the outline of a figure must be visible, hence are drawn as full lines, while the lines or edges which are invisible are always drawn dotted.
—*Architectural Drawing*, Anonymous

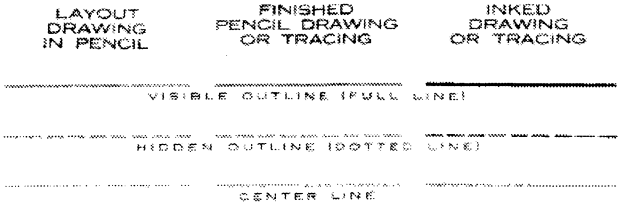
We touch here the most difficult point, that is, the bond between the flesh and the idea, between the visible and the interior armature which it manifests and which it conceals.
—*The Visible and the Invisible*, Maurice Merleau-Ponty

FINDING HIDDEN LINES

Use of the dashed line in architectural drawing is so ubiquitous that its significance becomes invisible. The architectural dashed line is rarely problematized and is seen merely as a transparent technical convention. But if dashed lines are mere technical notations, why is their use so consistent over long periods of time? Dashed lines are magical notations—allowing one to see the invisible, sewing together the physical and metaphysical.

During the Twentieth Century, even architectural drawing became standardized, however unsuccessfully prior to CADD. *Graphic Science*, now in its fourth edition, described the American Standards Association's "set of conventional symbols" for "all lines needed for different purposes" including three widths of drafting lines. The median was reserved for the "hidden outline (dotted line)."[1]

Fig. 1. American Standards Association Alphabet of Lines.



Behind what appears to be a modern convention is a long and consistent use of dashed lines to represent particular in-betweens. Theoretical unpacking of ordinary practices through historical analysis can reveal embedded imaginative potential. Architectural drawings are the site where theory and practice intertwine since drawing is not merely recording a known idea, but a fertile field that, when well tended, itself bodies forth a design. Drawing practices like the dashed line are consistently utilized to represent similar conditions not solely because of convention, but, it is claimed here, from the process of their making. In C. S. Peirce's terminology, the dashed line is an iconic sign based on likeness that was originally indexical, like a footprint as a sign of a human being.[2] This reverie will focus on Renaissance treatises to reveal the depth and role of the dashed line in the architectural imagination.

MAKING DASHED LINES

Reflection on the making of architectural dashed lines reveals that they occur simultaneously on two planes: one on the surface exhibiting a mark and the other floating above the marked surface. The pen, when "touching" the paper, visibly releases ink; when skyward, it continues its linear trajectory but at a heavenly altitude making its trace invisible, transient, and infinitely thin. In punctuation, a dash is an unvocalized physical presence indicating an omission or break in thought. Its denotative presence connotes an absence. The pen's movement above makes a transient line that is remembered by the equal but opposite movement of the pen along the paper's surface, depositing an inky trace. In executing the invisible suspended line, the hand perceives no resistance, while the visible, physical line plows a material surface, requiring a subtle change in the hand's force.[3] "To Dash," according to Samuel Johnson's 1755 Dictionary, is "to fly off the surface."

For architectural dashed lines, each dash and space ought to be consistent lengths, marking a measure, a footstep of the finger. Broken lines have intentionally varying fragments that seem to presume a prior continuous line, parts of which later disappear under erasure or failure of marking. Making a broken line modifies the flow of the stroke but does not move between two planes like a dashed line.

The forward motion of the pen in a dashed line, whether above or on the surface, is roughly equaled by its movement up and down between the two realms. Dashing is primarily a vertical movement. To dash is usually a rather violent striking or puncture, a quick stroke. "Dashing" can be visually striking or spirited such as a dashing young man. The similar experience of making is proposed as the source of the continuity of deployment of dashed lines.

LOOK TO USE FOR MEANING

Drawing architectural dashed lines demands more time and care than drawing continuous lines. Why go to this additional trouble when simpler lines could be assigned to the the sorts of tasks served by dashed lines? Julien Guadet, architecture professor at the Ecole des Beaux-Arts at the beginning of the Twentieth-Century whose textbook was widely influential on American students, introduced dashed lines for axes in plan. For Guadet, "the idea of the axis" was not merely a line, but "a vertical plane through the whole building separating the building into two parts.Ó[4] One could literally inhabit the space of this dashed line. In the Sixteenth Century, Sebastiano Serlio used dashed lines in his treatise to, among other things, indicate overhead conditions in plan drawings.

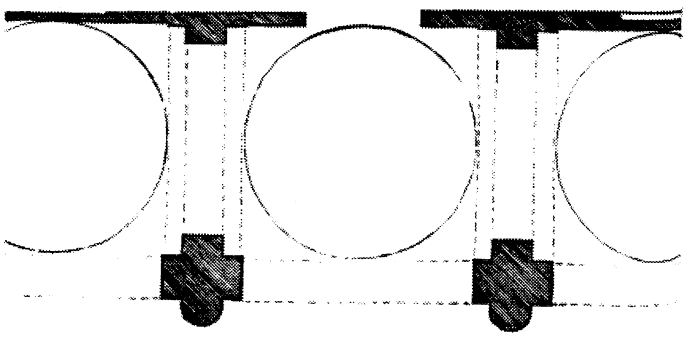


Fig. 2. Sebastiano Serlio. Plan.

As the viewer's head is over the paper looking down onto a plan, the dashed line is felt to be behind the head, suspended above. The viewer inhabits the in-between of the two sorts of lines. Whether in plan or elevation, the dashed line indicates something invisible but present: sensing something behind or above. The dashed line is also used to represent the past or future in a present drawing. Carlo Rainaldi used dashed lines to indicate plans of temporary festival structures within views of permanent civic buildings.[5]

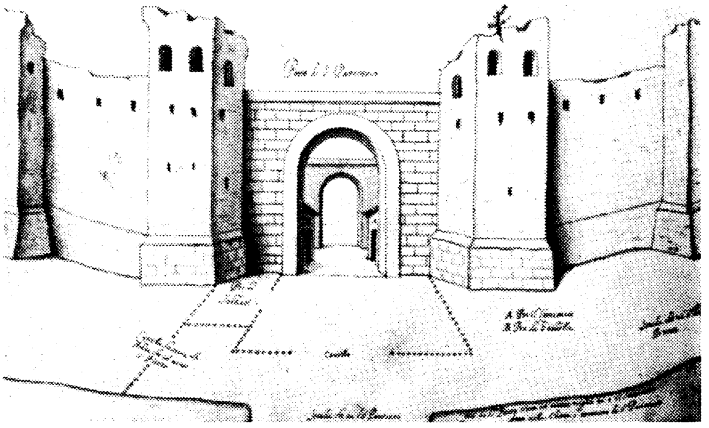


Fig. 3. Carlo Rainaldi. Porta S. Pancrazio.

For either time or space, the dashed line can reveal an absent presence of an in-between.

The predominant use of dashed lines in Serlio's treatise occur in Book One on geometry and especially Book Two on perspective. In Book Two, conceived together with Book One, Serlio provides what is probably the first theorization of dashed lines *(linee occulte).* Instances of Serlio's use of the dashed line suggests that for him it was related to geometry and most directly to perspective rather than to preexisting architectural drawing conventions.[6] Serlio uses *linee occulte* in relation to perspective in several ways, always as representing the present but invisible.

POINTS AND LINES, PUNCTURES AND THREADS

It has been shown that geometric thought derives from physical experience in the world.[7] A trope commonly used in Renaissance architectural treatises is the comparison between point and puncture, line and thread. Textual metaphors and drawn images convey the interconnected web of associations, simultaneously theoretical and practical. This is supported by Alberti's discussion of geometric line and point for the painter:[8]

> *Points and lines among painters are not as among mathematicians, where infinite points fall in a line. From our definition, a point is a mark* (signum) *because*
>
> *the painter perceives it as if it were somehow a kind of thing between* (medium quoddam) *the mathematical point and a quantity which can be defined by a number, such as finite particles like atoms.*

As the line was described as a thread, both Alberti and Filarete described the edge of a plane as a selvedge — the woven edge of a textile.

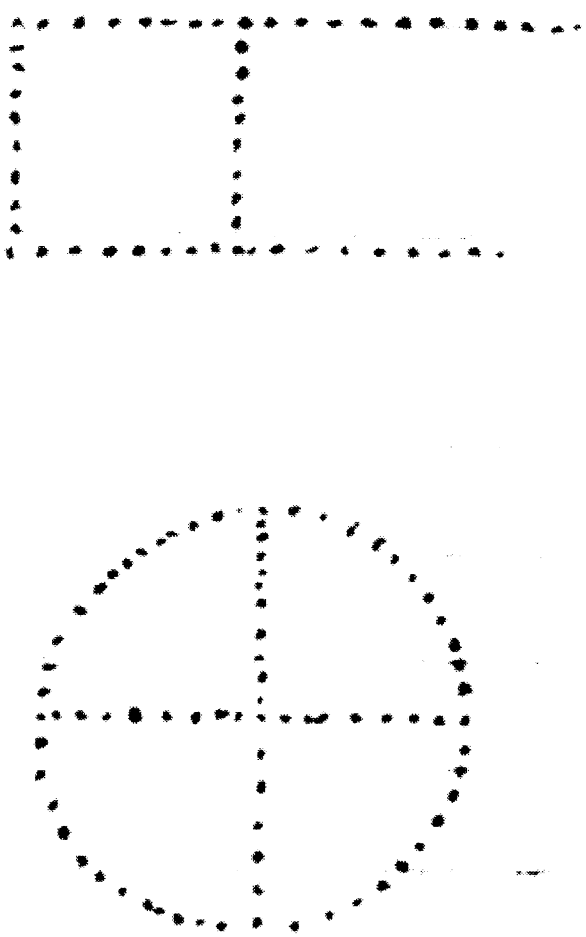


Fig. 4. Filarete. Treatise on Architecture.

At this time, fields like architecture, which applied mathematical knowledge to the sensual world, were considered intermediate sciences *(scientiae mediae)*. For Alberti, the geometry of painting was "a fat wisdom" *(pinguiore Minerva)*.[9] While the geometric line has no thickness, the physicality of the painter's line relies on paint as flesh to make its line.

Reflected in Serlio's association of *linee occulte* with perspective is Alberti's description of the invisible substance of visual rays. "Visual rays," Alberti writes, impress "the images of things upon the senses." "Let us imagine the rays, like extended very fine threads gathered tightly in a bunch at one end, going back together inside the eye where lies the sense of sight."[10] Threads are physically used as rays in later Renaissance books on perspective in pop-up diagrams, in perspective practices to project images on building surfaces, and even in engravings where viewers appear to hold rays represented as threads up to their eyes. The dashed line as a thread represents *species* that move between an eye and an object.

The stretching of lines over the ground to mark construction limits is an intermediate step between design and construction just as drawn lines are between design and imaginary ideas. Filarete describes this in word and image to lay out a piazza: "I first had the cords stretched according to the gridded drawing *(disegno lineato)*, the square compartments having been marked out across the area of the site according to the squared-off plan."[11] The drawn line and construction cord are equated through a process of translation. In ancient times, the layout of the temple was established with stretched ropes on posts to follow the invisible lines in the sky. Using conditions of construction in drawing representation is common. Nails had a similar role in perspective drawings. In the famous early perspective painting called the Baltimore panel, two rows of pin holes leading to the vanishing point probably held a string used for constructing the perspective.[12] Serlio drew and described nails in his perspective drawings. Serlio also mentions other perspective mechanisms, such as Alberti's frame and Durer's "pin-hole method" which use threads for lines and punctures for points. Modes of representation and means of construction are all closely intertwined in dashed lines.

TAILORING

As shown above, the trope of sewing was fundamental for Renaissance architects. The indexical origins of dashed line are embedded in tailoring procedures. The 1589 tailoring treatise by Juan de Alcega is titled The *Book of Practical Geometry*. The majority of the book consists of cutting patterns for cloaks and other clothing. The brief introduction explains that "unbroken lines show where to cut with the scissors" and "dotted lines show where there are to be extra-pieces"; in other words sewing.[13]

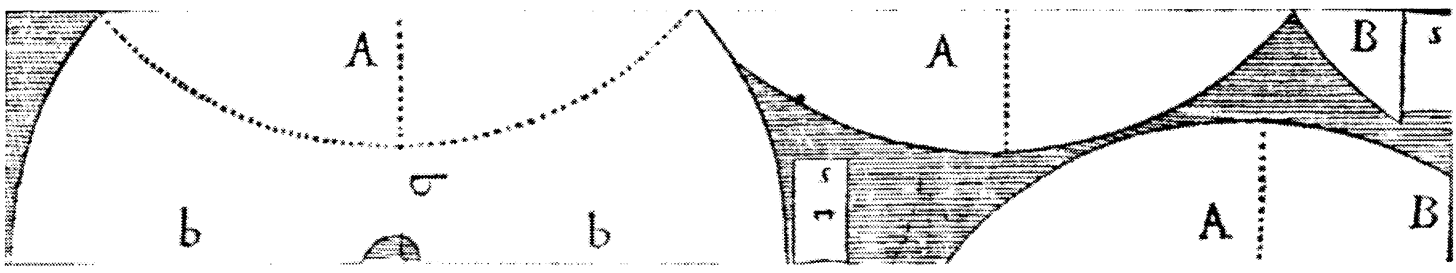


Fig. 5. Cloak of Silk Cutting Diagram by Juan de Alcega.

Sewing is fastening together with a thread, a suture, creating a dashed line of union. The dashed line is here a seam (from Latin "to sow") joining two things. In early punctuation, "hyphen" was a dash written below two letters to show they belong to same word at a time when words were only beginning to appear out of the continuous line of letters with the invention of spaces. Through tailoring, the physical relation of dotted lines as punctures in skin or drawing surfaces becomes apparent. Peake's 1611 unauthorized English translation of Serlio from Dutch defined the geometric point as "a pricke made with a Pen or Compass.Ó[14] Movement from sewing to drawing was common as fresco designs were transferred onto building surfaces by blowing pigment through holes punched along outlines.

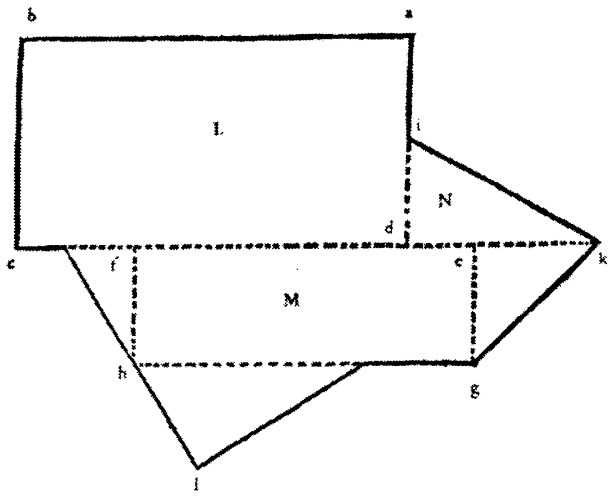


Fig. 6. Sebastiano Serlio. Diagram for dividing irregular sites.

Serlio implies awareness of his indebtedness of *linee occulte* to sewing when he refers to tailors cutting fabric after discussing dividing areas of land with *linee occulte.*

A line of points finds its material nature in "punctures." In Spanish, *puntos* (point), is also *puntada* (sewing, stitching). The movement of the dashed line between two planes as a drawing can now be understood to represent the movement of the thread from above to below the cloth. Movement between recto and verso through a puncture makes the hidden portion of the line, that which is present but not seen, *linee occulte.* The dashing up and down movement in making a dashed line is now understood to result from the needle and thread puncturing a cloth. The support or drawing surface is revealed not as a passive receptacle, but an active participant in making the dashed line. The dashed line as sewn thread is an indexical sign where the physical activity of its making suggests its meaning.

EMANATING RAYS

In writing on perspective, Serlio theorizes the dashed line by comparing *linee occulte* to a human skeleton as a "transparent body" *(corpo transparente)* opposed to a "solid body alive with its flesh."[15] The dashed line is present but invisible. *Linee occulte* are hidden lines shuttling between pure idea and materiality. For Serlio, the dashed line is not like the modern drawing where what is dashed changes with an observer's viewpoint. It is a category defining the nature of the line's existence. He describes dashed lines as a distinct entity, an essential rank of being, that cannot evolve into anything else. Serlio, a skilled woodcutter, was certainly well aware of the inversion between carving wood blocks and printing on paper. In preparing woodcuts, the material that is worked (removed) is that which in printing will remain white (unmarked).[16] That Serlio would bother to theorize dashed lines in his treatise suggests they were an important part of his thinking. Like Serlio's comparison between flesh and skeleton, the invisible present is a real category, in-between divine and mortal.

The Renaissance architectural dashed lineÕs significance results from its associated cultural meanings. Since it is a representational mode integrated with Renaissance cosmology and ontology, according to Peirce, it has a symbolic aspect. The neoplatonism developed by the Florentine philosopher Marsilio Ficino followed the already ancient tradition in presuming astral influences on the earth as rays emanating from celestial bodies. Renaissance magical practices were based on the belief that it was possible to attract and magnify these occult rays through particular images, materials, and even buildings. In the macrocosmos, Ficino explained the world spirit mediated between the divine heavens and the lower, earthly world. "Planets issue forth rays *(radios)* of spirit particular to each of them, and these rays are absorbed by objects in the world, natural or man-made. Thus, all we contact exposes us to planetary influence."[17] In the microcosmos, humans also participate in the spirit, which receives and is affected by celestial rays. Ficino wrote: "celestial goods pass to our soul and body down here through our spirit within us which is a mediator."[18] This *spiritus* or etheric substance allows communication between the physical body and the soul. Information from the external senses was believed to be translated into *spiritus* or phantasms (images) by the inner senses to communicate with the soul and conversely, the soul sent instructions to the body through the spirit. Ficino believed vision operated through species forming a "ray shining forth from the eye.Ó[19] Renaissance perspective was based on similar theories. *Spiritus* was also key in the creative imagination of the artist, believed by Ficino to be the vehicle through which divine inspiration as images reach the artist. Serlio reveals his sympathy with these beliefs in comparing his planned seven books on architecture to the seven planets and identifying his fourth book on the Orders with the sun, cosmologically the middle sphere. Serlio uses radiation theory to describe his creative genius, deriving from his teacher and his patron, as a ray.

Ficino does not so much describe the physical process of radiation as assume it. The proper description of the rays was widely debated, but there was general agreement that they were somehow in-between the physical and the metaphysical as a very subtle matter or a very heavy intellect. The rays were believed to be an incorporeal substance, a fifth element or spirit. Ficino explained *spiritus* is neither purely physical nor purely mental. St. Augustine's early emanationist thought lead him to describe three kinds of vision: "one, through the eyes, by which we see the letters; a second through the spirit, by which we think of our neighbor even when he is absent; and a third through an intuition of the mind, by which we see and understand love itself." St. Augustine's intermediate spiritual vision is thus a present absence which "is not a body, and yet is something."[20] Roger Bacon's widely influential late medieval ray theory described spiritual rays as made up of individual points or *species*. It "possess exceedingly incomplete being" because it does not "exist of itself, but in something else.Ó[21] According to Bacon, *species* are corporeal but have no body and move by transforming the medium (air) through which they travel.

How emanations were imagined in the Renaissance is difficult to ascertain, but there is good evidence to suggest dashed lines were a primary representation. Species or ideas were probably imagined as points radiating in a line. Robert Fludd, a late Renaissance English polymath steeped in hermetic and alchemic thought, was keenly visual and produced widely-known treatises with fascinating figures. Fludd, like others, illustrates his emanationist concepts with conic sections or pyramids of rays. Descending from the higher to the lower is the "forma Pyramidis" and ascending is the "materia Pyramidis."[22]

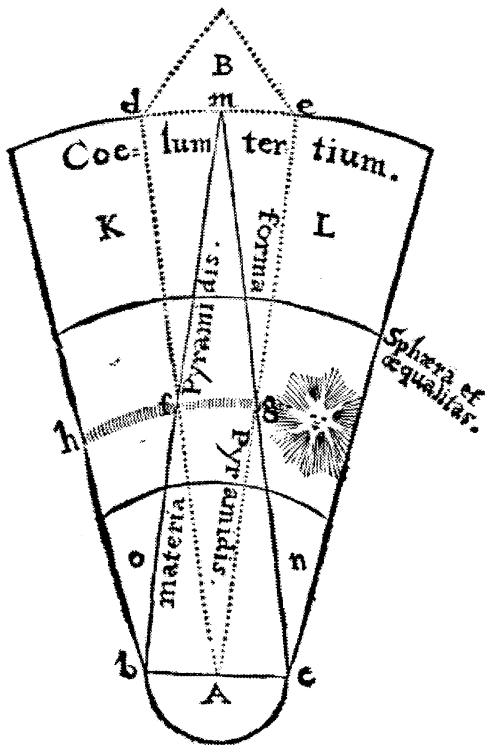


Fig. 7. Robert Fludd. Anatomiae Amphitheatrum (Frankfurt. 1623).

In his many images, Fludd consistently represents spiritual forms as dashed lines in contrast with material efflux as solid lines. Fludd also uses dashed lines to show the influence of the zodiac and meteorological events upon the human body, to distinguish imagination from the other inner senses, and as visual rays in a perspective machine. The prevalence of works by illustrative authors such as Fludd, utilizing dashed lines in similar yet varying ways, suggests the likelihood of educated Renaissance minds conceiving emanating *spiritus* as dashed lines.

Renaissance paintings of the Annunciation, when Virgin Mary asked Gabriel "how shall this be, seeing I know not a man," focus the problem of representation on a key Christian in-between. How can one depict divine incarnation, a miraculous penetration of the virgin's body without any physical evidence? Florentine painter Fra Fillipo Lippi made dashed lines radiating down to, but not touching Mary. Each individual point was built up with gesso and a gold flake was covered by a drop of oil to make it appear much like descriptions of *species* as shimmering luminescences.[23] While some have recently found these dashed lines oddly diagrammatic in otherwise representational paintings, this analysis suggests that for the time, the radiant gold dotted lines may well have been considered mimetic of occult divine presence entirely appropriate for the scene.

THE PERSISTENCE OF DASHED LINES

In the Renaissance, the dashed line was a symbol of occult spirit; in modern times, a symbol of rays of invisible physical properties such as magnetism, x-rays, and nuclear radiation. Many sorts of emanations have been represented with dashed lines. Use of the dashed line is neither dependent upon nor reflective of, any singular world view. While put to use by late Renaissance neoplatonists, it was also taken up at the same time by Descartes to illustrate his materialistic spirits as bits of matter flowing through the body and in vision.[24] Similarly, dashed lines have been used to explain changing notions of electricity from Mesmer to Lord Kelvin.

Fig. 8. Mesmerism. Ebenezer Sibley. A Key to Physic and the Occult Sciences. 1814.

It is not necessarily because each of these investigators and illustrators were directly influenced by their predecessors, but that each continued to reinvent the dashed line's meaning as a present absence through the act of constructing the dashed line itself. In this way, its indexical nature was translated to an iconic and symbolic sign.

On the front page of a recent "Style" section of the *Washington Post*, a light-hearted article advocating the return of flirting in modern society was illustrated with a man and woman turning to catch each other's eye. The connection between them was illustrated with a dashed line.[25] Comparison with Ficino across some five centuries is startling. "Fascinations [can be] achieved by a sudden glance and very passionate loves instantly kindled by rays from the eyes, which are also fascinations of a sort."[26] The persistence of dashed lines in representing in-betweens is not because of conventions moving across these vast tracts of time and space. It is likely because of the indexical nature of the making of dashed lines which leads people time and again to this laborious representation. What makes the dashed line a symbol as well as an index, are the changing intellectual constructions we attach to it in the continuing struggle to understand the in-between — between physical and metaphysical — present yet invisible.

The dashed line conveys its indexical meaning neither behind an image nor by veiling it, but from within itself, simply by the manner in which it is constructed. Like the dashed line, participating in both the physical world with its inky line and in the intellectual world with its dimensionless void, understanding the dashed line as an imaginal joint between two realms may help to widen the architect's radiant wonder within architectural practice.

NOTES

[1]Thomas French, Charles Vierck, *Graphic Science: Engineering Drawing. Descriptive Geometry. Graphical Solutions* (New York: McGraw-Hill, 1958) 38-39.

[2]Charles Sanders Peirce, "Prolegomena to an Apology for Pragmaticism" *The Monist* 16 (January 1906) 492-497.

[3]Gaston Bachelard, "Hand vs. Matter" in *The Right to Dream*, translated by J. A. Underwood (Dallas: Dallas Institute Publications, 1982) 51-53.

[4]Julien Guadet, *Elements et Theorie de l'Architecture* (Paris: Librarie de la Construction Moderne, 1909) I, 40-41.

[5]Giovanna Curcio and Mario Manieri Elia, *Storia e uso dei modelli architettonici* (Milano: Editori Laterza, 1982) 308 - 309. Serlio also used dashed lines in his manuscript for the Seventh Book to indicate existing or past grades to contrast with his proposed or future design.

[6]The translation cited here is Sebastiano Serlio, *Sebastiano Serlio on Architecture*, translated by V. Hart and P. Hicks (New Haven: Yale University Press, 1996). There are only five uses of dashed lines in Book IV, one in Book III, and one in Book V, where they all are unmentioned in the text. In Book I, thirteen figures include *linee occulte* and are textually introduced in the first case. In Book II, On Perspective, however, not only are *linee occulte* used most often (twenty-one images have dashed lines in the second book) but Serlio also mentions them in the text regarding fourteen illustrations and mentions *linee occulte* twice again without any corresponding drawings. For a somewhat different discussion of the visuality of *linee occulte*, see George Hersey, *Pythagorean Palaces. Magic and Architecture in the Italian Renaissance* (Ithaca: Cornell University Press) 1976, Chapter 2.

[7]Ernst Mach, *Space and Geometry in the Light of Physiological. Psychological. and Physical Inquiry* (Chicago: Open Court, 1906).

[8]Leon Battista Alberti, "De punctis et lineis apud pictores". The translation is adapted from Samuel Y. Edgerton, Jr., *The Renaissance Rediscovery of Linear Perspective* (New York: Basic Books, 1975) 81; and from Jack M. Greenstein "On Alberti's 'Sign': Vision and Composition in Quattrocento Painting" *Art Bulletin* 79 (1997) 669 - 698, 681.

[9]Leon Battista Alberti, *On Painting* (London: Penguin, 1972) I. 1.

[10]Ibid, I. 5.

[11]Antonio di Piero Averlino, *Filarete's Treatise on Architecture*, translated by John Spencer (New Haven: Yale University Press, 1965) 101r.

[12]Richard Krautheimer, "The Tragic and the Comic Scene of the Renaissance: The Baltimore and Urbino Panels" in *Studies in Early Christian. Medieval. and Renaissance Art* (New York: New York University Press, 1969) 345-359, 464, 346.

[13]Juan de Alcega, *Tailor's Pattern Book 1589*, (*Libro de Geometria y Traca*, Madrid: 1589), translation by Jean Pain and Cecilia Bainton (Carlton, Bedford: Ruth Bean, 1979) 19.

[14]Robert Peake, *Sebastiano Serlio's Architecture in Five Books* (New York: Dover, 1968) I. 1.

[15]Sebastiano Serlio, *Sebastiano Serlio on Architecture*, translated by V. Hart and P. Hicks (New Haven: Yale University Press, 1996) 58.

[16]Vaughan Hart, "Serlio and the Representation of Architecture" in *Paper Palaces. The Rise of the Renaissance Architectural Treatise*. edited by Vaughan Hart with Peter Hicks (New Haven: Yale University Press, 1998) 170-186.

[17]Marsilio Ficino, *Three Books on Life*, translated by Carol V. Kaske and John R. Clark (Binghamton, New York: Renaissance Society of America, 1989) III. 16. 1.

[18]Ibid., III. 3. 93.

[19]Marsilio Ficino quoted in Paul O. Kristeller, *The Philosophy of Marsilio Ficino*, translated by Virginia Conant (New York: Columbia University Press, 1943) 234.

[20]St. Augustine, *The Literal Meaning of Genesis*, translated by John Taylor, (New York: Newman Press, 1982) Volume Two, XII. 6. 15.

[21]Roger Bacon, *De multiplicatione specierum*. translated by David Lindberg (Oxford: Clarendon, 1983) III. 1. 55.

[22]Allen G. Debus, *Robert Fludd and His Philosophical Key, being a Transcription of the manuscript at Trinity College. Cambridge* (New York: Science History Publications, 1979) 137.

[23]Leo Steinberg and Samuel Y. Edgerton, Jr., "How shall this be? Reflections on Filippo Lippi's Annunciation in London" Parts One and Two, *Artibus et Historiae* 16 (1987) 25 - 44, 45 - 53.

[24]Rene Descartes, *The World and Other Writings. Cambridge Texts in the History of Philosophy*. edited by Stephen Gaukroger, (Cambridge: Cambridge University Press, 1998).

[25]*The Washington Post*, Tuesday, June 6, 2000, C.1.

[26]Marsilio Ficino, *Three Books on Life*, III. 16. 57.

1:1 Constructed Historic Details

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The whole history of architecture revolves exclusively around the wall apertures.

—5 points towards a new architecture. LeCorbusier and Pierre Jeanneret

The typical case study in architectural discourse provides students with a limited exposure to the architectural work, through drawings, photos, written description, analysis and representational models. The case studies conducted by my students over the last three years in a course entitled Construction Principles provided the students with an opportunity to understand the chosen buildings through the constructive, or reconstructive, process. Through a hands-on approach to the case study the students were able to participate in a broader discussion of architecture as it relates to tectonics, technology and the history of construction. Because of the inherent tension between interior and exterior, as well as the technological developments that occurred in the twentieth century, the case studies focused on aspects of construction relating to enclosure.

Construction Principles, a course offered in the second year of a professional five year architectural program, provides students with their first approach to the integration of concepts of technology and history as they relate to architecture as well as their first formal educational experience with full-scale construction. The course is taught by myself, an architecture professor, together with the school's wood shop supervisor. The methodology of the course promotes an understanding of the history of tools, materials and construction methods through a format of lectures and lab work, culminating in the full-scale construction of an architectural detail. Fundamental to the course is the belief that architectural education must provide ways for students to experience the act of building and think about the technological questions of building as part of the design process. The case study methodology is used as way to bring an understanding of way that architects have approached these issues throughout time.

technology — the body of knowledge available to a civilization that is of use in fashioning implements, practicing manual arts and skills, and extracting or collecting materials // Greek — tekhnologia, systematic treatment of an art or craft: tekhne, skill // teks — to weave, to fabricate, especially using an axe

Our approach to and understanding of technology is framed through the above definition as well as Heidegger's essay, "The Question Concerning Technology." An understanding of technology is fundamental to the making of architecture, as well as many other applied arts. Architectural education inevitably addresses technological issues directly and indirectly through courses in structures, materials and methods, mechanical systems, history/theory and design. Unfortunately, the more specific idea of "tectonic," or the art of construction, gets lost in the consideration of technology as a purely practical and pragmatic issue. As Kenneth Frampton points out in Studies in Tectonic Culture, architecture in its built form is one of the most powerful indicators of our culture and spirituality as humans. Therefore, it is imperative for architectural education to begin to address the ways of making buildings directly, through physical contact with actual building materials and processes, in order to develop architects trained in ways of thinking about the act of construction.

In choosing to investigate a building at full-scale one must immediately begin to hone in on the essence of the building to capture a single, meaningful moment. In looking for that moment we were informed and influenced by the history of architecture and architectural theory. As early as 1851 Gottfried Semper, in The Four Elements of Architecture, identifies enclosure as one of the four defining elements of architecture. He elaborates a history of the wall-fitter or weaver as the first architect. We return to the above etymological root of technology in teks, meaning to weave. He goes on to theorize a history of architecture in which the wall bears the symbolic and physical markings of culture though its execution and decoration.

With the advent of the Industrial Revolution and the emergence of new technologies and materials, architects began to rethink the wall as enclosure and develop a paradigm which was intimately bound to construction. Walter Gropius speculates in The New Architecture and The Bauhaus that the nature of the wall will inevitably change based on the emergence of new building technologies, particularly glass. He argues that standardization and rationalization in structure and construction will bring a new architecture and a new culture. He uses this theory as a basis for his radical approach to architectural education in the Bauhaus. Arguing for the necessity of practical, hands-on education as well as intellec-

tual education, Gropius hoped to graduate architects that would be capable of expressing the cultural and technological shifts which occurred as a result of the Industrial Revolution.

As Gropius predicted, the walls we make have undergone a dramatic change. And as Le Corbusier noted above, much of the history of architecture is still related to the way that we mediate the relationship between interior and exterior. This shift is evident in the materials and techniques we use to construct our buildings and reflects deeper changes in our understanding of culture, space and theory. The modern movement in architecture was able to provide entirely new definitions of space and enclosure which allowed the wall to become free of ornament, style and even function. Enclosures continue to define how we view the development of architecture and our evolutionary progress as architects. Thus, it became inescapable that the case studies we conduct should focus on the wall. This decision in turn affected the development of the course content leading up to the construction of the case studies.

construct(v): -ed. ing.s1. to form by assembling parts: build. 2. to create (an argument or sentence. for example) by systematically arranging ideas or terms (n): 1. something formed or constructed from parts. 2.a. a concept. model or schematic idea. b. a concrete image or idea . the latin root is ster — meaning to pile up

construction: 1.a. the act or process of constructing. b. the art. trade. or work of building. 2.a. a structure. such as a building. framework or model b. something fashioned or devised systematically. c. an artistic composition using various materials: an assemblage or collage. 3. the way in which something is built or put together

principle: 1. a basic truth. law or assumption. 2.a. a rule or standard. especially of good behavior. b. the collectivity of moral or ethical standards or judgments 3. a fixed or predetermined policy or mode of action 4. a basic or essential quality or element determining intrinsic nature or characteristic behavior 5. a rule or law concerning the functioning of natural phenomena or mechanical processes

As stated previously, the course was developed as an experiment in a "hands-on" learning approach. This attitude developed as a reaction to the oft-heard complaint from recent architectural school graduates that their training and education in school did not prepare them for the "real world" of schedules and construction documentation. Many architects practice architecture as a primarily cerebral exercise, rarely finding an opportunity to actually participate in the physical act of constructing the edifices they spend months and sometimes years drafting, editing and re-drafting. Of course, it is easy to rationalize why this has happened and one can only speculate that as information technology becomes faster and more powerful, that the architect will become yet further removed from the construction process. As Edward Ford has stated in The Details of Modern Architecture, the evolutionary loss of the craft of architecture is a complex series of events, no one more to blame than the others. Yet he goes on to say that the architects from history whom we agree have contributed the most to the study of form and design, have all also had an implicit or explicit philosophy of building as well, such as Mies van der Rohe and Frank Lloyd Wright. We learn not only from their successes, but their failures as well. For instance, we study the inconsistent results R.M. Schindler achieved when trying to mix local sand with Portland cement for the concrete in his Pueblo Ribera project in La Jolla, California.

Principles of construction were investigated through the course in lectures, demonstrations and lab exercises. Based on the exercises suggested in Mario Salvadori's book, Building: The Fight Against Gravity, students performed assignments demonstrating the basic structural principles behind certain shapes and forms, such as the arch and the serpentine wall. Group exercises included working to form a human flying buttress and building models of tensile structures using straws, string and paper. They also observed the appropriate use of various structural systems while on field trips to local building sites and fabrication shops. Once a basic understanding of certain fundamental structural principles was achieved, the remainder of the course was organized around a study of the primary materials used in construction and the principles of their usage and development as building components.

MATERIALS AND TOOLS:

material: greek root is mater or materia — meaning tree trunk. as in hard wood or carpentry, i.e., building

tool: 1. a device used to facilitate manual or mechanical work. 4. something used in the performance of an operation: an instrument

Throughout the course we focused on primary materials historically used in building, including masonry, wood, concrete, steel and glass. Each material was introduced to the students through lectures and readings, presenting both historical and specific technical perspectives, including cultural and geographical effects on the development of technology and the spatial implications of various materials. There was a conscious effort throughout to expose the students to both typical building practices as well as to expose them to examples of the ways in which architects have thought about and manipulated these materials in less typical applications. Through this introductory component of the course, the students could develop the framework for a working knowledge of accepted practices, as well as begin to think about how their preconceived notions of technology and construction could be challenged and improved.

Physical properties of the materials and tools were explored by the students through the lab exercises. For instance, one exercise involved framing a wall using basic wood stud construction techniques. In this exercise the students were also exposed to different tools through an impromptu race between a normal hammer and an air powered nail gun. Another exercise allowed the students to mix mortar and lay brick in low walls forming a corner. They quickly learned that there is an art to keeping mortar on a brick that they had previously under appreciated. They also learned there is a

significant difference between mortar and cement when we realized we had gotten bags of cement, without any sand, instead of pre-mixed mortar. All students participated in lab exercises, thus ensuring that each individual student developed an appreciation of tools and materials. An additional benefit of these exercises was that they could all see the inevitable failures of unskilled laborers and poor craftsmanship, a necessary component of working with any material. Most importantly, it allowed them to begin developing ways of thinking through the construction process logically and productively.

DETAIL CONSTRUCTION:

detail: 1. individual part: an individual separable part of something. especially one of several items of information 2. each and every element 5. small element of art or structure: a small element of a work of art or building structure. considered separately // French early 17th century — détail. literally "piece cut off." from détaillir "to cut up." from taillier "to cut."

After the completion of the materials lectures and exercises, the students divided into groups to study different materials in relation to specific buildings and architects focusing on the primary building materials of brick, steel, concrete and wood. The case study methodology was employed to focus on a specific detail of the building and construct it at a scale of one-to-one. Over the last three years we have conducted 14 case studies and built 13 consisting of the following buildings and architects:

Brick	Louis Kahn—Exeter Library
	Sigurd Lewerentz—St. Mark's Church
	Renzo Piano—IRCAM Center
Steel	Frank Lloyd Wright—Fallingwater
	Pierre Chareau—Maison de Verre
	Dominique Perault—Bibliotheque Nationale
Concrete	R.M. Schindler—King's Road House
	Frank Lloyd Wright—Millard House
	Carlo Scarpa—Brion Cemetery Chapel
	Tadao Ando—Koshino House
Wood	Greene and Greene—Gamble House
	Alvar Aalto—Villa Mairea
	Charles Moore—Sea Ranch

Working in groups of 6-7 each, the students prepared a 10 page research paper for each project, focusing on issues of construction and materiality, more specifically, in terms of tectonic, and historical significance. By studying the primary materials in depth, they became aware of the ways in which each architect deviated, rejected or developed new ways of looking at standard building practices through the projects. Students then chose wall sections that expressed the essence of the building and the architect's approach to materials and construction. Upon completion of the research component, each group presented their work to the class as a whole, thus allowing everyone to see the comparative value of each architect's approach.

This research allowed the students to appreciate the architect's approach to materials and building processes. This appreciation informed the student's decisions throughout the detail development and construction. For instance, the group studying Louis Kahn and the Exeter Library fully embraced Kahn's famous conversation with the brick wherein he asks the brick what it wants to be and the brick replies, "I like an arch." This lead them to the decision to construct one half of a jack arch from the library. In this section the brick is 3 rows thick but when it was suggested that they might ease their work and the structural load by creating a "false-front" to the arch by building a boxed out frame and cladding it with one layer of brick, they summarily rejected the suggestion as untrue to Kahn's principles. The impact of the this decision was great as they realized through studying Kahn's actual drawings from the library that each brick had been specially cut at different angles to create a smooth arch, not just one row but all three. Still they persevered and built the arch as intended because of their desire to pursue Kahn's principles; a desire that developed as a result of their research.

Simultaneously with the research paper, each group prepared fully detailed drawings and a study model of the wall section they had chosen to build. They prepared lists of materials, tools, and outlined construction schedules required for each wall section. Each wall section is constructed in actual full size materials, coming as close to the reality of the actual building as physically possible. Donations from the local building community supplied the majority of our building materials but when necessary we were able to purchase them with school funds. Through this part of the process, they became aware of the compromises inherent in any built work, for instance, lack of access to redwood for the Gamble House resulted in a compromise on cedar. As the materials were being gathered for the construction process to begin in earnest, preparations were made to the site.

As the building and construction process unfolded, the students quickly became aware of the limitations of the drawings and models they had previously believed to be complete representations of the details. This has often revealed failures and gaps within the translations from drawings to buildings...not just on the part of the students, but on the part of the architect's as well. For example, the Fallingwater team (working in steel to reconstruct the original Hope windows) realized that the hinges were not going to be commercially available so they spent hours designing and making prototypes of approximations of the actual hinges. In the end, their hinges were virtually identical to the originals. In addition, the entire piece had to be constructed of stock steel angles and flat stock so their previously "completed" drawings, in the form of blueprints in the shop, became an inscrutable Rosetta stone of calculations and drawings and re-drawings of each section they had to construct. These tattered blueprints remain the true testament to the thought process they went through as they built the piece.

ANALYSIS

What the case studies reveal to us at this point is the increasing lightness and thinness of wall construction. As Gropius predicted, the wall has truly become a thin veil separating interior and exte-

rior and has ceased to be the sole determinant of space. However, several assumptions of the modern movement have not come to pass as predicted. The wall has not dematerialized, in fact, the construction and detailing of the wall has become more complicated than ever. The constructed details reveal sections of walls where transitions between opaque materials and transparent materials are sometimes impossible to understand or predict as in the case of Exeter Library and the Bibliotheque Nationale. And sometimes they reveal sections where the transition is deliberately left unresolved (at least in traditional terms of weatherproofing) in the cases of Sea Ranch and St. Mark's Church. But never do these walls and connections lack material presence.

Also, Gropius' assertion that standardization and rationalization of the construction process would provide a new architecture has not come to pass as expected. Every one of the case studies proves that great architecture includes a high degree of craft for even when standard materials were used, they were modified and sculpted by the architect to the point of obliterating the benefits of standardization. While this is obviously a limited study of the topic, the architects and buildings selected provide a fairly good cross section of intentions and attitudes to the production of architecture.

In order to fully understand the nature of the details as they exist we have to look at their placement. In physical terms the details are placed along a walkway leading directly to the northwest entry of the school of architecture. Each wall section is approximately 4 feet wide by 8 feet tall and of a thickness which varies from project to project, based on the construction type and materials. The sections rest on 6-18" deep site-cast concrete pads and are fairly permanent installations at the school. In terms of curriculum, the case studies fall in the semester after an intensely rigorous theory course and immediately before the semester that students graduate from the foundations program to the professional program. The next courses the students take are in the history of modern architecture as well as structures. By being placed prominently both physically and within the curriculum, the experience of the case study exercise shapes the rest of the student's architectural education. The long-term effects of this placement are beginning to register as the first group of students to engage the process are entering their fifth and final year.

FINAL THOUGHTS

Part of the unique quality to the course is the combination of historical significance and construction, with minimal design decisions to be made. We would argue that this is particularly appropriate for Foundations level students and that this project can take the form of a more traditional design-build project later in their architectural education. We would hope that the heightened tectonic sensibilities of the students will stay with them throughout their careers.

In a more far-reaching view, the projects which formed the culminating experience of the course provide invaluable examples of construction principles and building of Modern architecture for all students. This approach to technology through the process of construction has proved to be one of the most invigorating experiences the school has had in years. In fact, the faculty recently agreed to adopt the paradigm of construction as a guiding force for the restructuring of the entire curriculum. One possibility for this may be incorporating more materials explorations in the Foundations sequence. Another possibility may be that language used in the curriculum would reinforce notions of construction, such as "building a concept, or curriculum."

The ultimate success of the course rests in the knowledge gained by the students in going through the process. While the hands-on approach to learning is not necessarily unique, we have found this model to be particularly interesting and successful in getting students to think and feel confident in the knowledge gained by going through this process. The success of the project lead to the offering of an advanced construction principles elective in which the students spent an entire semester researching a detail and ultimately building one of their own design. Those students were also able to contribute in the second-year level course by working in the lab component to execute their own research. The long-term effects of the confidence were felt last spring as those first students to build presented a comprehensive proposal of change to the faculty in which they demanded the option of a year-long thesis for their final year.

Another by-product of the course was a reaction from those upper-year level students who had missed the opportunity to participate. Last spring a group of three got together and developed a design/build proposal for their final studio — simply as a way to get some construction experience. Their project, an art gallery and storage room, is an awe-inspiring success and has lead to multiple new commissions. They see this as an exciting alternative to a traditional practice. They feel their experience makes them better and more responsible architectural interns.

Yet another student who has just completed the course spent part of his summer continuing his study of tectonics by constructing a primitive hut on his grandparent's farm. He wanted to spend more time thinking about the topic and details he had worked on in the class and did so without course credit or payment of any kind. He spent his days building and his nights drawing and reading. He consulted in a very limited way with his family and myself throughout the process. The resultant structure and narrative are exquisite and sublime. I can not imagine a better determinant of success than these small projects and the great young minds that have created them.

BIBLIOGRAPHY

The American Heritage Dictionary of the English Language. 3rd ed. 1992.

Ford, Edward. Details of Modern Architecture. Cambridge: MIT Press, 1990.

Ford, Edward. Details of Modern Architecture, Volume 2: 1928 to 1988. Cambridge: MIT Press, 1996.

Frampton, Kenneth. Studies in Tectonic Culture. Cambridge: MIT Press, 1995.

Frascari, Marco. "The Tell-the-Tale Detail." VIA 7 (1984): 22-37.

Gropius, Walter. The New Architecture and the Bauhaus. Cambridge: MIT Press, 1965.

Heidegger, Martin. Basic Writings. Ed. David Farrell Krell. San Francisco: HarperSanFrancisco, 1993.

Le Corbusier and Pierre Jeanneret. "5 Points Towards a New Architecture." Programs and Manifestoes on 20th Century Architecture. Ed. Ulrich Conrads. Cambridge: MIT Press, 1970.

Sekler, Eduard. "Structure, Construction, Tectonics." Structure in Art and in Science. Ed. Gyorgy Kepes. New York: George Braziller, 1965. 89-95.

Semper, Gottfried. "The Four Elements of Architecture." In Search of Architecture. Trans. Wolfgang Herrman. Cambridge: MIT Press, 1984.

The Frame as a Catalyst for an Architecture

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University of Virginia

"The frame has been a catalyst of an architecture, but one might notice that it has also become an architecture, that contemporary architecture is almost inconceivable in its absence."[1]
— Colin Rowe

The concept of the structural frame pre-dates twentieth century modern architecture, yet Colin Rowe's remarks serve to illustrate the fundamental relationship that the development of iron and steel construction technology had on modern architecture. However, the primary division between the structural frame and the exterior cladding that would become central to the vocabulary of a modern architecture is evident in Gothic architecture, Paxton's Crystal Palace and the vernacular architecture of the Japanese house and Semper's Cariab hut. And although the austere and progressive buildings of the Chicago frame rose in the late 1800's, the formal and spatial ideology of the modern frame did not become codified until Le Corbusier's iconic drawing of the 1914 Domino house. The structural frame is a constituent element of Le Corbusier's "Five points of a New Architecture" (1920), and the frame's formal and spatial role in this new modern vocabulary is revealed through his four villa compositions (Villa La Roche, Villa Stein, Villa Biazeau and Villa Savoye). His system of "Five Points" elevated structure to the role of art and made the concrete frame into an instrument of societal change. Implementing the grid as a major compositional device underscores Corbusier's belief that all men in the progressive industrial society are equal, with fundamental needs, regardless of their cultural levels.[2] Le Corbusier's "Five Points" harkened a new architectural spatial morphology for a culture and society that was rapidly changing. This new spatiality relied on the constructional logic of the frame as well as a new ideology of the frame, which drew from the practices of cubist painting and the premise of a geometric construct, from which a fluctuating multivalent spatial morphology could emerge.

Fig. 1: Shinmei-gu, near Matsumoto Shinto Shrine

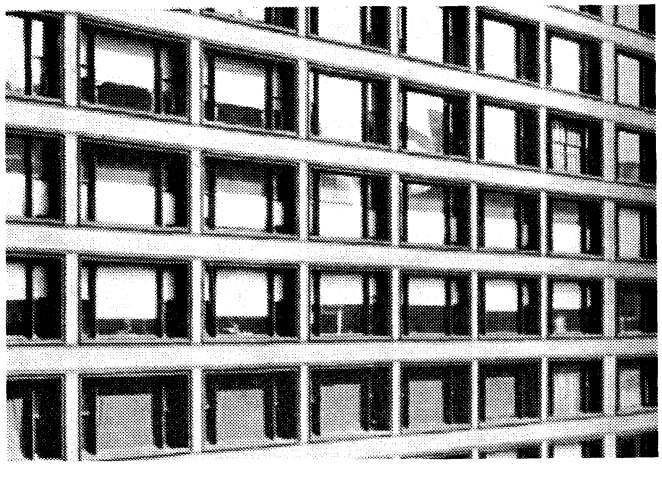

Fig. 2: Sullivan: Carson Pirie Scott

BUILDING CONSTRUCTION PRACTICES

The constituent elements and processes of building construction were forever changed during the industrial revolution of the nineteenth century and subsequent developments in the early twentieth century. This change was facilitated by the introduction of new

building materials and the development of new building systems: In Europe, reinforced concrete developed through the work of Francoise Henebique and August Perret. In the US, iron and steel frame construction fueled the building boom in Chicago and the work of William Lebaron Jenny and the Chicago School. The functional economy of frame construction soon liberated architecture from a solely mass based construction. Frame construction has become a contemporary building reality and companion layered wall construction, with the development of internal specialized components, continues to be one of the single most significant and on going construction technology developments of this century.[3]

For the developers and merchants of the late nineteenth century Chicago, the new frame buildings offered light filled space with increased rent-able floor area which was captured from the use of a more slender structure. And significantly, more floors of space as the steel framed building climbed higher than its masonry counterpart.

> *In America, the skeleton structure, conceived to be of utilitarian value...but in Europe...it was given a logical form only by the sustained volition of architectural intelligentsia...The frame became something other...not an answer to a specific problem, office building, but (rather) to the universal problem, architecture.*[4]

In Paris, the development of concrete frame construction reflected Perret's philosophical allegiance to the principles of French rationalism exemplified by the writings of Viollet-le-Duc. Through Perret, this rationalist's philosophy was transferred to Le Corbusier under Perret's guidance. Corbusier's study of Violet Le Duc and Choissy laid the foundation for his pursuit of an architectural language appropriate for modern society. This language would be the equivalent to the elements underlying the great styles of the past. (The parallel between the *five* classical orders and Le Corbusier's *five* elements of architecture is a poignant coincidence.) At a passage in Corbusier's copy of Dictionnaire raisonne' where Viollet describes the form of the Gothic flying buttress as a perfect structural expression, the young Jenerret inserted a note: "these lines show how this whole art lives by its carcass now Auguste Perret has told me, hold on to the carcass, and you will have the art."[5]

ART, THE GRID AND FRAME

The Italian Futurists, Russian Constructivist, and the French Cubists were all influenced by industrialization and its technological advances and their art attempted to capture these changes. For the Italian futurist Bocconi, this space was the result of movement— revolutionary speed— afforded by the new modes of transportation, which collapsed the conventional notions of space over time.[6] Cubist painters introduced a fluctuating and multivalent spatial construction based on the phenomena of transparency and structured by the presence of a new kind of compositional grid. The cubist grid dismantled the conventional notions of Renaissance space by diffusing the centrality of perspectival vision with a non-hierarchical grid that simultaneously allowed for multiple viewpoints and multiple spatial conditions. This uniform grid sectioned the canvas surface into a matrix of faceted planes that both flattened the volumetric spatial qualities of conventional painting and fractured space into dynamic layers. This produced a compression of distance into an abstract layer of shallow space existing between the actual surface of the painting and the construction of planes and volumes in the implied (deep) spatial layers. In this new spatial condition, several layers of visual reality exist: ranging from the flat and shallow space within the uniform grid and the deep space constructed by *chiaroscuro*, fluctuating figure / field reversal of recessing and advancing oblique planes.[7] The use and geometry of the cubist grid and the introduction of the steel and concrete structural frame simultaneously transformed the classical spatial planning attitudes in architecture. The effect of this new

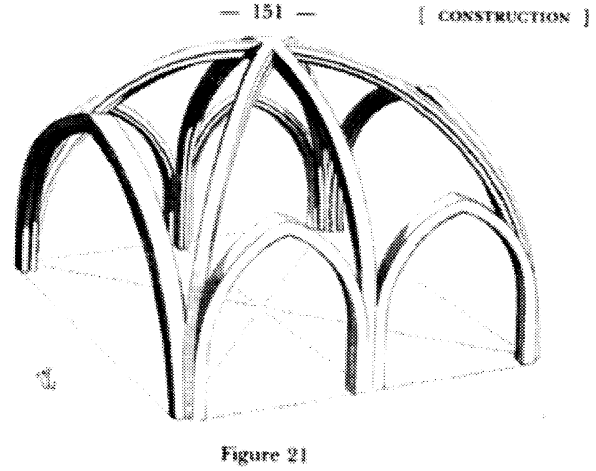

Fig. 3: Viollet Le Duc: Dictionnaire raisonne'

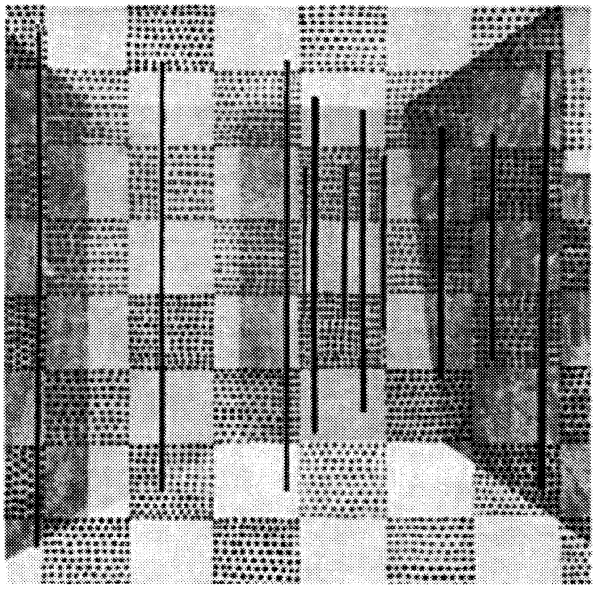

Fig. 4: Klee: Space diagram

Fig. 5: Picasso: Portrait of Wilhelm Uhde

spirit of art on the realm of architecture resulted in a re-consideration and new representation of a spatial construction that was temporal; based on the phenomenal experience of space through time.

ARCHITECTURAL GRIDS AND FRAMEWORKS

In her essay *Grids*, Rosalind Krauss, ties the space of the grid in modern art to architecture. "Logically speaking, the grid extends in all directions, to infinity...By virtue of the grid, the given work of art is presented as a mere fragment, a tiny piece arbitrarily cut from an infinitely larger fabric. The three dimensional grid (now a lattice) is understood as a theoretical model of architectural space in general, some small piece of which is given material form." Kraus also reminds the artist (and architect) that the power of the grid lies in its mythic quality of paradox or contradiction. The grid is objective science—a coordinate system and a structural frame—while at the same time it provides for a vehicle of illusion and interpretation.[8]

At the Illinois Institute of Technology, Mies van der Rohe imposed a "value-free" or universal grid as an organizing spatial and architectural structure across the campus. Mies' grid is a datum, which perforates free flowing modern space. Here a 24 x 24 x 12-foot

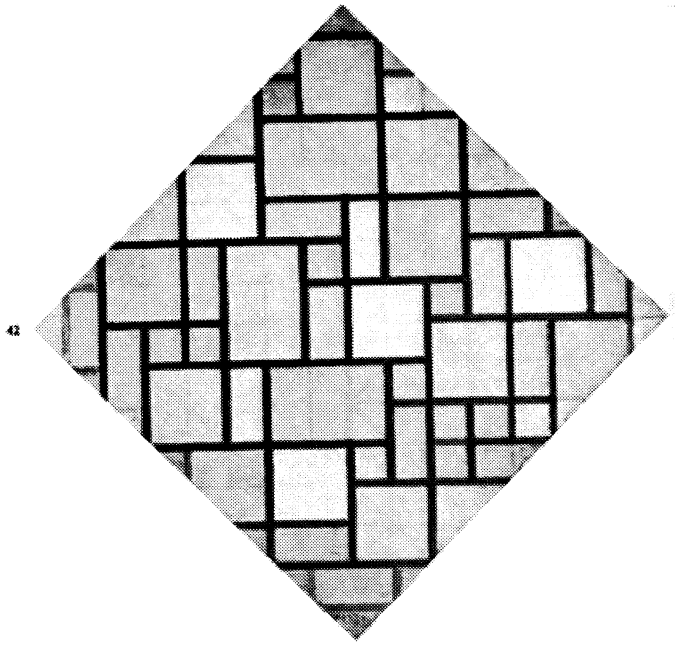

Fig. 6: Mondrian

classroom module prevails. It is proportionally enlarged when applied to the entirety of the campus plan and similarly addresses, incrementally at a smaller scale the building structure, facades, reflected ceiling plans and mechanical systems. At IIT, the grid is the tool through which architectural space is manifested.

Mies refers to the existence of another type of objective and continuous grid in both the Barcelona Pavilion and the Tugenhaut house. The chromium clad cruciform columns (of both buildings) imply a coordinate system of space, in which the columns serve as markers of an ephemeral, but omnipresent organization. The coordinate points (columns) provide a formal and physical structure for the dynamic, gravitating walls and panels of the free plan. "The free plan and clear construction cannot be kept apart. A clear structure is the basis of the free plan...the structure is the backbone of the whole and makes the free plan possible."[9] The grid of universal space and the structural frame are synonymous.

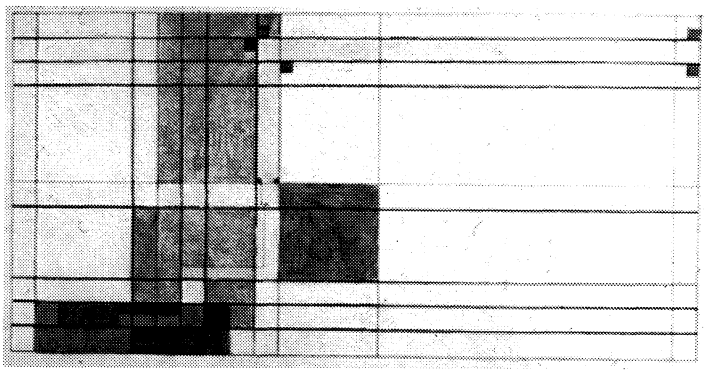

Fig. 7: Hanah Verner: Graduate Studio

In contrast, Bernard Tschumi deploys a continuous 120-meter grid across the Parc de La Villette site to begin the construction of a complex architectural organization. 10 x 10 x 10-meter three storey steel framed follies, occupy the coordinate points of the grid. This grid matrix is one of three superimposed systems providing an organizational order for the large park. Through superimposing autonomous and logical structures, each structure's capacity for order is questioned, yet their coincidence provides situations of reciprocity when elements reinforce each other: situations of conflict through opposing elements; moments of indifference when there is a low proximity of unrelated elements. Tschumi proposes a new model for the park "that could be conceived as one of the largest buildings ever constructed—a discontinuous building, but neverthe less a single structure."[10] In Tschumi's park, the grid framework serve to systematically promote conflict over synthesis, fragmentation over unity, providing a dispersed and differentiated reality.

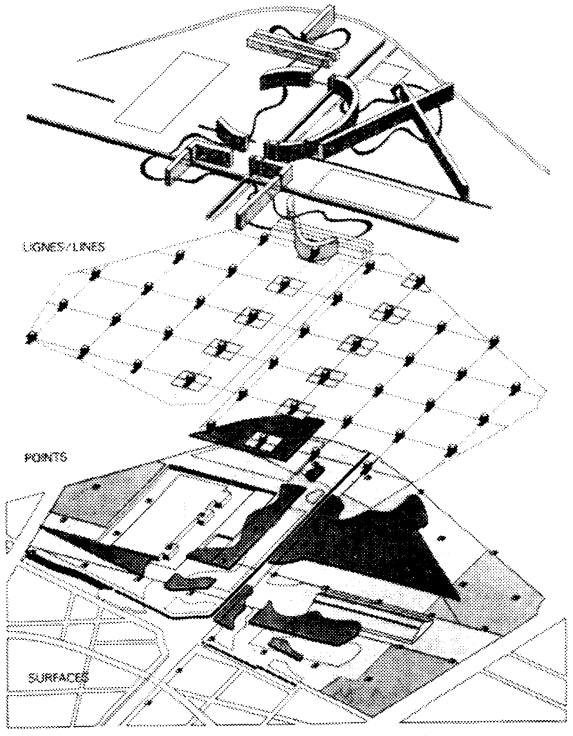

Fig. 8: Bernard Tschumi: Parc de La Villette

The global Mercator grid provides a coordinate system and geometric subtext for Morphosis' Crawford Residence in California. The building's structural frame, Mercator grid and boundary wall coexist in a complex geometric framework, but not a geometry of Miesean purity. Tom Mayne sees the arithmetic progression of the house's grid matrix as a highly structured order set in place to be eroded and carved away in order to generate a deliberate tension between the systematic and the idiosyncratic elements of space, structure and the site.[11] In addition, the architects propose the house's constructional framing devices as central to its spatial character:

> *"These geometries together create a house made of totemic pylons constructed of concrete, exposed steel T-frame structures and walls of stucco and redwood. The progression of these solid elements is reversed in the character of the negative spaces. Ultimately the relationship between center and periphery is inverted, forcing the life of the house to the periphery, where it cones into contact with those issues of site, context and connection that form the underlying pattern of the project"*[12]

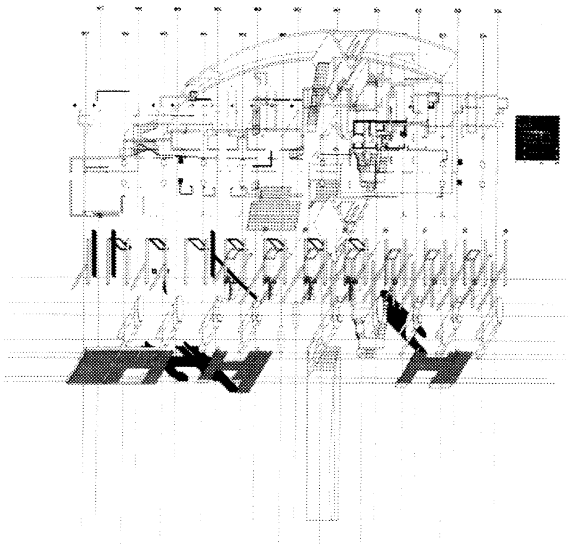

Fig. 9: Morphosis: Crawford Residence

A hybrid structural framing system of steel T elements on an 8-foot module, concrete pylons on a 16-foot module and conventional wood platform framing (a 16-inch module) further embellish the geometric matrix of the house.[13] The wood framing is largely concealed except where the "negative spaces" of the light monitors occur. The rectangular light monitors, and the light itself, serve to erode away the layers of building construction revealing the rhythmic language of the structural framework.

The woven compositional grids of Frank Lloyd Wright also exhibit an inflected modularity tied to the building's physical structure and spatial volumetrics. Wright explains:

> *All the buildings I have ever built, large and small, are fabricated upon a unit system—as the pile of a rug is stitched into the warp. Thus each structure is an ordered fabric. Rhythm, consistent scale of parts, and an economy of construction are greatly facilitated by this simple expedient——a mechanical one absorbed in the final result to which it has given more consistent texture, a more tenuous quality as a whole.*[14]

A tartan or simple quadratic-planning grid is evident in Frank Lloyd Wright's architecture. The modular dimensions of this grid vary, ranging from a basic two way three-foot grid of the mid-western, "Forest Period" to the sixteen-inch square grid of the California "textile block" period.[15] The three-foot tartan grid of the DD Martin House in Buffalo orders the interior spatial volumes, building structure, placement and size of window openings as well as

modulates the expanding landscape surrounding the house. Although his modular and resulting grid matrix varied by local circumstance, for Wright, the grid was a logical companion to the rising practices of industrialization and mechanization: the grid was as much an economic, democratic labor saving device as it was a framework for architectural space making.

Rosiland Kraus cites the grid as an emblem of modernity declaring "modern space is both autonomous and autotelic." The modernity of space is that which is rooted in an order of pure relationship, divorced from the "natural world". The grid in its overall regularity provides a matrix of relationships which is pure and final. It is a ubiquitous form in the art (and architecture) of this century. Kraus further notes that one has to search a long way back into the history of art—to the period of the renaissance and the inscriptions of a perspectival matrix on space—to find the presence of "grids" in art.[16]

Colin Rowe's analysis of Palladio's Villa Malcontenta and Le Corbusier's Villa Stein in the essay "Mathematics of an Ideal Villa" illustrates the genetic character of the grid when he compares the renaissance and modern grid in architecture. However, for all that is common with respect to the organizational grids of both of these buildings, remarkable spatial differences result from Corbusier's masterful ambiguity drawn from the principles of analytical cubism in contrast to Palladio's consistent volumetric clarity inscribed by the framework of renaissance proportion and perspectival systems. Palladio's spatial composition is legible from a glance at the building's façade. In contrast, The structural grid of Villa Stein provides an orthogonal three-dimensional datum to register the fluctuating spatial character, which is perceived through diagonal circulation. Once ascending to the second floor (the piano nobile), dramatic diagonal circulation across the living area and toward the dining room and garden façade slices through several spatial layers. Thresholds striate the gridded volume of space with surfaces, real and implied. The spatial layers are confronted obliquely and slipped through, much like the cubist canvas where oblique planes referring to deep (perspectival) space are emerging or dissolving against an orthogonal grid of the flattened canvas.[17]

GRIDS, SPACE AND SURFACE

Le Corbusier' did not produce ambiguity for its own sake, but rather to encourage a reconsideration of the true nature of space, spatial representation and the experience of spatial sequence afforded within the spatial and tectonic character of the frame. This is particularly relevant to the expression in elevation and the corresponding spatial condition beyond this surface. The elevation, façade and building surface are independent of the supporting members of the frame allowing great freedom of expression. Although Corbusier's five points of architecture include the ribbon widow alluding to the remarkable non-structural role of the buildings surface. The term *free-façade* proposes set of yet undefined opportunities for the frame's bounding or clad surface.

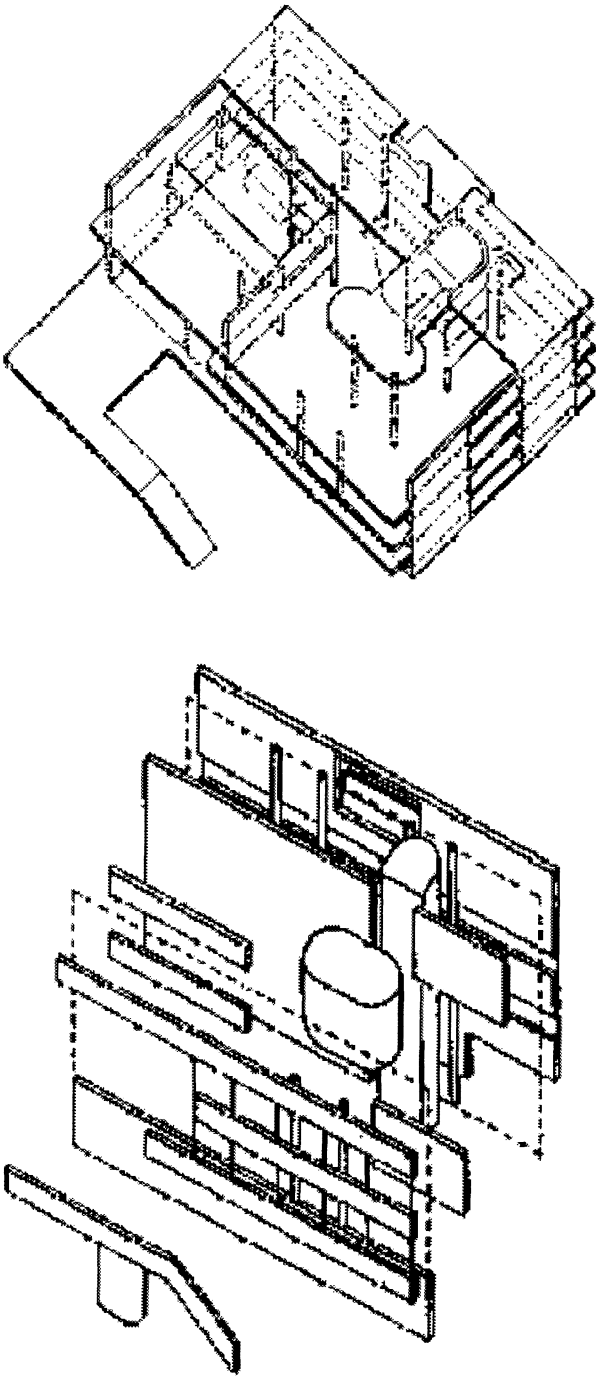

Fig. 10: Villa Stein at Garches

In the example of Villa Stein there is a provocative yet perhaps inconclusive reading of the façade as it may relinquish or embrace its ability to telegraph interior spatial intentions. In contrast to the architecture of Palladio, the interior spatial disposition of Villa Stein does not directly telegraph to the façade. Yet, upon analyzing the interior space of the building itself, fluctuating correspondences emerge between the order of the elevation and plan, the front elevation and rear elevation and the interpretation and appropriation of space. For example, the symmetry of the front façade, established by the main entrance and the service entrance serve to advance a notion of centrality and axis. This axiality is in reference to the major space of the piano nobile. However, the presence of this significant space is denied by the expression of several floors of ribbon windows on the front façade. Yet this opaque façade with banded widows is a formal inversion of the garden façade, which although similarly layered is more transparent, than solid surface. This inversion speaks to the transition of city to garden, public to private, which transpires as one moves through the house toward the garden. This is a way of spatial ordering and surface design stands in contrast to making elevations or surfaces as simple representations of the sectional space beyond, or considering elevations as somewhat neutrally ordered. The introduction of the structural frame and framing, the independent nature of the boundary surface, modern architecture's phenomena of fluctuating spatial conditions and an interest in a phenomena of multiplicity significantly altered the relationship between space and enclosing surface.

All building facades exist as a structured physical boundary and visual plane separating and connecting interior and exterior views and space. Throughout history, the exterior wall has had the ability to translate or obscure interior spatial developments, to convey or deny constructional form and to serve as an armature for cultural ornaments. The dialogue of frame and cladding is central to the work of Patkau Architects. In the Newton Public Library the requisite open spatial character is afforded by a sculpturally dynamic primitive-hut-type frame structure to which several forms of cladding and skins are collaged. With shelter established by the strong roof character, the open and fluid interior space is structured by a central spine of columns while the perimeter is made spatially ambiguous through a conspicuous layering of interior and exterior cladding. The sectional character of the building illustrates the unique dialogue between frame and skin. Between the regular march of a repetitive frame and the layers of cladding which are peeling away or bulking up to become dynamically figural poche. The theme of layering is in the service of spatial and perceptual functions, creating and concealing program spaces, while pulling reflected light into the interior and blurring the spatial boundary to the exterior.

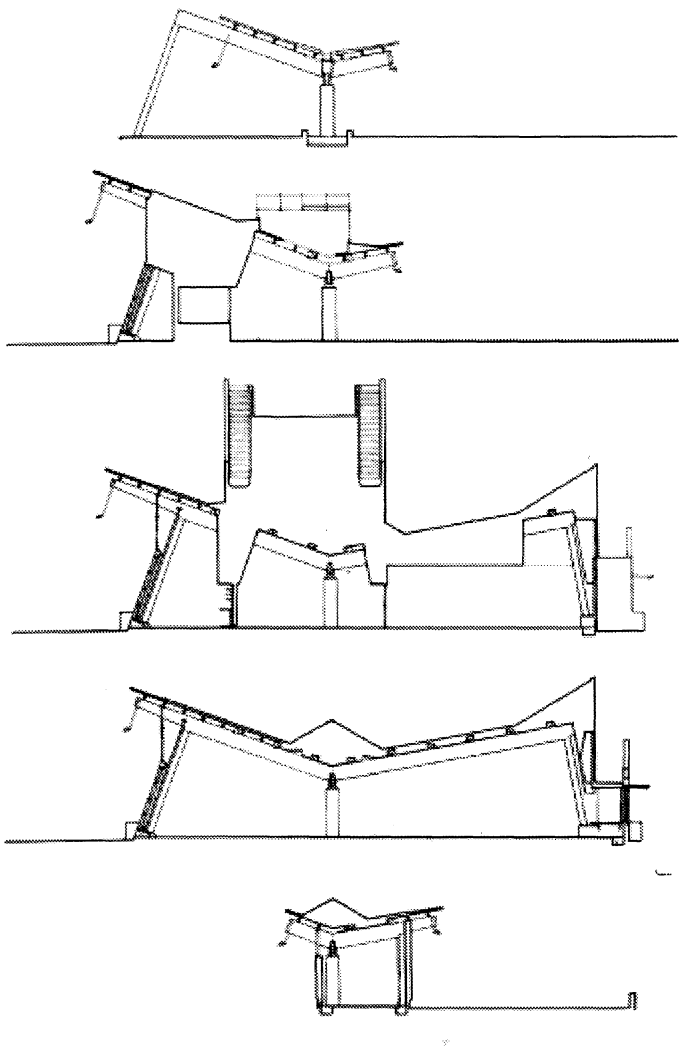

Fig. 11: Frame and cladding: Newton Public Library. Patkau Architects

SPATIAL FORCES IN THE GRID

As a mediator of a spatial boundary two simultaneous and opposite interconnected forces emerge from the grid, a centripetal force of inward spatial containment and, a centrifugal force of spatial layers or spatial volumes moving outward from the interior. The force of interiority supports a meaningful disconnect from exterior context in favor of a focus on or re-presentation of the structured interior "reality" and spatial experience. Religious architecture often relies on the force of interiority, as does Adolph Loos' raumplan and his development of architectural linings of his interior rooms. In contrast, Mies van Der Rohe's Barcelona Pavilion, Brick Country House and the architecture of Garret Rietveld and the DeStijl artists exemplify centrifugal forces moving outward, and compelling an acknowledgement of the world beyond. The centrifugal forces promote the modern idiom of continuous space defined by the grid continuing to infinity. Moving outward from the interior promotes an architecture of multiple layers and surfaces as an ex-closure of spatial character relative to the grid. The architecture of ex-closure translates interior definition to the exterior, defining spatial boundaries and spatial character, to and through adjacent rooms, toward the exterior of a building façade and even to the bounds of the site. The grid and structural frame both operate as datum for the forces of

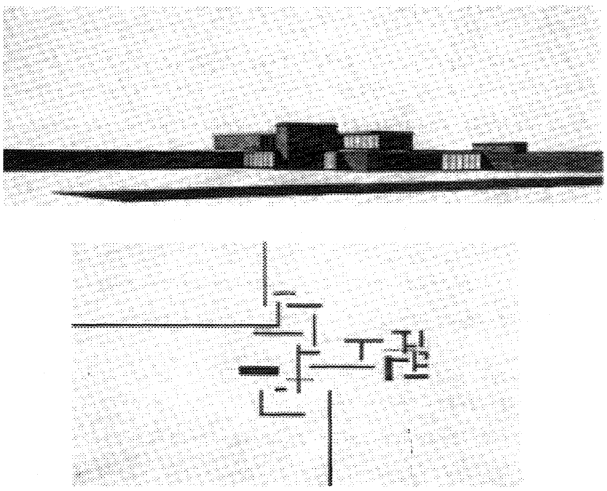

Fig. 12: Mies: Brick Country House

x-closure which is master-fully exhibited in Frank Lloyd Wright's)D Martin House and site planning. At the Barcelona Pavilion, the rame is a force of structural stability, which registers the centrifu-;al force of the walls. Mies' universal-planning grid at IIT implies .n infinite space in which the collection of campus buildings is imply a built fragment of a centrifugal force. In contrast, a centrip-tal force of interiority is present in Wright's Unity Temple where he interior world of the sanctuary is the result of a three dimen-ional matrix that has turned inward and is mapped back onto the pace of the matrix itself.

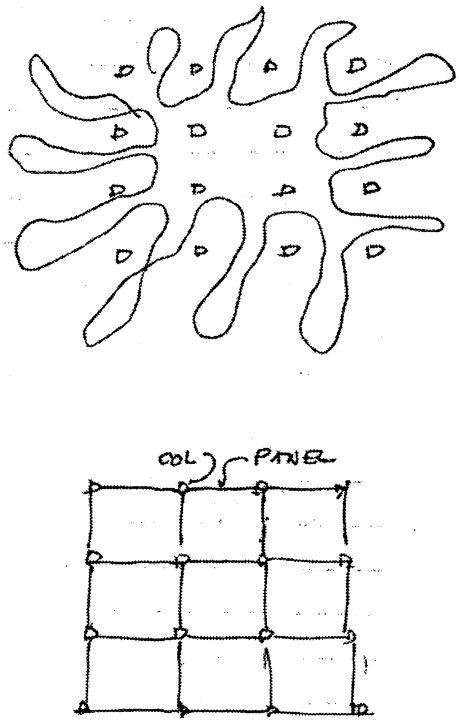

Fig. 13: Hejduk: The nine-square problem. 1954-1963 spatial fluidity and containment

THE FRAME AND EDUCATION

John Hejduk and Robert Slutzky attempted to capture modernism's spatial themes through the educational paradigm of the nine-square grid project, first given to students at the University of Texas in 1954. When Slutzky and Hejduk collaborated, the nine-square project became a pedagogic tool. On one hand, the frame is an abstract datum of pure geometric relationship and yet it has the ability to promote the development of essential constructional, detail relationships. "It is one of the classic open-ended problems given in the last thirty years."[18] Hejduk's drawings of the nine-square exercise recognize a significant spatial polarity: one of fluidity and a centrifugal force moving outward from the center and its opposite spatial condition, that of inward containment. Hejduk writes of the grid project:

> *It was always an architectonic problem. Working with the problem the student begins to discover and understand the elements of architecture. Grid, frame, post beam, panel, center, periphery, field edge, line, plane, volume, extension, compression, tension, shear, etc.*[19]

The nine-square continued as a fundamental organization for Hejduk's independent architectural investigations, which were, completed through a series of house design projects. In these houses and simultaneously in the work of his students, the nine-square grid expanded into a two-storey format and later into a three-storey cage. The Texas houses were started to re-consider "construction at a conceptual level, at a real level; detail, the methodological development of construction conditions: columns, piers, walls, beams, edges and so forth."[20]

Hejduk's pedagogic framework is described as an organic methodology, which grows from a spatial and formal understanding of the arrangement and consequence of elements within the matrix of the grid, and the elementary tectonics of post and beam construction. The frame as an educational device is a-sylistic; for Hejduk, the nine-square is metaphysical.[21]

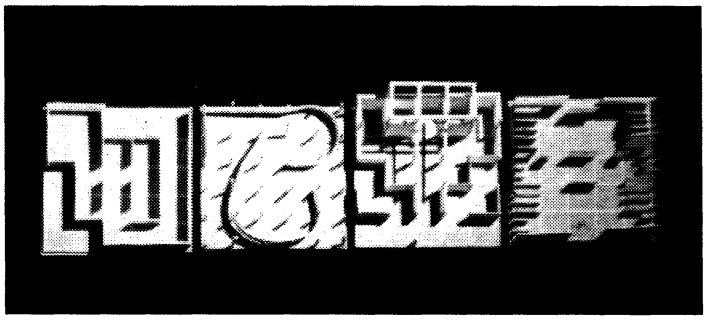

Fig. 14 author: studio UNCC, foundation undergraduate

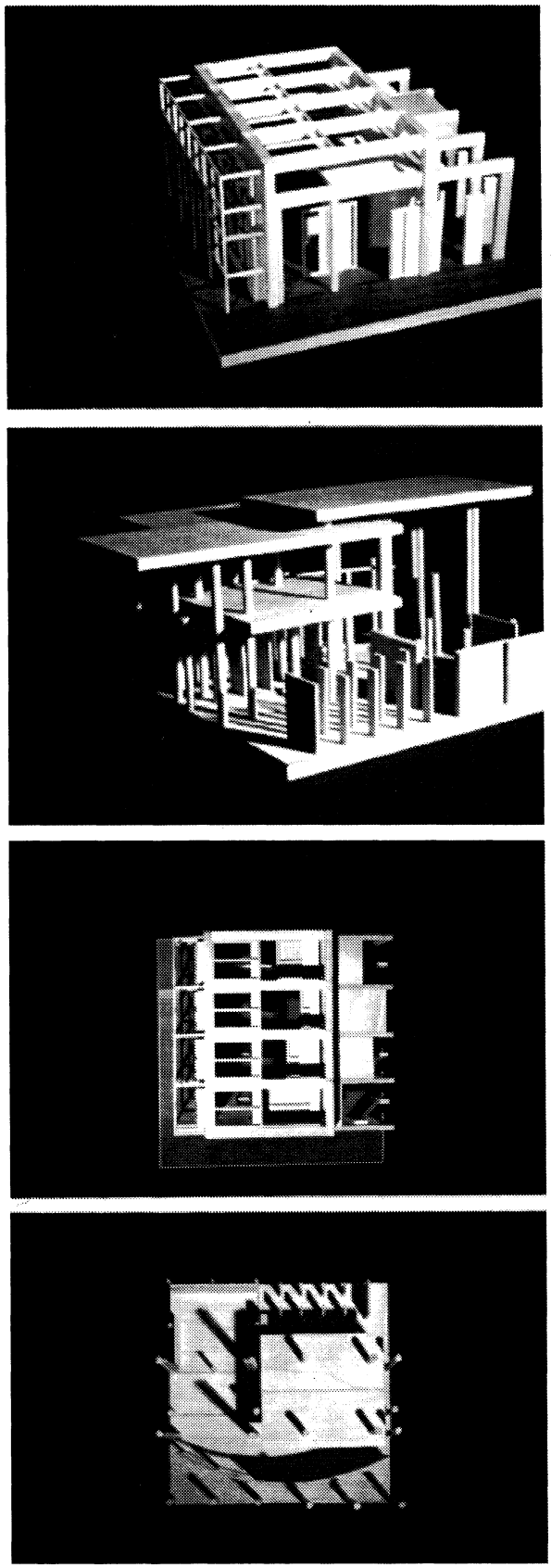

Fig 14: author: studio UNCC. foundation undergraduate

THE STUDIO: FRAME, GRID AND SPACE

The frame as a pedagogical model is a potent catalyst for the beginning student's development of architecture of form, space and materiality. Consciously incorporating the multi-valent readings of grid and frame affords the opportunity to simultaneously engage the abstract and the concrete, the poetic and the practical. As a close to this essay on the powerful and constant appearance and influence of the frame in modern art, architecture and education is a brief review of the author's studio pedagogy which has over time reflected upon and at times incorporated these issues.

The studio pedagogy focusing on the frame as a catalyst for architecture developed over several years and began in response to a foundation studio exercise that was similar to Hejduk's and Slutzky's nine-square project. Focusing on the development of an architectural framework that would be inherently and undeniably spatial transformed the studio work from plan based formalism to a project describing and inscribing spatial volumes with a three dimensional grid matrix through an architectural kit of parts. This pedagogical exercise investigating the frame and space making was again transformed by incorporating a material tectonic of constructional methods and processes that drew from the historical Semperian paradigm and Kenneth Frampton's noted polarities of a heavy stereotomic base: the earth and its compliment the light tectonic frame of carpentry.[22]

The tectonic frame is always presented to my students as a repetitious construct of a three dimensional quality. It is modern and infinite, however each student has the opportunity to condition and inflect the geometric lattice. As in several of the architectural works previously discussed, the organizational grid develops a level of complexity, which incorporates both site and architectural constructions. Or rather the site (stereotomic base) and the architectural constructions (tectonic frame) define a reciprocal relationship which is manifest in the geometry of the grid.

A series of linked spatial volumes are described through an architectural framework that includes a complimentary cladding, infill or skin. The condition of cladding, and the definition of a spatial boundary may well be considered as a Semperian opportunity, proposing a rich tectonic fabric or syntactical scrim that can negotiate between the realms of inside and outside by modulating light and views. Coincident with the agenda for cladding and developing the structural framework, is the inclusion of choreographed promenade of circulation, which takes advantage of multiple perceptual and spatial conditions within the student's projects. The promenade begins on the site mass with the development of a sectional and carved landscape and continues a dialogue with the spaces contained within the structural frame.

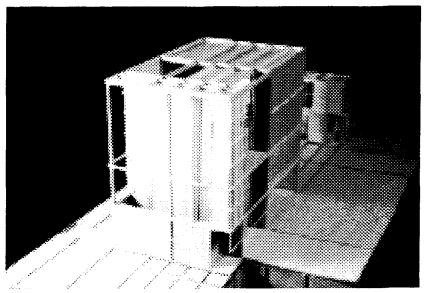
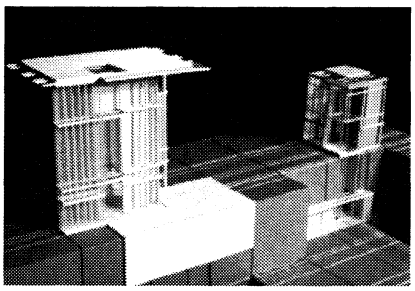
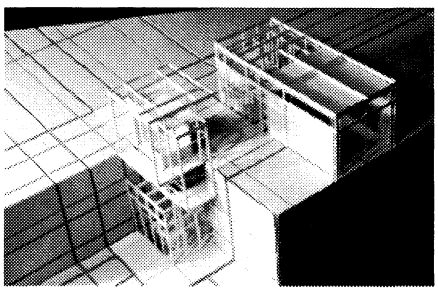
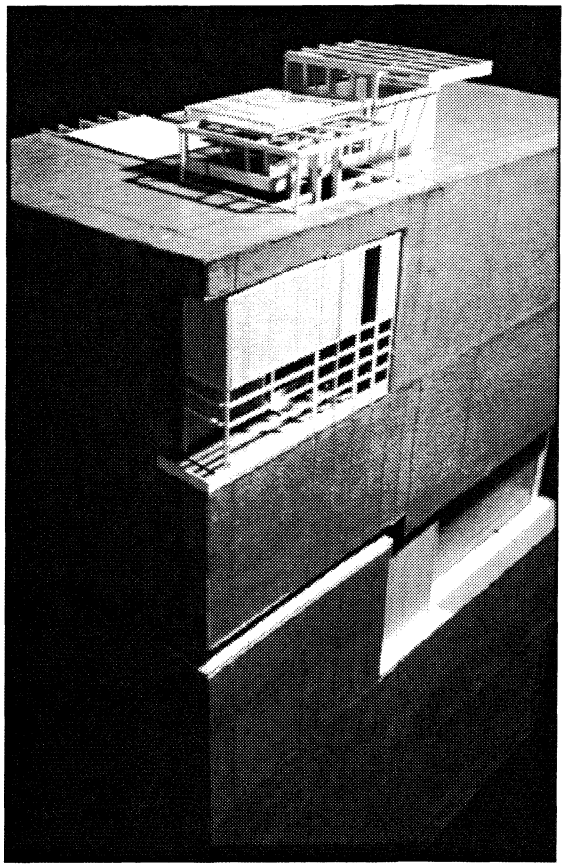
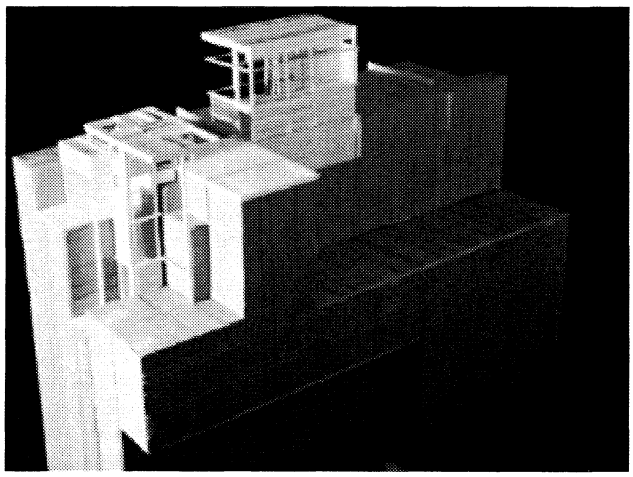

Fig 15: author: UVA graduate: first studio

NOTES

[1]Colin Rowe, "The Chicago Frame", The Mathematics of an Ideal Villa, (Cambridge: MIT Press, 1982)

[2]Francoise Choay, Le Corbusier, (New York: Brazilier, 1960)p. 19: "From an ethical standpoint, Le Corbusier is the spiritual son of the enlightened philosophers of the 18th century, and of the socialist utopians who were their 19th century heirs."

[3]Edward Ford, Details of Modern Architecture, (Cambridge: MIT Press, 1992)

[4]Rowe Colin, "The Mathematics of an Ideal Villa", The Mathematics of an Ideal Villa,(Cambridge: MIT Presss,1982)

[5]Turner Paul, "Rationalism, Romanticism and the Domino System", The Open Hand, R. Walden, ed., (Cambridge: MIT Press, 1977)p. 24.

[6]Reyner Banham, Theory and Design in the First Machine Age, (Cambridge: MIT Press, 1994) p. 99-105

[7]see John Golding, Cubism a History and Analysis, (Cambridge: Harvard, 1988)

[8]Kraus, Rosalind, "Grids". The Originality of the Avant-Garde and Other Modernist Myths. (Cambridge: MIT Press,1986)

[9]Christian Norberg Schulz, "Talks with Mies Van der Rohe". *L"Architecture d'aujourd'hui.* No. 79, p.100

[10]Bernard Tschumi, "The LaVillette Park Competition:, *Landscape: Princeton Architectural Journal*, vol.2

[11]Jim Murphy, "Literal Abstraction", *Progressive Architecture*, No. 11, vol. 72, Nov 1991, p. 56

[12]Peter Cook, George Rand, Morphosis: Buildings and Projects, (NY: Rizzoli, 1989)p.173

[13]Edward Ford, Details of Modern Architecture, vol.2, (Cambridge: MIT Press) p. 414-415

[14]Frank Lloyd Wright. "The life-work of an American Architect Frank Lloyd Wright" (New York: Horizon, 1965)p. 57.

[15]Robert McCarter, "The Integrated Ideal" Frank Lloyd Wright a Primer of Architectural Principles,(New York: Princeton Architectural Press, 1991)

[16]Krauss, Rosalind, "Grids". The Originality of the Avant-Garde and Other Modernist Myths. (Cambridge:MIT Press,1986)

[17]Rowe Colin, "The Mathematics of an Ideal Villa", The Mathematics of an Ideal Villa,(Cambridge: MIT Presss,1982): "Le Corbusier's Villa Stein is a "continuous dialectic between fact and implication. The reality of deep space is constantly opposed to the inference of shallow space; and by means of the resultant tension, reading after reading is enforced. The five layers of space which through out each vertical dimension divide the building's volume and the four layers which cut it horizontally will all from time to time claim attention; and this gridding of space will then result in continuous fluctuations of interpretation."

[18]Alexander Caragonne, The Texas Rangers, (Cambridge: The MIT Press, 1994)p. 195

[19]John Hejduk, Mask of Medusa, (NY: Rizzoli 1985)p. 37

[20]John Hejduk, Mask of Medusa, (NY: Rizzoli 1985)p. 35

[21]Alexander Caragonne, The Texas Rangers, (Cambridge: The MIT Press, 1994)p. 195

[22]Patricia Kucker, "The Semperian Paradigm: issues of tectonics in foundation design". *Proceedings:ACSA 84th Annual Meeting* (1995)

Weaving as an Analogy for Architectural Design

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PREMISE

Practicing architects today are expected to absorb and employ an ever-increasing quantity of information. They must retain small bits of knowledge from a broad range of disciplines. Yet beyond the traditional fields of business, construction, environment, history, law, sociology, etc., they also need to stay informed of our rapidly expanding technology. Because they are required to retain such a broad range of knowledge, architects must remain generalists in a world of specialization. But this raises the question of how can an architect continue to retain and process such a wealth of information? These can not remain separate fields existing on their own. Rather, as in weaving, each becomes a thread in a complex matrix from which they must glean and weave together individual strands to produce an integrated product.

Weaving, as a practiced craft, has been a common cross-cultural phenomenon for thousands of years. While patterns and techniques differ between cultures, the basic craft of weaving can be found in most. Because the concept of weaving is so accessible, it is often used as an analogy to describe various systems in our world. It describes fabrics of different races, religions, beliefs and values all co-existing. It is an apt analogy for how systems overlap and work together to create a harmonious living environment, as well as the possible destruction caused by the breaking of a single element or strand in the fabric. The fact that we exist as individual members of a cohesive team also applies directly to the building design industry. A look at the range of trades composing any building design team will clearly demonstrate this. Architects, as generalists, have traditionally occupied the role of supervisor for a building project. They are responsible for coordinating and 'interweaving' the interests of the related consultants, owners, occupants and contractors to produce a meaningful work of architecture.

By investigating the similarities between weaving and architecture we begin to see overlapping concepts. Architects and weavers both recognize the need to look beyond surface appearances in the process of designing. In the same way architects realize that quality design is more than skin deep, weavers understand the quality of a textile is dependent on the structure of the weave and not just the visual appearance of its fibers. As Anni Albers, a weaver from the Bauhaus, revealingly states:

> *"Surface quality of material, that is matière, being mainly a quality of appearance, is an aesthetic quality and therefore a medium of the artist: while quality of inner structure is, above all, a matter of function and therefore the concern of the scientist and engineer. Sometimes material surface together with material structure are the main components of a work: in textile works for instance, specifically in weavings or, on another scale, in works of architecture"*[1].

In their common need to relate a design's physical properties to its aesthetic implications, weaving and architecture share a trait worthy of further exploration

The history of textile use in architecture is broad. The most visible form of woven material today is tensile membrane structures. However, rather than concentrating on a single physical material, I chose to focus on the process of weaving as an instructional analogy in the design process. For example, in architectural design this analogy can inform the interlacing of ideas, people, place, space and construction. The comparing of weaving and architectural design from the analogical/conceptual viewpoint constitutes the basic premise of this paper.

WOVEN CONSTRUCTION

Before applying the weaving analogy to abstract notions of space or culture, it is helpful to first understand the history of physical woven construction. In terms of architecture, weaving in its fabric form has been used in tent structures for thousands of years. However, the history of planar wall construction also has weaving in its roots as the earliest building walls were likely woven. In 1851, Gottfried Semper published his well-known theory of the *Four Elements of Architecture*. Basing his theory on the form of the primitive hut, he categorized its construction into four basic elements of *Hearth, Roof, Mound* and *Fence*.[2] For the last of these, the *Fence*, he proposed that the walls of ancient houses were not made of stone but rather of hanging cloth or woven 'mats', thus suggesting the idea of the wall as a textile hung off of the supporting structure, similar to the curtain wall today. (Semper further proposed the knot as the oldest tectonic form of the joint based upon similar German

roots of the two words.[3]) To construct these walls, branches and grasses of differing sizes were interlaced to form a supportive structure that in colder climates was covered with a weather resistant shell of mud and/or leaves. Without this additional protective layer the cold and damp climate would be allowed to penetrate. This type of construction, generally known as waddle and daub, was common up to about a hundred years ago with the woven support always hidden. Even our closest modern relative, plaster on lath, has been generally replaced by gypsum board construction. The permeable nature of the exterior woven wall is a major reason why we do not see more buildings utilizing this technique. As an exterior wall they are best adapted to tropical climates where the temperature is relatively constant and airflow is encouraged. However if we expand the analogy of the woven wall to conceptual level it allows for the inclusion of solid wall construction. For example, Frank Lloyd Wright developed a system of custom concrete blocks interwoven within a metal reinforcing mesh into a double-layered wall. In this form the thin walls could retain the solidity of concrete while providing the flexibility of fabric to be shaped into any form.[4] Even traditional masonry construction when bonded with mortar in overlapping coursework can be considered a form of weaving.

The advent of new materials and joining methods has shifted the focus of construction away from what Kenneth Frampton calls "wet" techniques such as masonry.[5] The current trend of "de-materializing" glass walls into separate "dry" systems of structure, enclosure and shading/climate control opens up new opportunities to appropriate the woven wall. The desire to admit an abundance of light without excessive overheating or ultraviolet damage creates one role for woven screens as shading devices. When combined with a sealed envelope they make an effective system against the elements in exterior walls. They can also be extremely effective as vision screens to increase privacy or hide undesirable views. The future of woven wall construction looks promising in light of the proliferation of curviplanar forms in building design today. While our current construction systems are not well suited for complex shapes and stresses, a new material has yet to emerge. However there is research being done on various solutions. One relevant example can be found in the research of Doug Garafalo who is investigating the potential of a stainless steel mesh to realize structural curved shapes. "The mesh behaves like a fabric that can curve in all directions but it does have structure and can act and react according to the forces applied - it's a weave that can handle torque."[6] The way we approach form is changing and woven construction could play a major role.

Fig. 1. Student Weaving a Wall Panel

WEAVING ANALOGY AS INSTRUCTIONAL DEVICE

Literal woven construction is only one example of the overlaps between architecture and weaving. The weaving analogy can also be used as an instructional technique to help explain the complex design process. The impetus for this approach arose through the prominence of the textile school in our university. As our college was originally established as a textile school, we are consistently trying to find ways to relate architecture to textiles. Previous collaborations with the school have dealt with the production of fabric structures. However, I wanted to engage its people and facilities to investigate how the two disciplines also share other ideas about construction and form, specifically through the process of weaving. Architecture students see what is involved in the production of woven structures and textile students see the possibilities of weaving with non-fibrous materials. The studio follows one program throughout the semester divided into three topics of weaving and architecture that range from the literal to the theoretical. The first project involves the actual creation of a woven wall, the second investigates the abstract conception of weaving, and the third looks at the relationship of weaving to building construction. Though the studio course requires a linear format, the analogy excels as a reminder that design is a non-linear process that requires constant re-evaluation of site, program and construction throughout a project. The weaving model, in its capacity to intertwine varying elements and patterns, demonstrates the need to consider the many possible combinations of major and minor influences on the design. Following are the descriptions of how each project employed the weaving analogy.

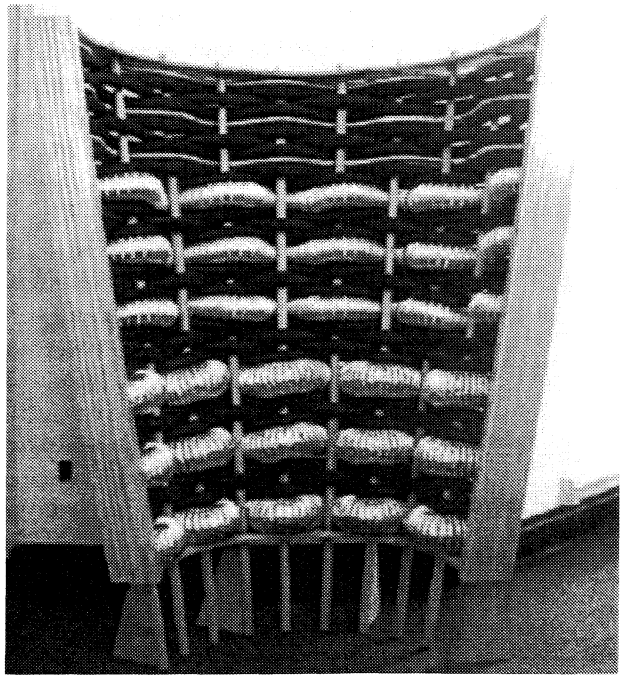


Fig. 2. Woven Ductwork Wall by Chris Bombardier. Debra Clark and Jaclyn Toole

THE STRUCTURE OF WEAVING

As students typically have had little experience with the process of weaving, the first project introduces them to the basic patterns and techniques involved. In this phase they work directly with members of the textile school. A general goal of this design studio is to examine how materials and methods of construction influence and direct the design process. Weaving provides an excellent example of how materials and patterns of weaving have a critical influence on the outcome of the fabric. The specific goal of the project is to study the characteristics of actual weaving through the empirical, hands-on *making* of an object at full-size. Weaving a textile by hand reveals much about the tactile qualities of the materials not evident by sight. In the same way, creating a piece of architectural construction by hand reveals qualities of the materials not evident in representational drawings. Architects have become separated from the tactile experience of construction. "Our materials come to us already ground and chipped and crushed and powdered and mixed and sliced, so that only the finale in the long sequence of operations from matter to product is left to us; we merely toast the bread".[7] Both architecture and weaving students need to understand the physical properties of materials that they normally represent by electronic pixels on a screen.

To test this idea, students divide up into groups that are each assigned a weaving student to act as an advisor. They must then design and build a woven wall structure at full-scale. To introduce them to the craft of weaving they tour the textile school's weaving facilities to watch both hand and power looms in action. They see first hand how the process of production and the structure of the weaving inform the final appearance: how plain, twill, satin or triaxial patterns produce varying results. Professors from the textile school act as consultants and reviewers for the architects as they design their screens. Instead of typical fibrous materials, they are required to use materials associated with building construction such as wood, metal and plastic. This places the project in-between the realms of architecture and textiles (more akin to basket weaving) which means neither the architect nor the weaver is an expert but both can contribute equally. While students utilized basic layout drawings to confirm overall dimensions, many of the design decisions were made during construction by adapting available hardware and materials to meet their intentions. Properties of the materials dictated many of the decisions. For example, many materials proved to be too stiff for weaving and had to be replaced. The project required at least one of the materials to be metal so for most of the students it was their first hands-on experience with cutting, drilling and welding steel, copper or aluminum. Through trial and error they learn how an initial concept can change over time as issues of real construction influence and affect revisions in the design. They understand how materials used for weaving are critically dependent on the manner in which they are assembled.

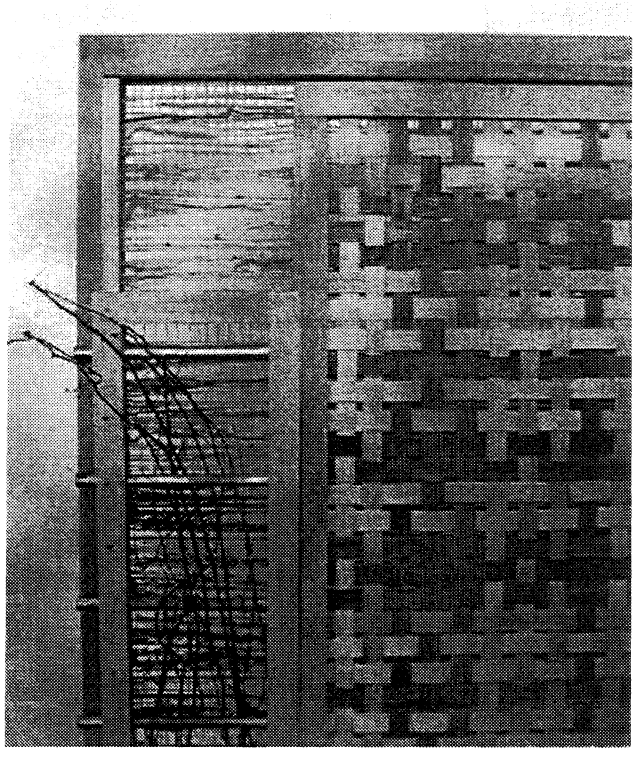


Fig. 3. Wood Screen Wall Detail by Kerissa Gaudioso. Jon Park and Michael Pavelsky

WEAVING AN IDEA: CONTEXT, CULTURE AND CONSTRUCTION

For this first part of the major building design project, students employ the weaving analogy in its most abstract form to understand

how the site, program and construction are inextricably intertwined in the design of architecture. The multiple strands of information derived from analyzing the context and program demonstrates the need for a strategy to integrate all the influences of a design. Students first analyze the climatic, social/cultural, legal and especially intuitive aspects of the site to discover how it fits into, or conflicts with the urban fabric. It is generally accepted the orthogonal geometry of American city plans originally derived from Greek city grids. However, these may have been derived from the structure of woven cloth. The tightly woven, right-angled patterns of cloth were seen as "harmonious" by the Greeks. This pattern may have been applied to the colonial cities as a way to create a "harmonious" and recognizable living environment in a foreign and hostile land.[8] Students investigate the various patterns of their urban site to seek out their own weaving analogies, analyze the contextual factors that influence a site and thereby determine a site design strategy. The location for the project is chosen in a prominent area of the city where the urban fabric has become "unraveled" and lost its sense of an urban place. The students must investigate its history, analyze the various factors that remain and propose a way to re-stitch their site to the fabric of the city through circulation patterns, built-form, and landscape design. Three groups each present an analysis of either the environmental, social or legal influences on the context. Each presentation is constructed in a transparent medium and interlaced with the others to present a collective analysis. This exercise provides an introduction to the way in which external factors impending on a site must be balanced and interwoven to recreate a harmonious urban environment.

After analyzing the site, the students research the programmatic aspects of the project such as the functions as per occupant needs, the history of the type and local traditions as a source of regional identity. They concentrate on programmatic aspects to determine not only the relationships of spaces but also, more importantly, how the building can fulfill the diverse needs of the people who will use it. At about the same time they will analyze the constructive aspects of the program that influence the direction of initial design ideas. Materials, structure, assemblies and services of physical building are studied to develop a basic tectonic concept within the legal code constraints and spatial requirements of the program. By sorting through all of these jumbled 'threads' of information, they begin to organize priorities en route to developing a design concept. Just as woven cloth has major and minor threads and patterns, the students will compose a conceptual textile of ideas to integrate the various influences. The weaving analogy performs as an instructional vehicle for describing the non-linear design process.

The concept is then expanded into three-dimensional spaces that reveal the interwoven experience of architectural space and construction. They examine the overlap of light and shadow, solid and void, all within the aspect of movement in time. As Steven Holl states: "When we move through space with a twist and turn of the head, mysteries of gradually unfolding fields of overlapping perspectives are changed with a range of light-from the steep shadows of bright sun to the translucence of dusk."[9] Students need to understand a space is not static but made up of multiple layers that continually change as one moves around and through it, something rarely evident in orthographic drawings. Through sketches and study models, they study interior spatial conditions by establishing hierarchies between public and private, service and served space, vertical and horizontal circulation, bearing and non-bearing construction, as well as how they overlap, parallel and penetrate each other. Space is approached as a three-dimensional cloth pulled apart to reveal changing sizes, shapes and rhythms of space and structure.

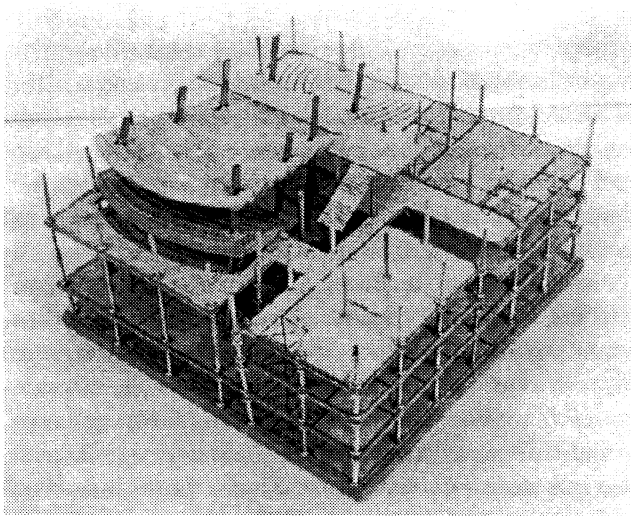


Fig. 4. Structural Study Model by Carmen McKee

INTERWEAVING CONSTRUCTION

This phase concentrates on the numerous construction systems of a building which are "woven" together to create a comprehensive product. With the advent of the iron frame in the mid-nineteenth century, the enclosing walls of buildings began separating into distinct structural, envelope and service systems. In 1852 Joseph Paxton presented a speech to explain the structural principle behind his "Crystal Palace." In it he compared the iron structural frame and the enclosing glass envelope to a "table and tablecloth". By this description he wanted to represent the glass skin as a tablecloth separate from the structure (table) that would now allow it to be "greatly varied to suit changing conditions and uses".[10] Kenneth Frampton employs R. Gregory Turner's study, *Construction Economics and Building Design* to further describe the shift away from the monolithic masonry wall toward a division into his categories of *podium*, *services*, *framework*, and *envelope*. In terms of percentage of construction cost, the structure has been reduced while services and envelope now make up the majority of the expense.[11] The simple bearing wall building has become rare. Instead it has been divided into separate systems providing support, comfort and convenience which, while allowing greater freedom for design, also create an abundance of information to coordinate. As the skeletal frame has become the major structural system used today, it func-

tions as a type of "loom" framework onto which the other systems of the building can be interwoven.

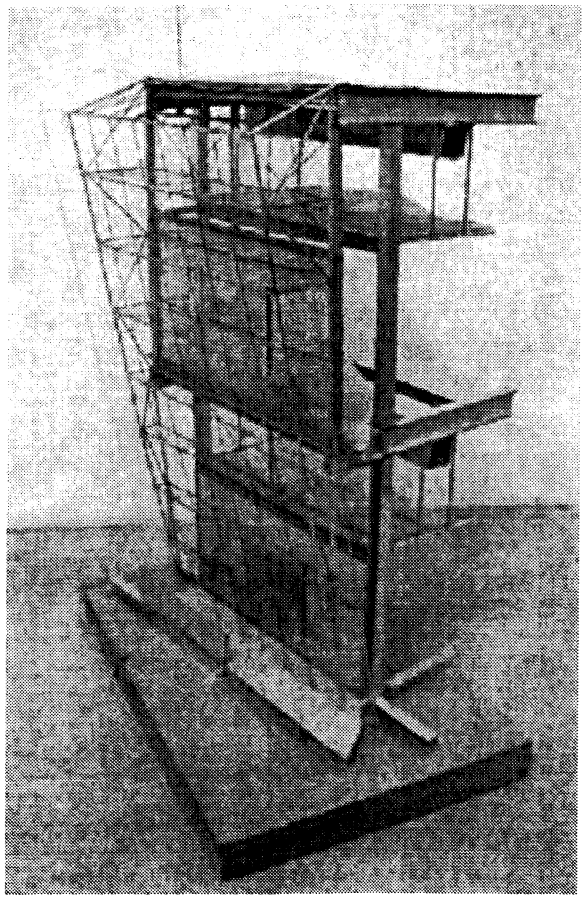


Fig. 5. Perimeter Wall Section Model by Jennifer Crane

Students study the structural system in a manner that reveals the qualities of the space inside. Too often models present the external form of a building without revealing the critical space inside. Therefore, they make a physical model of the structural system with templates created from current floor plans that can be mounted to board and woven together with threaded rod 'columns' and basswood 'bearing walls'. By allowing the student to see inside the building, these "woven" study models reveal spatial and structural issues not always evident on computer or physical massing models. Threaded rods also allow for quick revisions by adjusting the nuts up or down and replacing floor plates to create new spatial conditions. As mentioned earlier, in both textiles and architecture, the inner structure plays an integral role in the overall form. Thereby through this exercise, students now begin to see the overlaps evident in the spatial, organizational, and especially the structural systems of a building. To understand how enclosure systems affect their design, students next study the envelope in detail. They complete their structural model by clothing it in an envelope of transparent, translucent or opaque cladding to convey their design intentions and thus adding another element to the weave. The skin is detailed by studying a portion of the enclosure critical to the concept and developing it at a larger scale in partial section, plan and elevation. Typically this is a wall section that depicts an important relationship between the structure, services, envelope and shading systems to demonstrate how they must coexist within a thin slice of space. They develop the wall section by selecting the specific materials and systems required to create assembly details. While students may desire an unbroken wall of glass, they must first address the complicated issues of supporting, shading, fire-rating and heating it. The goal of this exercise is to demonstrate how all the physical components concentrated at the perimeter of a building must be interwoven to allow each to function efficiently while still reinforcing the design concept.

For a textile to exist as a cohesive work, all the individual yarns and varying patterns must be bound together in a synergistic and integrated whole. Similarly in architecture, all the influences on the design must ultimately coalesce into a final product. Therefore to document this phase, a digital, compositional drawing is created that integrates the wall section with the most critical building design drawings into one interwoven layout similar to an analytique. Relevant plans, sections, elevations and three-dimensional drawings are interlaced with construction details in a drawing summarizing the design. Students take advantage of CAD's flexibility to overlay drawings of different scales and views and 'weave' them together by an appropriate graphic technique. This drawing becomes a comprehensive tapestry of the entire semester-long project in one document.

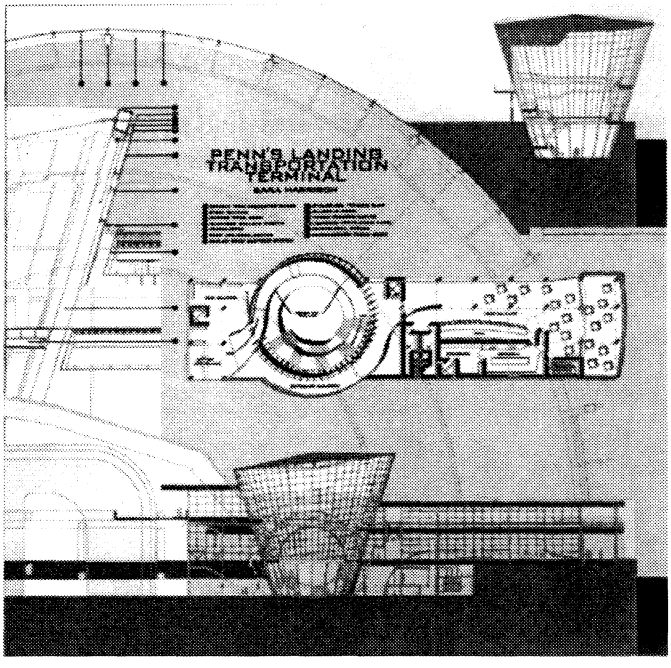


Fig. 6. Compositional Drawing by Sara Harrison

CONCLUSION

By the end of the semester students have studied the analogy of weaving in architecture from the hands-on to the virtual. After going through all phases, they can draw associations between them-

selves, their work and the larger world. To improve this course, the first objective would be greater involvement fore the weavers. Although they served well as advisors, the new palette of materials often acted physically opposite of what they expected which deterred them from deeper involvement. The next step would be to improve the presentation of the figurative analogy. The students had more success understanding the weaving analogy through the literal projects such as the woven wall, the threaded rod model and the technical wall section drawings. Finding better ways for them to understand the abstract notion of weaving an idea or space could be further developed.

Whether used in this particular studio format or in a general studio, the weaving analogy has a relevant application to architectural design. Students are always searching for a way to make sense of all the information they acquire in college. Beyond studio, they receive indoctrination in professional courses on structures, building construction, environmental systems, history, and professional management that can be applied to their design projects. Yet they often question the need for their liberal arts courses that reveal little evident application to their main area of study; design studio. Weaving, as an analogy, is a useful tool for explaining the benefits, indeed the necessity, of a wide range of knowledge. Architects must continue to operate as generalists to acquire a multitude of ideas that someday may be retrieved and woven into another tapestry of architectural design.

NOTES

[1]Anni Albers . *On Weaving* (Middletown Connecticut: Wesleyan University Press, 1965)

[2]Wolfgang Herrmann. *Gottfried Semper: In Search of Architecture*, (Cambridge, Massachusetts: MIT Press, 1984)

[3]Kenneth Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, (Cambridge, Massachusetts: MIT Press, 1995)

[4]Frampton, 1995

[5]Kenneth Frampton (Editor), *Technology, Place and Architecture. The Jerusalem Seminar in Architecture*, (New York: Rizzoli, 1998)

[6]Joseph Giovanni, "Building a Better Blob", *Architecture*, September 2000

[7]Albers

[8]Indra Kagis McEwen, *Socrates' Ancestor. An Essay on Architectural Beginnings*, (London :The MIT Press, 1993)

[9]Steven Holl, *Intertwining*, (Princeton: Princeton Architectural Press, 1995)

[10]Herrmann

[11]Frampton, 1998

TECHNICS

Craft and Construction Documents

Structures

Bucky Fuller, Candela, and F.L. Wright: Commonalities

Craft and Construction Documents

Moderator: Ellen Dunham-Jones,
Georgia Institute of Technology

Master Architect Redux:

How Digital Progress Helped Restore the Role of Master Architect

RENEE CHENG
University of Arizona

(Un)Concealed Tectonics, Concurrent Constructions

THOMAS STAUFFER
Kent State University

The Material Imagination:

Architecture and the Craft of Making

PAUL ARMSTRONG
University of Illinois at Urbana-Champaign

Building in the Middle of "Nowhere"

CLARE CARDINAL-PETT
Iowa State University

Master Architect Redux:
How Digital Progress Helped Restore the Role of Master Architect

RENEE CHENG
University of Arizona

...today, the roles of architect and builder are formally dissolving: the architect designs the building but then gives up control and becomes a design consultant who does not actually stamp the drawings; and the contractor gives up control by passing liability along to subcontractors and manufacturers.

—Howard Davis, The Culture of Building, *1999*

The new computer and management system allows us to unite all the players – the contractor, the engineer, the architect – with one modeling system. It's the master builder principle...the reverse of the twentieth-century system.

—Frank Gehry, Gehry Talks, *1999*

INTRODUCTION

Examine the work of Frank O. Gehry and Associates and you will find a twenty-first century architect with the mind-set of a medieval master mason. Gehry has often been quoted as heralding the computer-assisted return of the "master architect". One might have expected that Gehry would be anticipating the future with his state-of-the-art software, but ironically his new-found power is being used to move back in time to reclaim the long-lost role of the master builder.

This paper will examine how the role of the architect has progressively gained more legal definition while paradoxically losing decision-making power in the actual building construction process. The Experience Music Project, recently completed in Seattle, will be used as one example of Gehry's attempts to reverse this trend and regain a central role in the construction of his buildings through the use of the computer model as a reincarnation of the full-sized template.

HISTORY: THE GOOD OLD DAYS

There was a time when the architect was the lynchpin to any construction. The demise of the Greek "tekton" (master constructor)– replaced by the litigation-constricted lackey of developers and bankers – is a sad story. Increasing specialization, shortened time frames for construction and the need to limit liability exposure are but a few of the contributing forces. Architects have become marginalized in the building process, relegated to the role of the conceptual designer who must rely on others to translate the vision to built reality. Since the nineteenth century, the roles of architect and builder have become more defined and the architect has gradually lost control over the construction process.

There were two time periods where the role of the architect/builder was the most central powerful position in building culture. One is embodied by the master builders of the Middle Ages, the other by the precursor to the modern practice, the late nineteenth century firm McKim, Mead and White.

In the Middle Ages, undertaking to build a cathedral was the most challenging endeavor that a builder could face. The medieval master mason closely resembled the Vitruvian ideal of an architect:

> *Him I call Architect, who by sure and wonderful Art and Method, is able, both with Thought and Invention, to devise, and, with Execution, to complete all those Works, which, by means of the Movement of great Weights, and the Conjunction and Amassment of Bodies, can, with the greatest Beauty, be adapted to the Uses of Mankind: And to be able to do this, he must have thorough Insight in the noblest and most curious Sciences.*[1]

Through a system of apprenticeship and training by means of empirical testing, the master masons grew into a role that we would now think of as the architect's[2]. In charge of all aspects of building from its form to the construction techniques that would be employed, the master mason was consulted by every tradesman on site for practically every decision. In his book *The Art of Work*, Roger Coleman compares the work of the medieval master with the contemporary architect:

> *The master mason, therefore, was exactly what the modern architect is not: a skilled builder with a mastery of the complete field of building practice. Nowadays no one has the kind of overall grasp of building processes that the medieval mason had, and as a result all manner of faults are built into buildings at every stage from conception to completion. If a medieval mason could build a cathedral then, ipso facto, the whole elaborate business was comprehensible within the traditional skill of masonry, and*

therefore contained in that body of knowledge which constituted the trade of masonry, of which the skilled practitioner was quite rightly acknowledged a master.[3]

The authority of the master mason stemmed from his control over a simple palette of materials. Since the cathedrals used stone and stone only, the men who had mastered stone-work could assume mastery of the whole construction. As the noted historian John Fitchen points out, the knowledge gained through the mason's experience was more reliable than what we can calculate today, the empirical knowledge of the Gothic builders may well have been superior to our present-day scientific computations as applied to their buildings, for this reason: our scientific formulae (which are based upon empirical observation of natural forces, and which undergo revision from time to time as those observations become more exact and comprehensive) are concerned primarily with materials such as steel and reinforced concrete which resist both tensile and compressive stresses; whereas the medieval builders had to solve all their major structural engineering problems in terms of one material, stone, which is trustworthy only in its resistance to compression. Hence the medieval builders came to have the most thoroughgoing and explicit first-hand experience in all aspects of a material that is seldom employed structurally today.[4]

There are no contemporary parallels to medieval stone construction. Rarely do we see monolithic construction today, systems are increasingly specialized with each layer performing its own task and having its own trade (with its own expertise) associated with it. To become the modern equivalent of the medieval master mason, a single individual would have to master *all* the trades for a modern building. This person would have to apprentice dozens of accepted trades and acquire knowledge of new subspecialties that emerge each year.

There are a number of reasons why the master masons did not leave a legacy of master builders. Societal shifts of patronage and building culture during the Renaissance played a large role in this break. But the nature of construction itself evolved slowly enough that it would have been possible for the master mason to transform into the master architect or builder who understood multiple trades involved with multi-faceted construction systems. One of the primary reasons that the legacy was not established beyond the Middle Ages by continuity or apprenticeship was because of the closed nature of the elite ranks of masters. In fact, there were severe penalties for releasing secret information outside the masons' guilds[5] . Historians have long wondered why there are so few accounts of construction from this era. Fitchen attributes this paucity of writing to two factors:

...it is highly doubtful if any but the master masons could have been competent to write a factual account of the specific procedures followed in erecting a building. However, not only were these men too busy to write: above all, they were at once practitioner and custodians of the 'mystery' of their professions, and in both capacities they had a vital interest in not *disseminating the close and jealously guarded trade secrets thorough knowledge of which was held only by these men of superior ability and experience, the masters themselves.*[6]

The aura of omnipotence surrounding the master masons coupled with the fact that they went "extinct" have made many contemporary architects romanticize this era as the apogee of centralized construction power that would never again be matched. Frank Lloyd Wright describes the Middle Ages in glorious terms in his summary of Victor Hugo's *Notre Dame de Paris*.

After seeking the origin and tracing the growth of architecture in superb fashion, showing how in the middle ages all the intellectual forces of the people converges to one point – architecture – he [Hugo] shows how, in the life of that time, whoever was born a poet became an architect. All other arts simply obeyed and placed themselves under the discipline of architecture. They were the workmen of the great work. The architect, the poet, the master, summed up in his person the sculpture that carved his facades, painting which illuminated his walls and windows, music which set his bells to pealing and breathed into his organs – there was nothing which was not forced in order the make something of itself in that time, to come and frame itself in the edifice.[7]

In his own practice and carefully cultivated persona, Wright attempted to craft a position for himself that was closely allied to the ideal he describes above. There were many aspects of a building that Wright assumed under his authority that were not at that time typically considered to be the architect's responsibility. Wright was notorious for dictating the furniture, lights, windows and rugs of the buildings, every aesthetic aspect of their inhabitation. He also became involved with the design and testing of building products and structural forms such as the textile blocks of the Hollyhock house or the mushroom columns of Johnson Wax. His innovative concepts for heating, ventilation and cooling were sometimes more visionary than could be effectively achieved. Both Unity Temple and the Larkin Building were designed with systems that were unheard of at the time. Looking back on these projects today, his logic has been proven correct and the systems he envisioned are strikingly similar to modern HVAC strategies. In fact, Unity Temple was easily adapted to a modern system not long ago, and a contemporary mechanical contractor examining the reflected ceiling plan and building section of Larkin building would find its ducts appropriately sized and logically laid out for the most sophisticated air-handling equipment available today.

THE SLIPPERY SLOPE

In the nineteenth century, the architect emerged as a powerful force in building construction. Howard Davis, in his study of construction culture, pinpoints this time period as critical in the development of the modern architectural practice.

As the nineteenth century progressed, the architect – as a formal institution separate from the building firm – gradually assumed a greater controlling role in the building operation. One needs only

to look at the operation of the preeminent New York firm at the end of the century, McKim Mead and White to see this. Every detail and every payment to contractors and subcontractors had to receive the firm's approval; the firm had final say over quality of materials and workmanship; and they produced, for each major building, hundreds of drawings to help them in their control of the outcome.[8]

This power came with a price; as the architect placed more layers of people beneath his power, the distance between the drafting room and the construction site increased. "The architect was at the apex of a hierarchical control system...As the system evolved further, the role of the general contractor grew at the same time as the architect's connection to craftspeople lessened."[9]

Though the nineteenth century architect was in command of the building design and construction, it was a position that had to be increasingly spelled out in multitudes of written and graphic instructions to those in the field. Greatly differing from the constant field-supervision of the medieval master mason, the office-bound architect had to make decisions that were often far removed from the realities of actual construction. Davis describes how another critical legal development changed modern practice:

> *The emergence of the contract [in the late twentieth century]....went hand and hand with an increase in the number of players in a building project. ...As an arbiter of the building contract, the architect was central – but paradoxically. ...the architect's role on the building site was less one of shaping the building and more one of checking on the compliance with the contract.*[10]

The apparent power given to the architect by contractual definition was an illusion. Working within the role of contract administrator, the architect could only exert control through the mediating devices of the contract and the construction documents.

THE CONTEMPORARY CONDITION

Paradoxically, by seeking to rigorously define his role in the contractual definition of the building enterprise, the architect has become completely separated from the construction process. AIA documents specifically seek to protect architects from any decisions made about the construction of their designs, yet also severely limits his power on site. The General Conditions of the Contract for Construction states:

> *The Architect will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures...*[11]

The architect and constructor are not only separated by prescribed contractual roles, but there is a wide gap in their thinking processes. Rafael Moneo, in his address to Harvard's Graduate School of Design in 1985, bemoans the mind-set that allows architects to design without an awareness of construction.

> *The intimacy between architecture and construction has been broken. This intimacy was once the very nature of the architectural work and somehow was always manifested in its appearance... to be an architect, therefore, has traditionally implied being a builder: that is, explaining to others how to build. The knowledge (when not the mastery) of the building techniques was always implicit in the idea of producing architecture...Architects in the past were both architects and builders. Before the present disassociation, the invention of form was also the invention of its construction. One implied the other.*[12]

In a similar vein, Renzo Piano, in his article "Have an Idea, Act as an Architect"[13], calls for young architects to view their ideas through the filter of construction. Responding to competition entries that he is judging, Piano criticizes a fashionable belief that the outline of a theoretical idea is enough to be considered architecture, he insists that the true architect considers how it will be built.

REDRESS

The situation today has become so dire that many architects have sought to change the way practice is structured. Some architects, such as those who formulate design/build firms, are trying to change the nature of contractual agreements, serving as both architect and contractor. Since many of the contemporary problems arise from the development of the contract, it is logical that the problem could be solved by a redefining the contractual role in a way that is more favorable to the architect.

Gehry's approach is different than this; he maintains his identity as an architect but redefines it as having a central and powerful role. He has been able to gain control of the building's forms or to be more exact, he controls the *information* needed to build those forms.

Gehry has not accepted the twentieth century definition of the architect but in a sense, favors the role of the master builder. The curvilinear forms of his stylistic language have never been inherently easy to construct, and as the scale and complexity of his commissions grew more substantial, the "fear-factor" of the contractors escalated the bids beyond acceptable levels. In his efforts to get his buildings constructed in a reasonable time frame for a reasonable cost, Gehry has been forced to take on more responsibilities than the architect might normally assume.

These added responsibilities have not been a burden but have proven to be a great liberator for the architect. Gehry relishes his new-found power in the bidding process. He states:

> *...We have to change the way that architect is practiced, because the architect takes the blame for all the market ups and downs...Now most architects pretend that there's no problem and they get the client 'a little bit pregnant,' and then its too late, and then they get blamed, and the profession gets blamed for being a bunch of flakes. When you get a bid from a contractor, you can tell with our system whether or not its an accurate bid if*

the drawings are complete....we are so accurate with the computer that they don't have any wiggle room, because we give them quantities, to seven decimal points of accuracy. It's that clean. It's really precise.[14]

The existing system has been formulated to maintain the status quo and has not been flexible enough to accommodate a different kind of architectural practice. Stepping outside the strictly defined role of the architect, Gehry describes why he no longer counts on traditional systems of legal and insurance protection:

The American legal system, the insurance system and the tradition of the architect-client-contractor relationship are based on a bunch of phony assumptions. After the architect designs the building and does the drawings, he rises from the floor five feet and becomes the holier-than-thou arbiter between the client and the contractor. That's the assumption of the old system. What really happens is that the contractor goes to the owner and says, 'if you straighten out this wall, I can save you a million dollars.' and the client says, 'Wow!' And sometimes he does it. The contractors, because of their relation to money, become parental in the equation, and the architect becomes the child – the creative one. 'Here comes the creative one again: watch out.'

The computer changes the system. We show the contractor the computer model and we show him a wall, built like the most difficult piece of the design. We also give him a disk that says, 'give this to the stonecutter. We want 1,700 pieces of stone double-curved, 800,000 single curved and 800,000 flat of this size.' And the stone cutter says, 'Oh that's not a problem.' He takes a look and says, 'Flat is one dollar, single curve is two dollars, double curve is ten dollars,' multiply that by the areas we've given him, and he is happy. In fact we're doing a lot of the contractor's work. They're happy. They smile. They like it. Now the problem is the insurance companies. This being a legal responsibility, the lawyers say, 'Wait a minute, you're opening yourself to all kinds of lawsuits.' And the insurance company says, 'Wait a minute, you're doing something different. We don't know how to insure this if you're going to take more responsibility.' So it's complicated. But we're doing it anyway.[15]

The most important tool in expanding his role has been the computer and CATIA – the modeling software developed by Dassault for the aerospace industry. The computer is thoroughly integrated in his design process – one that has remained heavily weighted towards physical models[16]. By cycling between physical and digital models, Gehry has been able to continue his design process with very little compromise. One of the most significant benefits that Gehry cites is that the computer can provide instant cost estimates during the course of design. He talks about how this aspect of the computer has affected his design:

Consequently, I'm designing with specific conditions and I don't go out of bounds. Because, you know, when you design without knowing the boundaries, you find a form and you become enamored with it. It crystallizes. It's a fixed image. Its really hard once it's a fixed image to go back and cut, cut, cut. But if you are cutting as you go, you don't get fixed until you know you can do it. When you're fixed, you're fixed. You know you can afford it.[17]

Equipped with this powerful new tool, Gehry has regained the central position similar to that of the medieval master mason. Though the systems of construction are exponentially more complex that a monolithic stone building, the computer model contains the knowledge of the entire construction. There are several ways the information can be used. For example, data points can be taken at any section line, profile lines generated, or skin material tensions calculated. Each of the primary trades can use the information embedded in the model. Just as the master mason was the person who understood every corner of the building and how it was to be constructed, the architect who creates the model can find information about any part or section of the building. Gehry specifically recalls the master builder in several interviews, in this one about the Guggenheim Bilbao he states:

We found early in our exploration of developing relations with builders that the more precise the delineation, the more it could be demystified and reduced to the ordering of materials of a certain shape and almost the ability for the contractor to paint by the numbers. It gave the contractor security in their bid and prevented inordinate premiums. Of course it was more expensive, but not outrageously so. It is this new process that was tried on a large scale in Bilbao. It has resulted in a completed building within a reasonable budget and within a reasonable space of time. What it all leads to, is the architect eventually taking more responsibility and becoming once more the master builder.[18]

The gains that Gehry describes are mostly in the realm of bidding and pricing of the work. There are other equally powerful ways that the computer model is employed to make his forms "buildable". I propose that the computer model is a reincarnation of the medieval mason's template. It is a source of information controlled by its designer, encoded with all the information necessary to construct the building forms.

THE SOURCE OF MASTERY

Had they entrusted their power to the instruments necessary to construct form and space instead of the legal instrument of the contract, modern day architects might have maintained the absolute power of the medieval master mason. Full-scale drawings, models or templates have held an important role in construction throughout history. The medieval master builders also used full scale templates as a means of design and communication to the fabricating mason. Floor tracings of gothic cathedrals have survived, testament to the working processes of the time. The historian Lon Shelby describes the preeminence of the template over any of the drawings, full-scale or otherwise:

...masons' templates, rather than architectural drawings, were the primary instrument by means of which mediaeval architects – that is master masons – transmitted their architectural forms to the masons who executed the forms in stone.[19]

Templates from this era were often generated by a systemmatic formal manipulation of geometry and proportional ratios. The generative calculations for the templates was sometimes recorded on the templates themselves allowing the users to modify the templates to other scales. The two dimensional template would contain information to create secondary templates and eventually, the three dimensional stone.

In France during the late seventeenth century, the stereotomic device called a "trait" was used to enable precisely defined stonecutting. As a layout drawing, the trait was often beautiful on its own terms, but it was created for the purpose of guiding the mason. As Robin Evans tells us in his chapter "Drawn Stone", after the trait was complete,

> *from here it is a short step to the mason's yard. because each face. when drawn full size. would become a template furnished to the mason as a paper. board or zinc panel.*
>
> *Each stone of the* trompe *therefore has its individual and unique specification. They are cut and dressed as prefabricated items. which. when assembled on site. magically combine into perfectly unified form.*[20]

The trait was a development of the medieval template, more sophisticated in appearance but equal in power to the template.

In late nineteenth century America, when the architect's power to affect construction was already eroded by contractual prescribed roles, documentation of the building's forms were of paramount import. Davis discusses the kinds of drawing involved in documenting a large building of the time:

> *The New York firm McKim Mead and White for example. which some scholars consider the prototype of the modern architectural firm. attempted to maintain complete control over all aspects of the building's design. materials and production. This control was maintained through the mechanism of drawings. in which little was left to the discretion of the craftsmen. For the construction of...prominent buildings...drawings were made at three different scales. done at different points in the construction of the building: 1/4" drawings for the bidding and the overall layout: 3/4" drawing for such operations as the exact placing of the stones and openings in the exterior walls: and full-scale drawings for giving instructions to the craftsmen who were making details such as cornices. window trim. and interior plasterwork.*
>
> *...Many of the[se full scale] detail drawings...did not have the precision of the final work. with all the critical dimensions called out...Even though the architect made the sketch. the craftsmen were still responsible for giving precision to the design. subject to the architect's approval....Finally in the twentieth century. the full-scale details have largely disappeared from the architect's responsibility....*[21]

In this same era, the innovative structural design of the Auditorium Building in Chicago challenged Adler and Sullivan to come up with more specific ways to communicate the design in the field. Differing from McKim Mead and White's use of drawings to document every known aspect of the building, Adler relied on three-dimensional tests to discover what he might not have known before. In her article on the artifacts produced during Adler and Sullivan's work, Clare Cardinal-Pett writes:

> *Throughout the design and construction of the Auditorium Building. drawing was frequently abandoned in favor of alternative means of modeling: full-sized samples. mathematical calculations. and ingenious on-site testing devised by Adler and his array of consultants. These design methods have more in common with the everyday practices of the English. who were slow relinquish the craft-based approach of medieval engineers and designers...diagrams. templates and prototypes were made with materials and methods of construction in mind – often on the site or at the factory as part of the on-going fabrication process.*[22]

Gehry's computer model is the equivalent of Adler's resourceful inventions. For all their formidable quantites of data, Gehry's digital models are surprisingly crude. These are not seductive presentation images, but working tools developed with realities of the construction or fabrication site in mind. Curiously, the CATIA model has supplanted the two-dimensional drawings in Gehry's office. There is an eerie emptiness to the working drawings. Each time one looks for critical dimensional information there is a note which appears over and over: "See CATIA model for information"

In addition to controlling costs during the design and ensuring that the bids are reasonable, the accuracy of the computer model makes it an ideal base for the manufacturing process. The computer model can provide dimensions taken from any point, material take-offs for skin and structure. Viewing the model becomes a way to envision how the elements will be put together, exposing conflicts in the construction sequence or between systems. Used in this way, the computer model is very similar to the full scale drawing or mockup that the master builders employed. As information about structural members, cladding, sprinklers and ducts are added, the model becomes a three dimensional record of "as-built" conditions.

Examples of all of the computer-enabled gains in design and construction control are illustrated in the Experience Music Project (EMP). While Gehry's Guggenheim Museum in Bilbao garnered hyperbolic accolades from the architectural press, the flashy forms, colors, contents and budget of EMP has captured the public's attention. In addition to demonstrating some of the most complex forms in Gehry's exuberant language, EMP has a ground-breaking structural strategy. As an illustration of the model as master mason's template, EMP provides an ideal case study.[23]

EMP had one of the highest budgets among Gehry's projects to date. There were few cost-driven cut backs in the forms. At every juncture the project grew more "swoopy"; compound curves folded into themselves, fluid elements appeared on both the exterior and interior. To achieve these forms, a new technological advance was tested in EMP. In previous Gehry projects, the curved forms were created primarily with straight structural framing elements. In EMP,

the structural framing members were curved to follow the approximate forms of the final building. Wide flange members were created by cutting curved web pieces and welding flange pieces onto them. The cutting of the web was achieved through CAD/CAM software that could translate the CATIA model information to a plasma cutter. The flanges were roughly bent to the final curves, then a robotic welder was developed that could ride along the web and continuously fuse the pieces together.

The skin of the building did not follow the curved structural beams exactly. A network of steel pipe provided a secondary structure for the skin panels or groups of panels to attach to[24].

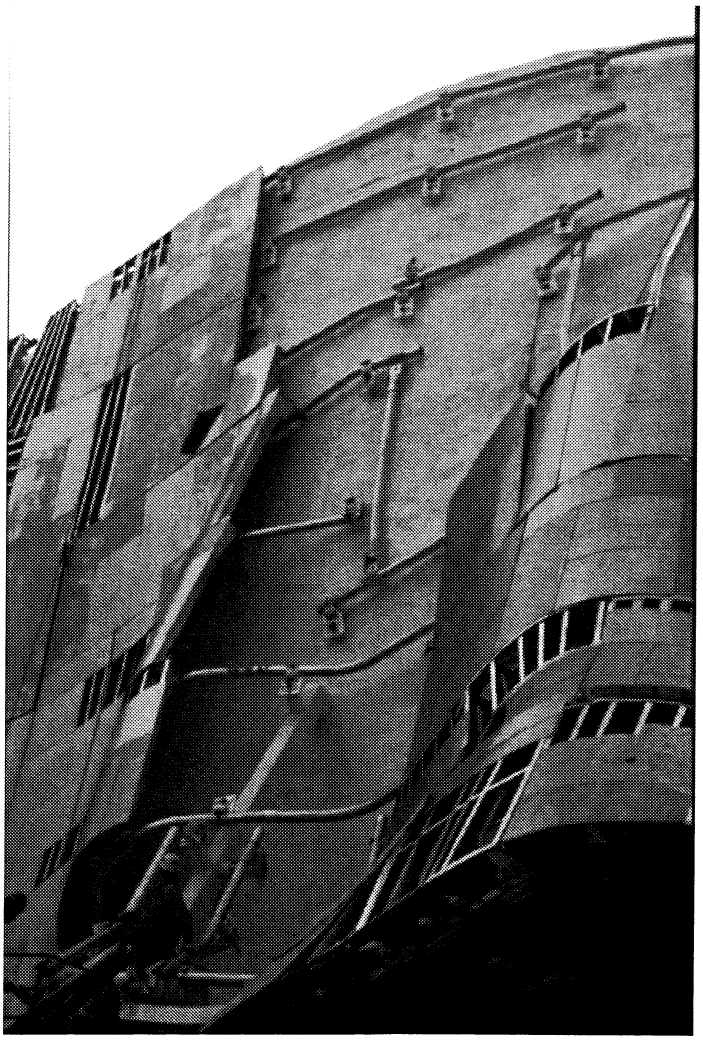


Fig. 1. EMP under construction.

The cladding manufacturer was also heavily reliant on the CATIA model as the basis for his manufacturing. Similar to the structural steel process, the data provided by the architect's computer model drove the CAD/CAM process[25].

The CATIA model could be used to generate an infinite number of full-sized templates. When the construction was relatively straightforward, CATIA information could be directly applied. To create the interior curved plywood wall, known as the snake wall, the CATIA model was sliced at successive levels both horizontally and vertically. Each slice became a full-sized template for one of the plywood ribs. Through an egg-crate construction, the plywood ribs could be fitted together to form the curve defined by the model.

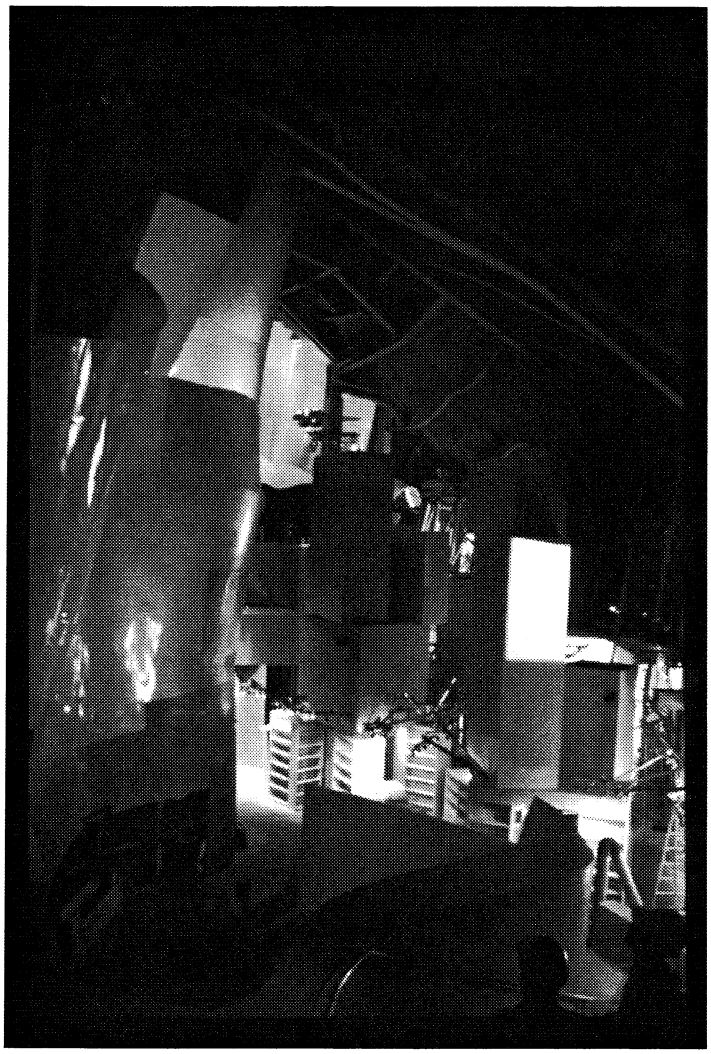


Fig. 2. EMP lobby interior showing finished snake wall.

CONCLUSION

Gehry's high-tech computer model is remarkably similar to ancient devices used to describe building form. Through the application of cutting edge technology, Gehry has re-discovered the power once held by the master mason of the medieval era. Reasserting his control over the information that describes the forms, Gehry has found a way to circumvent the usual restrictions placed on modern architects. The CATIA model is a multi-phase tool, useful in the design, bid and production of design. It is far more effective in delivering the power to control construction than the most well-written contract could ever be.

As the technology becomes available to architects of more modest resources, CATIA and software like it have the possibility of transforming practice. It is not only the large firms with large-scale projects who will drive innovation in the profession. Firms such as SHoP in New York have effectively used computer models to generate construction templates for small-scale installations made of cedar or metal. At these smaller scales, it is easy to see the computer model as a full scale virtual model that is only a short step away from the fabrication floor.

NOTES

[1]Vitruvius, preface to *Ten Books of Architecture*

[2]Nicholas Hiscock in his book *The Wise Master Builder*, Brookfield Vt: Ashgate Pub., 2000 p. 171 quotes from a 13th century text written by Nicholas of Biard: "In these great buildings it is the custom to have a chief master who only directs things by word, seldom or never lays hand on the work himself...."

[3]Coleman, Roger, *The Art of Work*, London: Pluto Press 1988, p. 17

[4]Fitchen, John. *The Construction of the Gothic Cathedrals*, Chicago: Univ. of Chicago Press, 1961, p. 3

[5]Hiscock, Nicholas. The Wise Master Builder, Brookfield, VT: Ashgate Publishing, 2000, p186-7

[6]Fitchen, op.cit., p. 5

[7]Wright, Frank Lloyd. "The Art and Craft of the Machine", from *An Autobiography* (1932) reprinted in Frank Lloyd Wright, Writings and Buildings, ed. Kaufman and Raeburn, New York: Signet, 1960, p. 57

[8]Davis, op.cit., p 122

[9]Davis, Howard. *The Culture of Building*, New York: Oxford Univ. Press, 1999, p. 196-7

[10]Davis, op.cit., p. 196

[11]4.2.3 AIA Document A201 General Conditions of the Contract for Construction (1987)

[12]Moneo, Rafael. "The Solitude of Buildings", Kenzo Tange lecture, Harvard University, March 1985

[13]Piano, Renzo, "Have an Idea, Act as an Architect" in *Japan Architect*, vol 1. 1994

[14]Gehry, Frank, "Commentary" in *Gehry Talks*, ed. Friedman, New York: Rizzoli, 1999, p. 55

[15]Gehry, Frank, "Commentary" op.cit, p. 54

[16]This process has been well described by both Coosjie Van Bruggen in *Guggenheim Museum Bilbao*, New York: Solomon R. Guggenheim Foundation, 1999 and Mildred Friedman in *Gehry Talks*, New York: Rizzoli, 1999

[17]Gehry, Frank. "Commentary" op.cit., p.52

[18]Frank Gehry as quoted in Van Bruggen, Coosje. *Guggenheim Museum Bilbao*. New York: Solomon R. Guggenheim Foundation, 1999, p. 138

[19]Shelby, Lon. "Mediaeval Masons' Templates", *Journal of the Society of Architectural Historians*, May 1971,p, 142

[20]Evans, Robin, *The Projective Cast : Architecture and Its Three Geometries*. Cambridge: MIT Press, 1995, p. 189

[21]Davis, op.cit., p. 196

[22]Cardinal-Pett, Clare. "Necessary Excess", *Journal of Architectural Education*, 51/1 (Sept 1997), p. 52

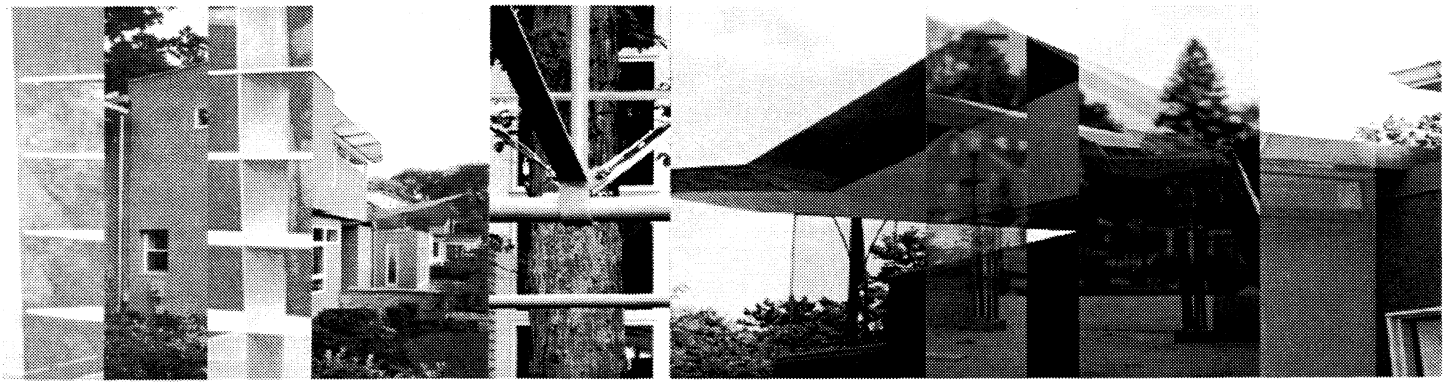
[23]I will focus on the use of the model in construction and fabrication. The design process for EMP was a typical one for the office and CATIA was used in a manner similar to the one described by Coosje Van Bruggen for the Guggenheim Bilbao.

[24]Paul Zumwalt, the client representative for EMP told me that the steel was such a success that he wished that they had pushed the limits of the process further and simplified the skin. The variation in distance between the structure and skin caused many problems in the construction.

[25]There was not a direct path from model to manufacture, both the steel and the cladding manufacturer had to submit shop drawings that were tediously checked against the model. In the case of the cladding, the manufacturer, Zahner, used another software which was compatible with CATIA called Pro-Engineer to drive their CAD/CAM system.

(Un)Concealed Tectonics, Concurrent Constructions

THOMAS STAUFFER, AIA
Kent State University



[un] CONCEALING

CONTENTS

PREFACE

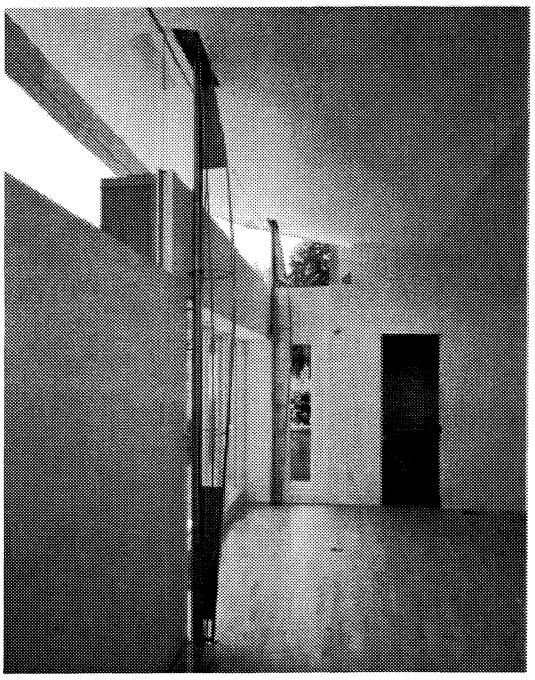
"Do not now seek the answers, which cannot be given you because you would not be able to live them. And the point is, to live everything. Live the questions now."

—Rainer Maria Rilke, *Letters to a Young Poet*

Architecture is about abstract concepts and pragmatic methods. The **concepts** behind *[Un] Concealing* originate in the writings of Martin Heidegger and Gaston Bachelard. In Heidegger's assertion, a work of art is "an expression of being, emerged into the unconcealedness of his being." By unconcealedness Heidegger means truth.1 Bachelard observed that the poetic image has no past, that in a particular work of art something appears for the first time or rather is created.2 What art is should be inferred from the work. What the work of art is we can come to know only from the essence of art.3 Bachelard stops, however, at calling this unique appearance a poetic image, whereas Heidegger helps one to understand this image as truth, or the unconcealedness of being.4

The **practice** of *[Un] Concealed Tectonics: Concurrent Construction* is derived from the work of Carlo Scarpa, Louis Kahn and Adolfo Natalini. References to the poetic image and to truth and being are inherent to a tectonic language in Louis Kahn's poetic writings of implied Order. Design habits leading to the concealment of structure have no place in this implied order; rather structure is unconcealed, that is, revealed in the technics of construction and representation. I believe that in architecture, as in all art, the artist instinctively retains the marks that reveal how a thing was fabricated.5

The thesis of this paper and the presentation of our work assert a consciousness of construction-mediated representation in the realm of tectonics. Conceptualizing and constructing architecture leads to the crafting of elements, details and finishes to form the essential tectonic dimension of our work. Tectonic language is realized through direct and constant engagement in making: representing the process through construction is our modus operandi.



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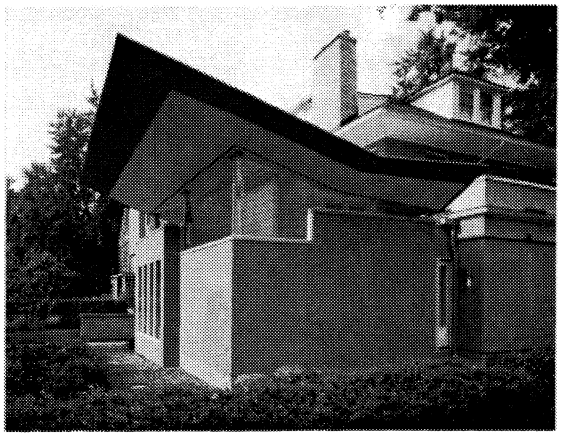

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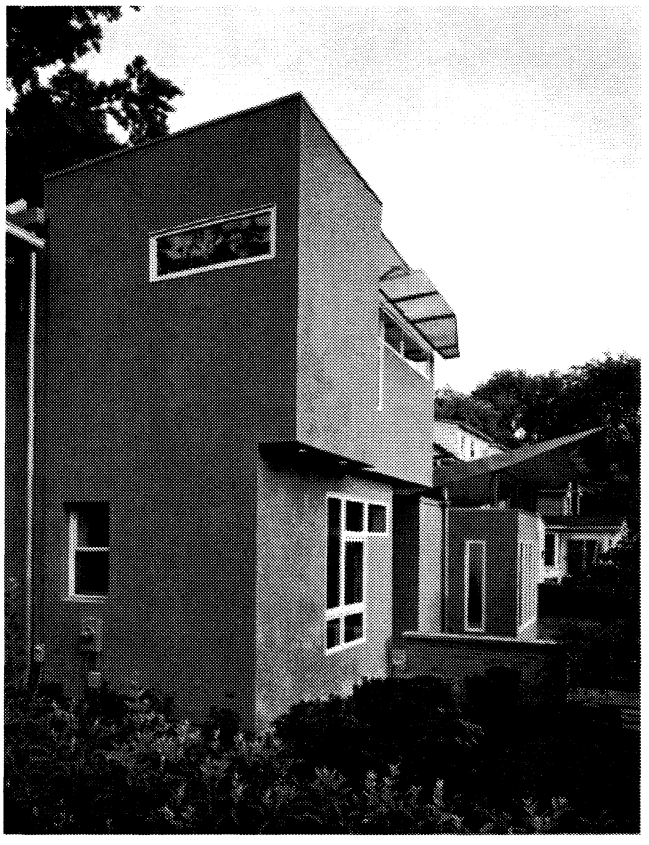
Our predilection toward the assembly of selective components results from the realization that the building industry (contractors, suppliers, and subcontractors) is resistant to change/advancement of its methods of general construction. What is missing from general construction is the **tectonic realm of building.** A commitment to design detailing concurrent with construction can extend the expressive content of architecture well beyond pre-construction detailing.

What we have experientially confirmed is that the tectonic domain belongs fully to the architect, and that this domain cannot be disengaged from the artist/architect's responsibility in the orchestration of detail and finishing. I am describing the lived experience of constructing tectonics.

The philosophy embracing this is phenomenology - form given meaning through experience. Poets, painters and architects are phenomenologists. As the meaning of *unconcealed tectonics* embraces the question, what is the origin of concealment?, the architectural construct that results would consider lived experience crucial to its significance. Moreover, experience factors into related issues, to wit: What are the necessary questions to be lived in contemplating the tectonics of architecture and what is the relational form of tectonics to the poetics of form and how does conceptual form become measurable? As Kahn poetically considered, a good question is greater than the most brilliant answer. This is a question of the measurable and the immeasurable.6



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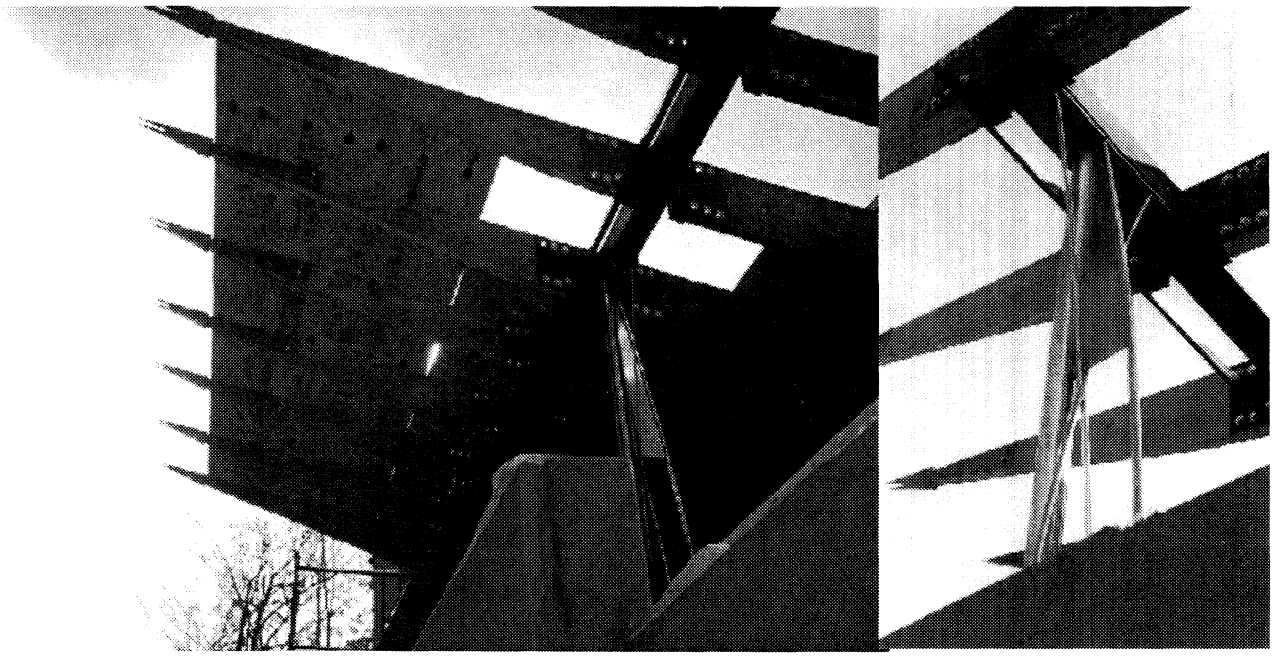

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I. INTRODUCTION

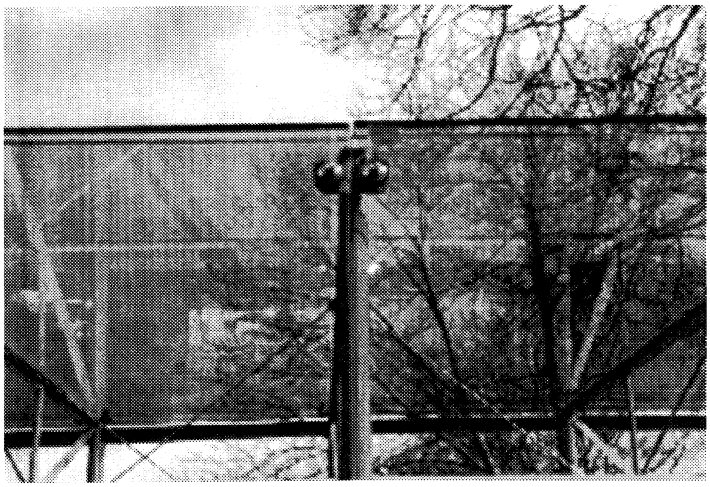
The historic centers of northeastern Ohio are indebted to their architects, civic planners, and local industrialists for their collective contributions. The Beaux Arts formality of the original Moses Cleaveland plan, the Burnham Group Plan of 1903, and the Terminal Tower Complex are in visual opposition, but conceptually related to the industrial architecture and infrastructure shaped by the Cuyahoga River. All are dependent on the requirements and representational of industrial production. The picturesque plans for the residential communities of Shaker Heights, Cleveland Heights, Lakewood, and Rocky River were designed as referents to English and European precedents for the same industrial, elite urban community as it represented and produced its spaces and places of leisure.

Nestor Addition

The cultural moment of the 1990s in Cleveland has been that of a decade of construction of major public projects, the reuse of nineteenth-century industrial structures, and the redefinition of lakefront and Cuyahoga Riverfront for a new, more demographically diverse culture of leisure.

The current tectonics of Cleveland architecture have failed to recognize a language of new cultures, economies and building trades. Understanding our legacy of production and the manufacture/fabrication of brick, stone, glass, rubber, steel, and polymers is essential to becoming knowledgeable about and sensitive to the **nature of materials**. Likewise, understanding our legacy of leisure in reflections of past cultures and present demographic dynamics is essential to becoming sensitive to the **representations** of **architecture**.

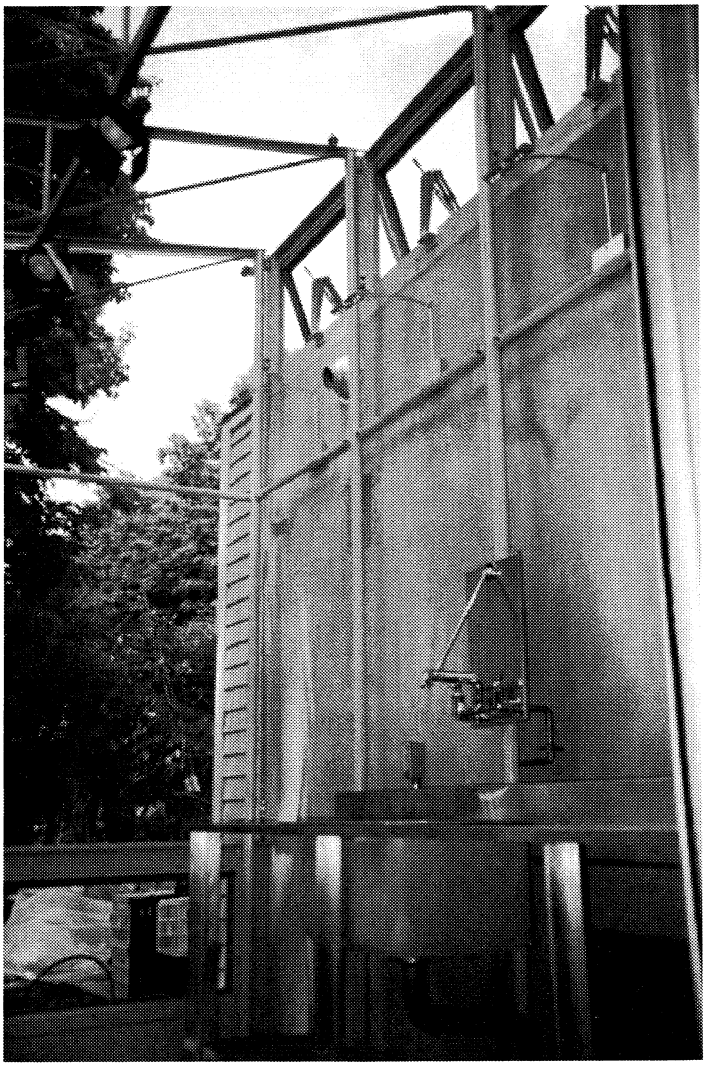
Construction, materiality, joinery, and fabrication are an **engagement in making** which architects originally failed to negotiate when Leon Battista Alberti parted from his friend, Filippo Brunelleschi. Alberti's commitment to his atelier and Brunelleschi's continued presence at the construction site, designing, drawing, modeling and constructing in-situ signified a critical dividing moment in the history of architectural practice. Concurrently, architecture was being defined as conceptual, mathematical, and theoretical as well as experiential, worked out through construction and practical.



Nestor Greenhouse

Following this disjunction, the **historical** separation of (Albertian) architects and (Brunelleschian) constructors has yielded a high, yet barren ground of **repetitive** and **conventional detail**, uninformed by the knowledge of artisans and detached from the experience of making. The active engagement of the architect in refining detail - the selection of materials, fasteners, fabrication, and finishing - dispenses with the reliance on conventional detail as well as the reliance on constructors for costly, labor-intensive, customized components and processes. The architect returns to the craft of construction as an installation/builder [as opposed to a master builder]. delegating the volume of communications, specifications, and construction administration to others allows the architect to orchestrate the dynamic and complex conditions of construction toward unexpected, unforeseen, and unpredictable details. Yet, up to this moment, architects have not regained the trust of artisans and tradespersons to contribute to this radically redirected and reconfigured aesthetic of work.

The importance of substantial, relational architecture cannot be denied. Tectonics is essential to the objects – its substance, narrative meaning, and formal character as present in its place. Architecture makes place. Architecture cannot form places without the tectonics of making. If architecture is to escape from the endless cycles of use and progress, it must place itself in opposition; it must come from *within*, from a more original conception of the nature of technology itself.7 This is verified by key theorists and practioners of our generation.



Nestor Greenhouse

Most recently Herbert Muschamp, the architecture critic of the *New York Times*, has stated that

> *"The cultural responsibility of the container is at least as great as the contained. We cannot dispel the impact of architecture on the imagination, the metaphoric and functional value." (Herbert Muschamp), August 13, 2000, Arts and Leisure section, New York Times Newspaper.*

The forms of tectonic intentions are expressive of inherent and relational architectural elements. In his book, *Figures of Stone*, Adolfo Natalini, the distinguished architect and professor of architecture at the University of Florence, has stated, "We may speak of architecture as primary elements, morphological elements and constructional elements." The active construction of specific elements is focused on the tectonics of selected installations and details.8

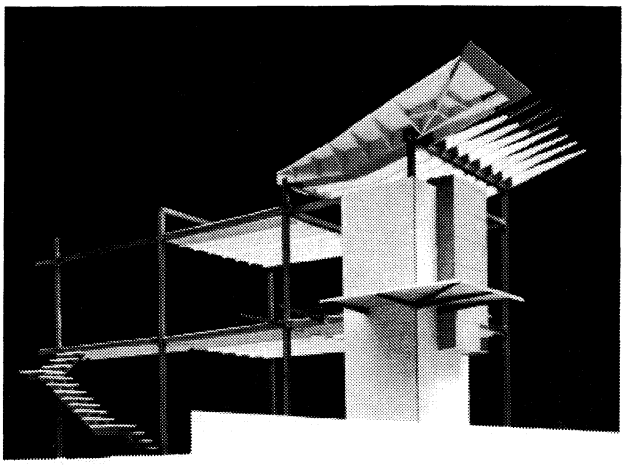
The tectonics of detailing refer to an architectural idea and theory, but may also be expressed experientially through knowledge of tectonics. Notwithstanding, the fact that normative tectonics are masked by veneers and surfaces with a loss of connection to expressed structure, material and detail, tectonics is not about representing the visible, but rather **rendering visible.**

In bowing to constraints of budgets and schedules, corporate building campaigns have resulted in a generic morphology of architecture. Our work proves that this is not a necessary corollary of twenty-first-century practice. Recent architectural installations presented here have utilized the construction process concurrently in use in technical design. An ethos of subjectivity through objectivity has attempted to retain/extend the art of concept and craft of building within the requirements of current technology, systems, costs, and schedules.

II. UNCONCEALED TECTONICS

Realization of what the *Existence Will* may be is the meaning of feeling and thought – the source of what a thing wants to be.9

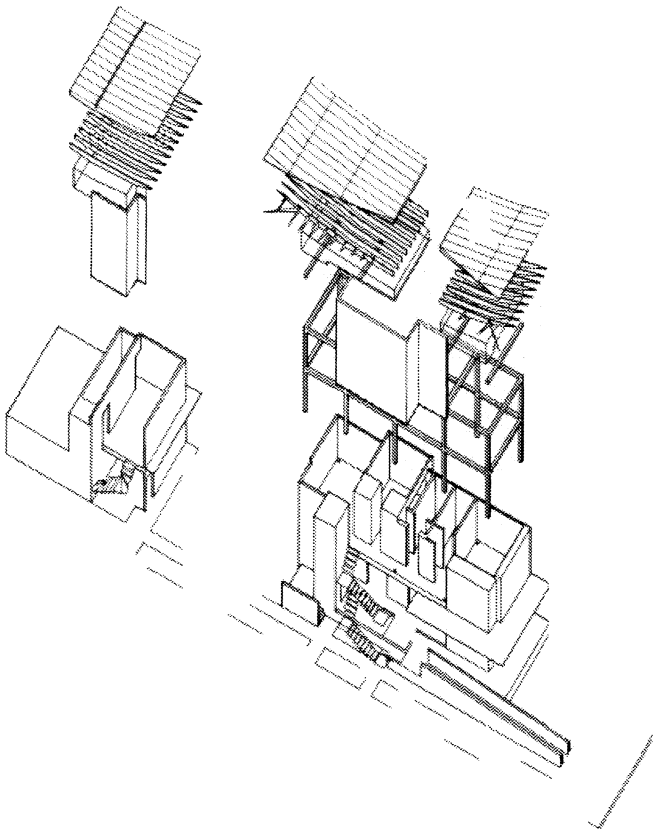
The revealing of architecture is an encounter between what has been idealized in drawings and models [us] and what is [actual construction].



Tremont Housing - Construction Model

Contact with things is full of meaning – you know where you are, you have something that exists. It should be important to have some identity with phenomena. One has to start on the concrete and slowly converge with the abstract, but always keeping one's eye on how the symbolism works with the fact. Observation should be the companion of intuition. I tend to rely on the test as the companion of intuition. As if to propose welding torches to Plato. (Robert LeRicolais)

The neutrality of a completely finished mass/space lacks acuity of detail to engage sensory aesthetic experience – a mental construct. The extremes of minimalism fail to capture the cultural and constructional phenomenology. Thus a compassion for the nature of materials combined with a passion for the craft of making advances beyond minimalism. Architectural tectonics is about bringing the earth into appearance.



Tremont Housing - Construction Axonometric

Un-concealing is about the refinement and selective detailing of tectonics to expose and keep exposed - through revealing the beauty and clarity of selectively informative conditions of construction. The tempering of concealing through the act of unveiling and the manipulation of surface afford the opportunity to explain the inherent qualities, complexities, and logic of structure as well as the craft of construction.

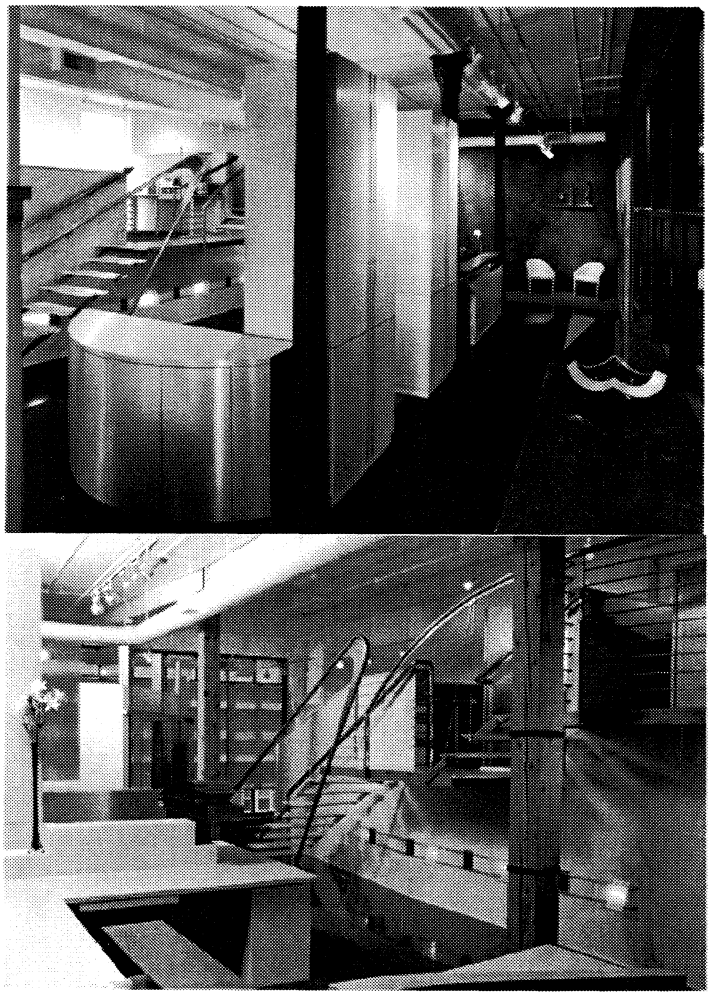
The decision to unconceal requires a commitment to envision the finished expression of a detail prior to its making. The presence of unconcealed details and elements in a space is essential to tectonic language as the essential morphology of architecture. The concrete detail explains the environment and makes its character manifest.10

Dunn Addition

Dunn Addition

Our affinity for steel and wood joinery is twofold. The economic and cultural dominance of steel making and the original wood framed architecture of the Connecticut Western Reserve, together with the massive masonry construction of industrial architecture, form our dominant architectural precedents. The rigor of developing comprehensive details prior to construction requires extraordinary foresight, design genius, and **determinism. Predetermined** details become less speculative, more ordinary, and more generically derived from precedent **details. Postdeterminism** in detailing accommodates the life of the construction – the art of making, the experience of the constructors, and the original processes of fabrication.

The postponement of absolute choice, a sort of giving up to the process of making, allows us the possibility to discover and master the detail. Engagement with the process of making, of constructing, offers a privileged stance, a special knowledge of the construction experience and becomes an essential dimension of our work.



Skunta Interior/Stair

III. CONCURRENT CONSTRUCTIONS

Concurrent construction is to be interpreted as the overlap/blur of detailing and installation design. The making and the installation of specific elements, [frame, glass house, roof, stair, canopies, screen] in three residential additions and three corporate interiors were informed by an active engagement in the pragmatics of material fabrication, the detailing of joinery, and the processes of construction. These additions to substantial buildings are representative of the traditions, memories, and tectonics of mid-to-late-twentieth-century construction in Cleveland; a composite of exposed steel structure, glass wall, and wall bearing masonry continuing, in a

small way, the industrial architectural legacy of Albert Kahn. A re-engagement of construction technology and human experience in the making of tectonics, as a language of connection, expresses the inherent **structural** and **enclosing** concepts of this architecture.

Concurrent constructions are, in essence, **availabilities** in our work, which require primary and constructed elements to be in place for the morphology of detail to inform concept. The pursuit of the poetics of construction is the distinct realm of the architect. Understanding the meaningful, poetic nature and attributes of materials, and crafting expressive joinery in the workplace and the home narrate architectural intentions.

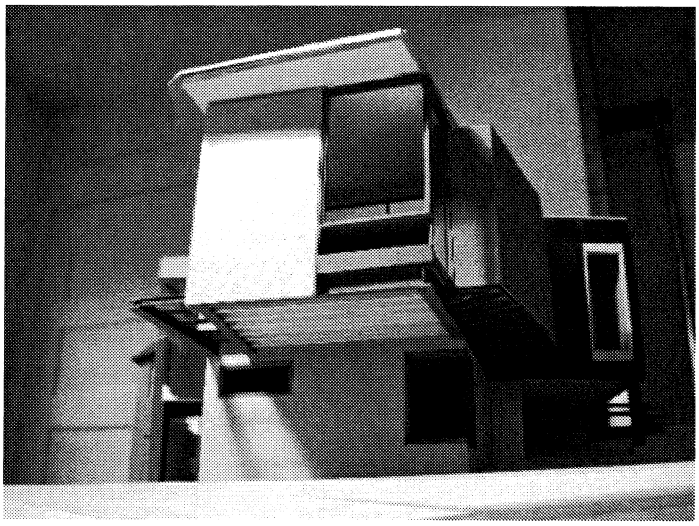
The possibilities of tectonic investigations early on in our pursuit of construction knowledge came through gallery installations and furniture. These constructions allowed an immediate experience of materials, structure, connection and dimension that was never completely represented by drawing or modeling. "If we were to train ourselves to draw as we build, from the bottom up, when we do, stopping our pencil to make a mark at the joints of pouring or erecting, ornament would grow out of our love for the expression of method. The desire to express how it is done would filter through the entire society of building, to architect, engineer, builder, craftsman."11

The sub-contracting of special elements allows the contractors to accurately estimate the general work, which is clearly documented and this mitigates the uneasiness of dealing with challenging unconventional installations and details. The general contractor defers to the architect for tectonic detailing of essential morphological elements. Architects must commission themselves as sub-contractors for the construction of specific installations, which require rigorous large-scale maquette studies, fabrication drawings, and structural design, occurring simultaneously [concurrently] with general construction.

Concurrent construction accepts tight schedules and impossible budgets. It remains a challenge to achieve innovative and expressive tectonics within tight budgets. This is far more difficult than deferring to conventional structures, details, and materials. A maquette stage is added to the process of transforming details from drawing to building. Large-scale modeling and full-scale templating allow for exact jointing, precise perception, and representative fabrication.

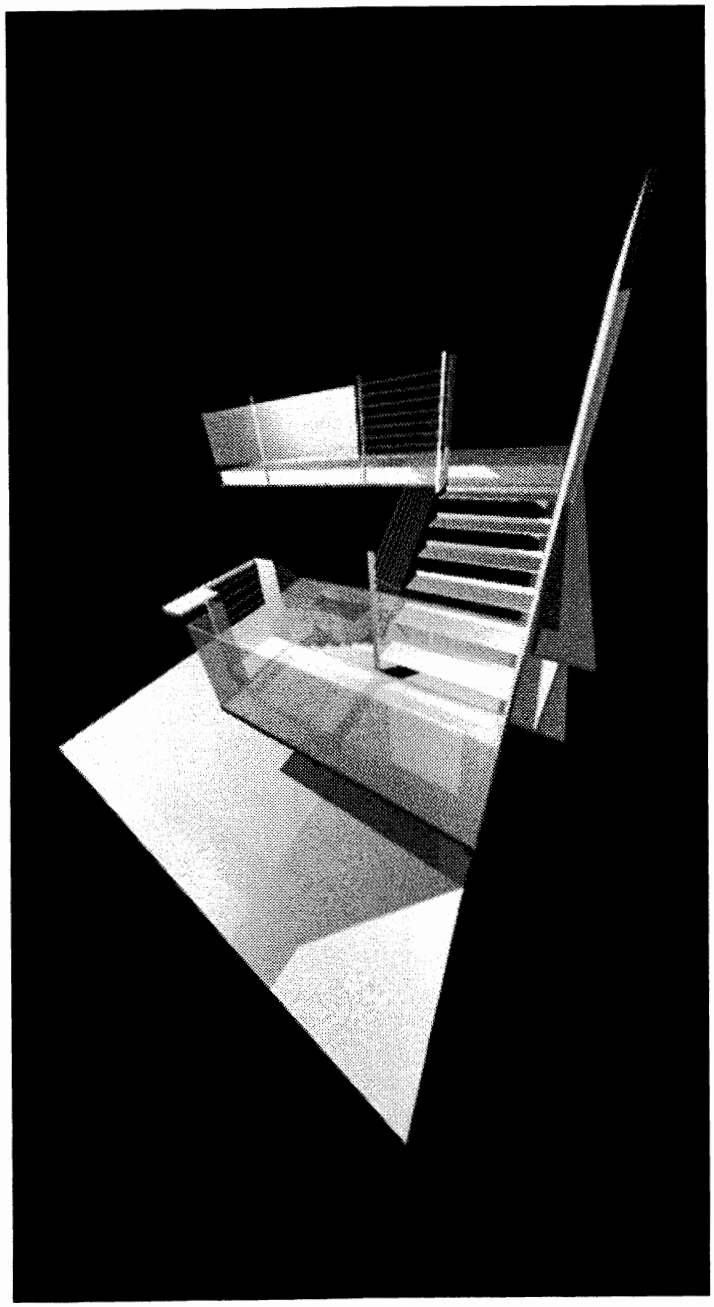
Concurrent detailing requires the artist/architect to be present in the resolution of line, texture, and finish, as surfaces and materials become "illuminated" and revealed in place. The continuous resolution of detail as informed by technology and the actual experience of construction is a way of revealing, as stated by Martin Heidegger, "...in terms of letting appear."12 The expediency of detailing throughout the duration of construction is essential to forming an inherent **tectonic language**.

Concurrent installations attempt to resist and oppose economic and utilitarian determinism and absolute pre-construction detail. The standardized, optimized production of building components, construction methods and costs has required us to (re) think the primary elements of roof, wall, floor, window, stair, column, and beam in the forming of tectonics.

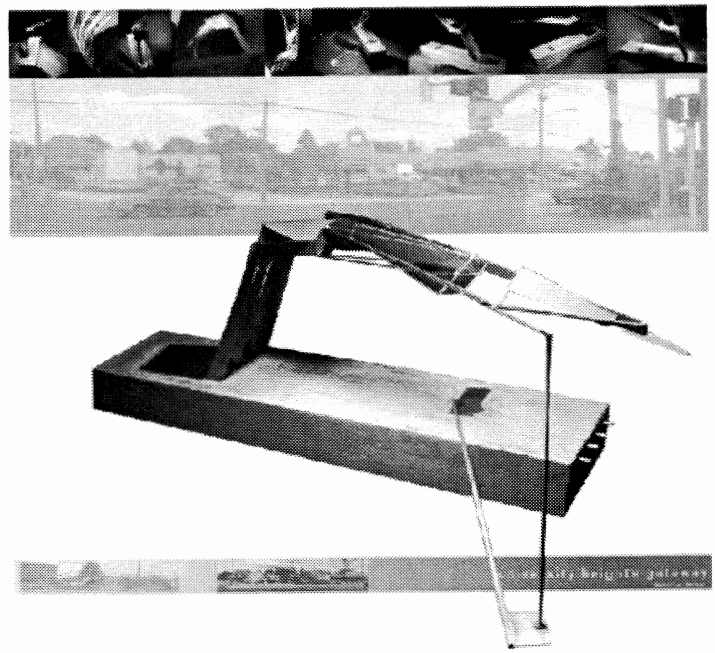


Knutsen Addition

Knutsen Stair Construction Model



Knutsen 3d Computer Stair Model



University Heights Gateway. University Heights. OH

IV. FUTURE PROSPECTS

We are proposing a re-engagement of construction and production to allow for the investigation of a more thoughtful, meaningful, and relational tectonic architecture.

Acknowledging that architects are the masters of making and the masters of production, the possibilities of expanding responsibilities through design and fabrication make for a précis of rigorously designed installations and details.

ENDNOTES

[1]*Jeanine Russell. "Questions Concerning the Artist."* Architronic. *Kent State University p. 3. V2. N2. 1. 1993.*

[2]Ibid, p. 4.

[3]Ibid, p. 4.

[4]Ibid, p. 4.

[5]*Louis Kahn.* The Notebooks and Drawings of Louis I. Kahn. *p. 26. 1973.*

[6]Ibid, p. 60.

[7]*Robert McCarter.* "Escape from the Revolving Door." *Architecture and the Machine. Pamphlet Architecture. no 12.*

[8]*Adolfo Natalini.* Figures of Stone. *p. 35. 1988.*

[9]Louis Kahn, p. 60

[10]*Kate Nesbitt. "Introduction."* Theorizing a New Agenda for Architecture, An Anthology of Architectural Theory 1965-1995. *p. 29. 1996.*

[11]Louis Kahn, p. 26.

[12]Jeanine Russell, p. 18.

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The Material Imagination:
Architecture and the Craft of Making

PAUL J. ARMSTRONG
University of Illinois at Urbana-Champaign

When men are ignorant of the natural causes producing things, and cannot even explain them by analogy with similar things, they attribute their own nature to them. The vulgar, for example, say the magnet loves the iron.

—Giambattista Vico, New Science

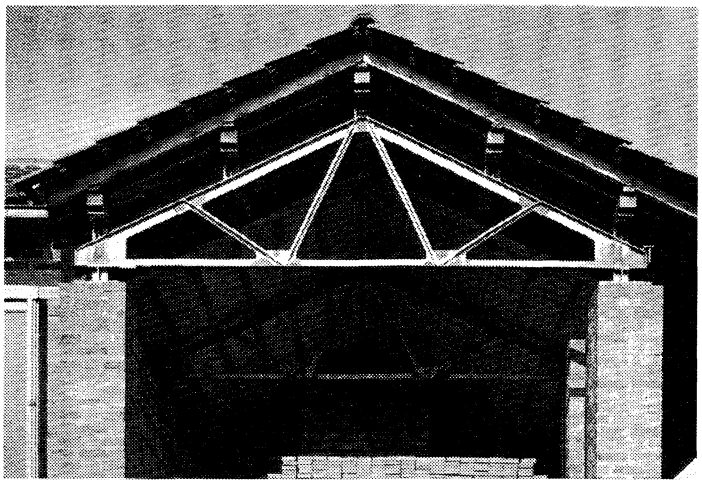


Fig. 1. Rodenkirchen, Köln, Germany.

TECHNÊ AND *POIÊSIS*

Throughout its history, architecture has been defined as a balance of science and art – of construction and technology, on the one hand, and formal ideas and social and environmental factors, on the other. This view of architecture, although somewhat over simplified, continues to shape the views of both academics and professionals. The balance between *technê* (arts and crafts) and *poiêsis* (bringing-forth), however ideal, is not easily achieved or accommodated. More often than not, the means of technology and materials are pitted against the ends of aesthetics and form. Although, by definition, architecture encompasses firmness, commodity, and delight, achieving one of these goals is often accomplished at the expense of the others.

Within the framework of this dilemma lies another: There has been an historical tendency to place architecture within the contexts of both the arts and crafts tradition as well as aligning it with engineering and the sciences. There is almost a mythic/poetic view of the architect/artist who, when building was by-and-large a product of necessity, had a holistic command of the building process in its entirety. Certainly this view underlies the various accounts of the primitive hut with appropriate emphasis placed upon either aesthetic or technical criteria. Somewhere along the line, we are informed, the architect/designer became disengaged from the craftsman/ producer. Building and architecture, once integral, were no longer one. According to this exegesis, architecture has been trying ever since to reconcile design with the means of production, art with craft.

In "Academicism: Modernism" Anthony Vidler exposes the anti-Academic discourse of modernism that encouraged the formation of a myth around the architectural production of the nineteenth century and specifically around the institution of the Beaux-Arts.[2] This myth, he says, has tended to obscure all subsequent attempts to analyze not only the conditions of that production but also those of the Modern Movement itself. Thus the work of the arts and craft movement is understood more readily in terms of social engagement than according to any aesthetic criteria stemming from the problem of building.

Vidler traces this social criteria to strains of utopian socialism – technological socialism from Saint-Simon and social utopia from Fourier. Thus the Gothic revival is more studied for its evidently proto-modern ideology, he asserts, than for its revived stylistic language. Likewise, the work of the arts and crafts movement is understood more readily in terms of social engagement than according to any aesthetic criteria, especially because craft is not placed in the same intellectual category as the fine arts.

Rayner Banham critically linked technological innovation with modern ideology in *Theory and Design in the First Machine Age.* Just like his modern mentors, he sought to portray the utopian outlook of the First Machine Age against the gritty and brutish backdrop of 19th century industrial capitalism:

"The machinery of the preceding Victorian Industrial age of 'cast iron, soot, and rust' had been ponderous, simple-minded, tended by a mass-proletariat in parts of the world that were remote from centers of enlightenment and culture. The machines of the First Machine Age of the early 20th century were light, subtle, clean and could be handled by thinking men [sic] in their own homes out in the new electric suburbs."[3]

Banham also sought to establish historical continuity with earlier theorists who viewed architecture both as an art and a process of making tethered to a craft tradition. He traces the *rapprochement* between creative designers and industry in the twentieth century to the formation of the Duetscher Werkbund and its founder Herman Muthesius.[4]

The German Werkbund emerged, in part, as a result of Muthesius's experience in England from 1886 to 1903 from which he gained an appreciation of the English Arts and Crafts tradition. But the German establishment regarded Muthesius with suspicion because he was Prussian and was intolerant of the "Bohemian individualism and aestheticism" of the German craftsmen and designers.[5]

The resistance of German artisans toward Muthesius's "foreign" ideas was already evident during the Weimar Republic and abetted the rise of fascism during the 1920's. Heidegger's Black Forest farmhouse, with its pitched roof and utilitarian accommodations, represents a paean to German vernacular building traditions and aesthetic honesty. As such, it became a symbol of deeply rooted notions of German nationalist identity and xenophobia. However, even Heidegger acknowledges that this "in no way means that we should or could go back to building such houses; rather, it illustrates by a dwelling that *has been* how *it* was able to build."[6]

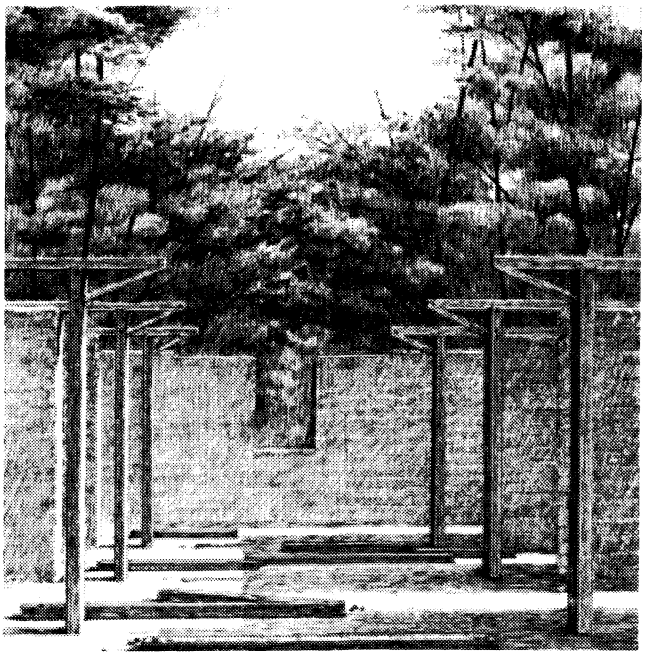
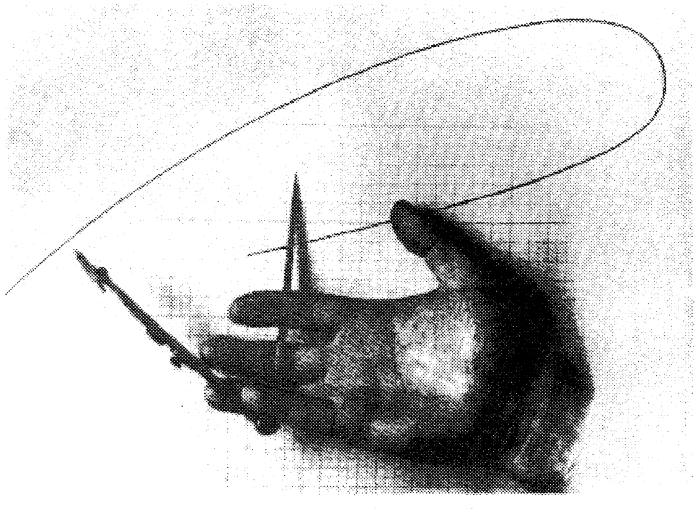


Fig. 2. Pre-industrial building technology.

UNIVERSALIZATION VS. TRADITION

In his essay "Vernacular Architecture and the Economics of Dwelling," Daniel Willis writes that vernacular architecture is but one instance of the broader field of vernacular production. Although these production practices vary among societies, they have one thing in common: They are always "premodern." This distinction, Willis clarifies, is based upon an ideological, not chronological, distinction of "modernity."[7] Accordingly, vernacular architecture must then combine both limited and relatively inefficient production practices with the will to imbue its creations with an "aura" of significance. From a modern perspective, such practices are literally backwards because they do not seek to progress beyond their moderate levels of efficiency. The economies in which such architecture flourishes also operate in an inverted manner: instead of being dedicated to growth, they strive to maintain the status quo.

Kenneth Frampton's writings on regionalism and the tectonic extend Banham's premise that building is inherently a phenomenon of technology and that aesthetics in architecture is fundamentally a product of materials, detail, and assembly. In his essay "Prospects for a Critical Regionalism," Frampton cites the philosopher Paul Ricouer's struggle with the paradox of universalization. "In order to take part in modern civilization," he writes, "it is necessary at the same time to take part in scientific, technical, and political rationality, something which very often requires the pure and simple abandonment of a whole cultural past."[8] Ricouer's thesis is that a hybrid "world culture" will only come into being through a cross-fertilization of rooted culture on the one hand and universal culture on the other. In his essay "Universalization and Rooted Cultures" of 1961, Ricouer implied that everything will depend in the last analysis on the capacity of regional culture to recreate a rooted tradition while appropriating foreign influences at the level of both culture and civilization.[9]



5. *The Constructor* (1924), El Lissitsky.

Fig. 3. The Constructor *(1924). El Lissitsky.*

Giuseppi Zambonini projects Ricouer's argument about hybrid culture and the roles of the artist/craftsman and technology into his own theory of making. "Every man-made form – and in particular, every architectural form," he writes, "does not exist solely as static consequence to an otherwise irrelevant act of production, but conversely, that the nature of form is inlaid in the process of making."[10] Zambonini contends that issues of quality are governed by the degree to which materials and methods typical to the host society are integrated together. "Through their employment," he says," the maker intends to contribute to the traditions and common meanings of the collectivity in which the production activity is nested, without renouncing technological advance or personal expression."[11] It is in this context that a distinction can be drawn between Frampton's and Zambonini's views of the artist as "maker."

Zambonini writes that any activity of production involves the transformation of matter for a purpose clearly defined somewhere between society and the individual. The maker and the object to be created are tied to together by an intimate relationship that does not disappear at the conclusion of the production process. Although this relationship can be described in different ways, in each case it is inseparably connected to the nature of the production process itself.[12] For him, the "maker" can either be a craftsman intimately involved with materials through the production of artifacts, or a designer who at least understands through experience the characteristics and tectonic limitations of materials.

Frampton defines Critical Regionalism as a "dialectical expression that self-consciously seeks to deconstruct universal modernism in terms of values and images which are locally cultivated, while at the same time adulterating these autochthonous elements with paradigms drawn form alien sources."[13] His implied view of the artisan is decidedly more intellectual and, in a sense, utopian. For him, the artisan is a product of both local and regional traditions and universal culture (i.e.: modernism). Thus, the modern artisan must walk a fine line between assimilating indigenous forms and methods of making, whatever they may be, and outright eclecticism. However, "any attempt to circumvent the dialectics of this creative process through the eclectic procedures of historicism," he warns, "can only result in consumerist iconography masquerading as culture."[14]

THE AESTHETICS OF CRAFT

Like Banham, Martin Pawley eschews traditional arts and crafts-based notions for a more progressive version of inexorable technological advancement. "The Second Machine Age," he laments, "is an age without ideology."[15] It is not so much that the Second Machine Age failed to produce a sequel to the Arts and Crafts movement, Pawley writes, as it has failed to produce any unifying theories at all. Earlier theoretical treatises contained "urgent texts and clear plans urging principle and practice." In an academic sense, they were "suppositions explaining something, based on principles independent of the phenomenon being explained."[16]

Pawley contends that architectural theory has been incrementally superceded by architectural imagery. The dissemination of readily attainable building images through architectural publications has merely substituted visual culture for ideology.[17] The conquest of theory by imagery, he cautions, is not a superficial phenomenon. When building elements are no longer dependent on culture, context, or climate, it reflects disturbing changes in the structure and task of the architectural profession.

Frampton points out that for Heidegger the rootlessness of the modern world begins with the translations of the Greek experience into the edicts of the Roman imperium and culminates with the productionist philosophy of the machine age. Like Eduard Husserl, Heidegger turns to the phenomenological presence of things in themselves in which, he argues, form already exists.[18] A brick, for example, cannot be anything but what it is: formed and fired clay. Its material properties of malleability and extrusion give it form.

In Zambonini's view, the materialization of an idea has a moral component – a quality that goes beyond material integrity and a business ethic – sustained by personal choice, and ultimately comes to bear on society as whole. In traditional artistry, where the artisan is singularly responsible for the entire production process, the artist or craftsman is first concerned with the embodiment of an idea through a unique materiality. Here the process requires the definition of an economical and efficient path of fabrication. The maker faces two dilemmas or burdens that are conditioned by morality:

> *"The first burden concerns the identification of materials and tools used in the process of transformation. Its moral component is that the most significant properties of material can only be discovered through a methodical investigation measured in years of pursuit....The second burden has to do with the relationship of the artisan and the history of their trade.... The object produced epitomizes the artisan's role in society."*[19]

Because it inevitably carries meaning, the object contains all of the advancements and contradictions manifested in the society of which it is a product. It also speaks to the relationships among the members of that society and, in turn, the relationship of those individuals to the environment they occupy.

Zambonini's argument for making is circumscribed, once again, by Ricouer's paradox of universalization and preservation of tradition. "Here the moral responsibility of the artisan is two-fold: it deals simultaneously with preservation and innovation. It is within the critical interpretation of these two opposites that the range and quality of discussion applicable to the process of making occurs."[20]

When Le Corbusier extolled the virtues of the engineer's art in *Towards a New Architecture*, Willis contends that he was praising an "engineering vernacular."[21] The ocean liners, airplanes, and automobiles Le Corbusier then photographed were still partially experimental. Their production and operation had not yet become certain. The engineering behind them was still of a practice, as opposed to a technique. In a phenomenological sense, the engineer's aesthetic is simply a manifestation of the form already inherent in materials and the means of production. According to Willis, "there

are no ambiguous rules regarding what is true to a material."[22] There is, one might argue, an optimal way to assemble an automobile with all the parts in the proper order so that it will function efficiently. Likewise, buildings have their own optimal orders based on material properties and climate. The roof must shed rain; walls must either be pervious or impervious to sun and weather; and, wood, steel and concrete have intrinsic structural properties that must not be exceeded.

Le Corbusier's pairings of Greek temples with automobiles signified his desire to preserve those aspects of the past that, in his view, were enduring while at the same time embracing the innovative uncertainty of the future. Both the temple and the automobile are products of technological refinement; both are emblematic of their own eras.

Much like Heidegger's farmhouse, Rudofsky's images and descriptions of what he calls "nonpedigreed architecture" carry the utopian promise of human beings living in harmony with each other and the land. Karsten Harries observes that this architecture is neither burdened by technology, nor what we think of as "Architecture." "This architecture belongs to a specific region, as do its rocks, caves, trees, and animals."[23]

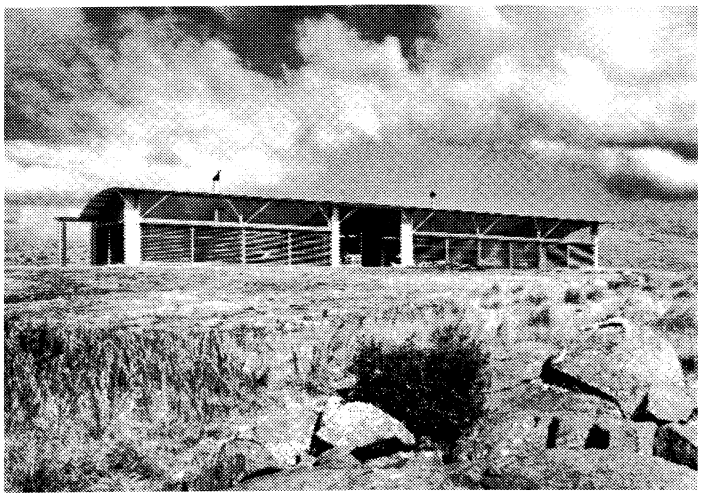


Fig. 4. Moruya House, Australia. Glenn Murcutt.

Glenn Murcutt's interest to produce "an architecture that continually acknowledges the physical and climatic character of its site" is not an unrequited desire for an Edenic paradise, but a search for environmental harmony. His choices of specific materials and forms is conditioned by an innate sense of place and a moral consciousness of the ecological consequences of unrestrained technology.[24] Murcott is critical of fellow Australians who have difficulty with the *raison d'être* of his buildings and tend to focus on their image only. They see references to a supposedly authentically "Australian" character of forms and materials that Murcott characterizes as "a romantic response of a people who live in the most suburbanized country in the world but who cling to mythic images of the landscapes that have become so distant from their lives."[25]

According to Harries, part of both pedigreed architecture and the economic imperative to produce the largest results at the least cost is an antagonistic relationship to the environment, which treats nature as no more than a source of materials to be exploited. "'Pedigreed' architecture and engineering are both made to appear as products of a fall into sin that, like the first fall, means inevitably also the fall out of a natural realm."[26] Furthermore, in the never-ending search for economic expedience and technical efficiency, the technologist cannot afford to hold allegiance to any particular material or method. Thus, "in a technological society, all materiality is destined to 'melt into air.'"[27]

In "The Valor of Iron," Willis contends that we are constantly lead to the conclusion that one material is as good as any other from an aesthetic point of view, provided that we are sophisticated enough to use it properly. His observations hinge on *technique* in terms of the formal limitations of a material or fabrication process to determine the relative merits of substances. "Traditional methods of fabricating wrought iron railings," he hypothesizes, "could be dismissed once a casting technique is devised that produces a cast iron railing with enough formal diversity to convincingly simulate wrought iron."[28] Of course, purists (a la Ruskin) would object on moral principle claiming that such a procedure would result in a "dishonest" material.[29] Compared to the "directness and simplicity" of the wrought iron method, casting is a fairly dull procedure. It imposes a distance between the craftsperson and the substance; the immediacy of contact between the smith and the iron is lost.

The intimate relationship described by Willis between artisan and artifact is rarely experienced in today's era of specialization and industrial production. The exigencies of scheduling, economics, and manufacturing technology have permanently transformed historical notions of craft. But this phenomenon is not unique to our own era. As Andrew Martindale points out in *The Rise of the Artist*, as early as the second half of the thirteenth century there already existed a division between the office and the shop floor:

> *"It was the custom to have a principal master who gave only oral orders, was very rarely on the job or never used his hands, although he received a much larger salary than the others.... This is part of a tendency on the part of architects within the bounds of their own competence to emphasize the 'scientific' or 'intellectual' aspects of their occupation at the expense of the 'art' in its medieval sense of craft."*[30]

This distance between artisan and object is reflected today in architectural practice where the role of the architect is relegated to planning, designing, and specifying. When an architect professes to build, they are speaking metaphorically since the actual construction of buildings and places is in the domain of other specialists. Similarly, an individual practitioner may be credited with the design of a building, whereas design is typically the collaborative effort of a team.

For Frampton, the notion of mediating instrumental reason through an appeal to tradition, as an evolving matrix from within which the lifeworld is realized both materially and conceptually, must be viewed circumspectly since an a priori value is attached to the

fragmentary – in this case the artifact and the means of production. Architecture, in the sense of a technoscience, has no hope of being universally applied:

> *"One only has to look at the spontaneous megapolitan proliferation [of built forms besieging the landscape] to recognize the incapacity of the building industry, let alone architecture, to respond in any effective way. Where technology, as the maximization of industrial production and consumption, merely serves to exacerbate the magnitude of this proliferation, architecture as craft and as an act of place creation is excluded from the process."*[31]

CONTINUITY, INTEGRATION, AND THE "MATERIAL IMAGINATION"

Alvaro Siza observed that "architects don't invent anything, they transform reality."[32] Unlike fine art, all such transformations have to be rooted in the opacity of the lifeworld and come to their maturity over an unspecified period of time. This implies a more essential understanding of craftsmanship, which Zambonini defines as "knowledge of the entire process in view of its goal."[33] This holistic knowledge of the process of making requires historical continuity of a craft tradition and the ability to integrate each element of the creative and production process. *Continuity* refers to a unity in time – a set of relationships to be seen in the life of artifacts and their inception. *Integration* suggests another kind of unity among the makers themselves, expressed at once in their work.[34] It resists all notions of standardization and specialization.

Willis contends that the technologist would prefer the relationship of raw material and finished artifact to be of one pure, proportional projection.[35] The relationship of a stone carving, for example, would perfectly match the source in scale and detail. In these "perfect" translations from one material and process to another, the technological conceit is that material processes can be made transparent, and all universes rendered immediately accessible. Not all materials, however, behave in fashion that allows such projections to be made easily. "The preconceived ideal product is always distorted by the partially opaque lens of the substance or process; the 'eye' of any material will always disrupt the projective focus."[36]

As a society becomes more technological, the imaginative opportunities opened within it will become increasingly formal. Once the process of making anything has been deemed irrelevant to the meanings attached to it issues of shape, style, and visual appearance must gain in importance. Echoing Pawley, Willis observes that one defining characteristic of modernity has been our cultural de-emphasis on the material imagination. This tendency has been further exacerbated by the problem of "mechanical reproduction," as noted by Walter Banjamin, and by the invention of synthetic materials pulled from the "womb of the earth." Willis quips, "there are no myths associated with the creation of plastic."[37]

Zambonini insists that integration of the representational process in drawing with the experience of material itself is among the most difficult to communicate if one does not already believe that material – in its structural and aesthetic properties – precedes the transforming idea.[38] In recent years there has been a tendency to give drawing pre-eminence in the conceptual process, leaving to distant executors all decisions concerning how best to build the work. This means that knowledge of all phases and all components of building becomes crucial if the designer is to properly observe and interpret these material properties.

Whereas Pawley is searching for an overarching techno-scientific ideology, Zambonini asserts that direct material experience identifies the difference between a process oriented fundamentally to material as opposed to ideas. Zambonini's argument follows a trajectory similar to Heidegger's where he is focusing attention "on an object's capacity to carry meaning embodied in its physical qualities, in its materiality."[39]

"At the end of the millennium," Willis says, "we find ourselves, members of a society whose hands are asleep."[40] Traditional artifacts will be increasingly difficult to produce as our society converts imaginative work to efficient labor. The ambiguous duality that is the nature of all materials, he writes, is, of course, a mirror of our own double nature – between our desires for freedom and rootedness. However, he cautions, we must not interpret "the substantial dreams of the material imagination as reductive rules."[41]

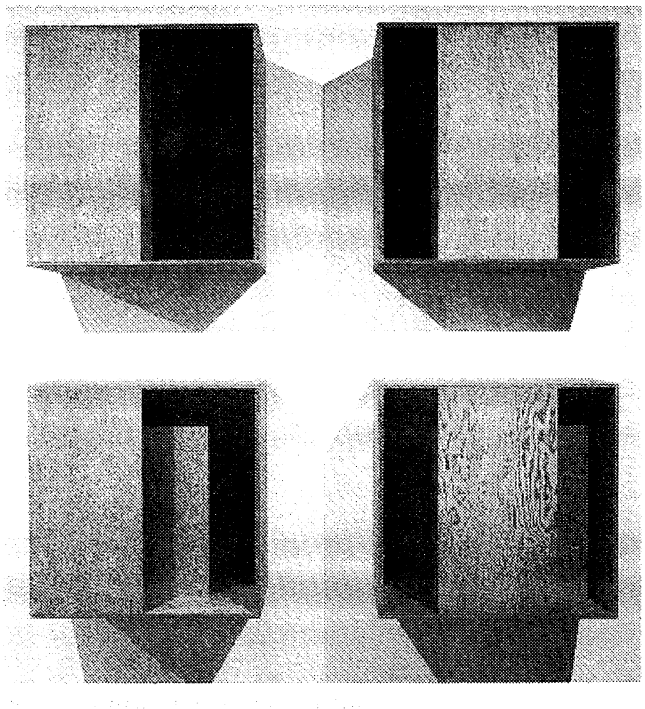


Fig. 5. Untitled. *1987. Donald Judd*

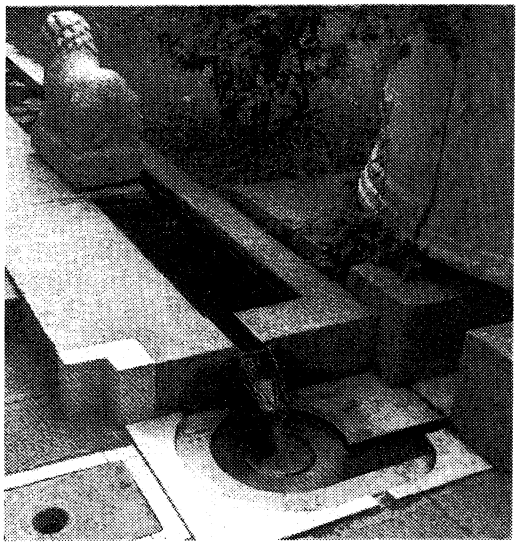
We must look not only at the quality of the material used and at the craft employed, but also at the quality of the intention in selecting and working with the material. In the artistic work of Donald Judd, for instance, Zambonini points out that the quality is not in the material, which is plywood, and not in the production methods,

though the methods of cutting the plywood have been perfected to an exacting standard. "The quality," he says, "is projected by the sensual and perceptual sensations produced by the finished work."[42]

Vitorio Gregotti maintains that detailing should never be regarded as an insignificant technical means by which the work happens to be realized. According to Frampton:

> *"The full tectonic potential of any building stems from its capacity to articulate both the poetic and cognitive aspects of its substance. This double articulation presupposes that one has to mediate between technology as a productive procedure and craft technique as an anachronistic but renewable capacity to reconcile different productive modes and levels of intentionality. Thus the tectonic stands in opposition to the current tendency to deprecate detailing in favor of the overall image."*[43]

IUAV, entrance courtyard.



Fondazione Querini Stampalia, Venice (1961-63).

Fig. 6. IUAV Courtyard Details. Vicenza. Italy. Carlo Scarpa

In Scarpa's buildings, for example, we begin to understand that one must accept a method of representation based on the complex play of smaller-scale relationships held together by a tectonic text. As Zambonini observes: "It is [through] the art of joinery, the method of producing convincing details, [where the architect can achieve] optimal results, since it is in the conception of those details that we fully express the meeting of our history, in our visual culture, of all the meaningful events that we have witnessed."[44]

• • •

In Italo Calvino's *Invisible Cities*, Marco Polo describes a bridge stone by stone. Impatient with his detailed account, Kublai Khan asks "But which is the stone that supports the bridge?" Marco explains that neither one stone nor another supports the bridge. When the Khan presses him for more information about the arch, Marco answers: "Without the stones there is no arch."[45]

ENDNOTES

[1]Daniel Willis, "The Valor of Iron: An Introduction to the Material Imagination," *The Emerald City and Other Essays on the Architectural Imagination* (New York: Princeton Architectural Press, 1999), p. 30.

[2]Anthony Vidler, "Academecism: Modernism," *Oppositions*, vol. 8 (Cambridge, Massachusetts: The MIT Press, Spring, 1977), p. 1.

[3]Reyner Banham, *Theory and Design in the First Machine Age*. second edition (Cambridge, Massachusetts: The MIT Press, 1981), p. 11.

[4]"The heart-theme of the practical body of thought in Germany in 1907 was the relationship of architecture, as an art of design, to mechanical production at all its phases, from the factory work-hall to the advertising of the finished product. This relationship was scrutinized most closely at two critical points: the aesthetics of engineering construction, and the aesthetics of product design." [Banham, p. 68.]

[5]"[Muthesisus] was a Prussian civil servant who regarded himself as an instrument in the furtherance of German economic policy, he naturally stood for order and discipline, and not for the Bohemian individualism and aestheticism of the loosely organized German *kunstgewerbe* craftsmen and designers. Furthermore, he seems to have been regarded as the importer of a foreign style to be imposed on German Arts and Crafts." *[Banham, p. 69.]*

[6]Martin Heidegger, "Building Dwelling Thinking," *Basic Writings*. David Farrell Krell, ed. (New York: Harper & Row, 1977), p. 338.

[7]Daniel Willis, "Vernacular Architecture and the Economics of Dwelling," *The Emerald City and Other Essays on the Architectural Imagination* (New York: Princeton Architectural Press, 1999), p. 120..

[8]Kenneth Frampton, "Prospects for a Critical Regionalism." *Perspecta: The Yale Architectural Journal*. vol. 20 (Cambridge Massachusetts: The MIT Press, 1983), p. 148.

[9]Paul Ricouer, "Universal Civilization and National Cultures," *History and Truth* (Evanston, Illinois: Northwestern University Press, 1961), pp. 276, 283.

[10]Giuseppi Zambonini, "Notes for a Theory of Making in a Time of Necessity," *Perspecta: The Yale Architectural Journal*, vol. 24 (Cambridge Massachusetts: The MIT Press, 1988), p. 3.

[11]*Ibid.*, p. 3.

[12]*Ibid.*, p. 3.

[13]Frampton, p. 149.

[14]*Ibid.*, p. 149.

[15]Martin Pawley, *Theory and Design in the Second Machine Age* (Cambridge, Massachusetts: Basil Blackwell, 1990), p. 3.

[16]*Ibid.*, p. 3.

[17]"With the stripping away of the real historical context of plan, structure, and ideology, all architecture has been reduced to imagery, and all imagery is available to be used in any combination. Today all features ever included in any building, from the stone reliefs of the temples of Abu Simbel to the perforated steel sunscreens of the Hongkong and Shanghai Bank, can be mixed and matched and applied to any other building under the guise of 'historical references.'" [Pawley, 4]

[18]"That which gives things their constancy and pith but is also at the same time the source of their particular mode of sensuous pressure – colored, resonant, hard, massive – is the matter in things. In this analysis of the thing as matter, form is already co-posited. What is constant in a thing, its consistency, lies in the fact that matter stands together with a form. The thing is formed matter." Martin Heidegger, "The Origin of the Work of Art," *Basic Writings*, David Farrell Krell, ed. (New York: Harper & Row, 1977), p. 338.

[19]Zambonini, p. 4.

[20]Zambonini, p. 5.

[21]Willis, "*Vernacular Architecture*," p. 123.

[22]*Ibid.*, "The Valor of Iron," p. 43.

[23]Karsten Harries, "Context, Confrontation, Folly," *Perspecta: The Yale Architectural Journal*. vol. 27, Roberto H. de Alba and Alan W. Organschi, eds. (New York: Rizzoli International Publications, 1992), p. 7.

[24]"It is no longer enough to use a material because we like the way it looks or because it's cheaper. It's absolutely crucial to come to terms with the fact that our paints and coatings may poison our water or air; that our choices of exotic and inaccessible materials may cause destruction of a landscape in another part of the world...." Glenn Murcott, "The Mining Museum of Broken Hill," *Perspecta: The Yale Architectural Journal*. vol. 27, Roberto H. de Alba and Alan W. Organschi, eds. (New York: Rizzoli International Publications, 1992), pp. 173–174.

[25]*Ibid.*, p. 174.

[26]Harries, p. 10.

[27]Willis, "Valor of Iron," p. 41.

[28]*Ibid.*, p. 25.

[29]"Wrought ironwork is 'direct,' primitive,' and 'simple.' It requires a high degree of skill and runs an appreciable risk of error. The limitations imposed by the size of the smith's forge, the variety of anvils and dies at his disposal, as well as by the limits of his own size and strength leave their characteristic trace on the shape of any wrought iron work." [Willis, "Valor of Iron," p. 25.]

[30]Andrew Martindale, *The Rise of the Artist in the Middle Ages and Early Renaissance* (New York: McGraw-Hill, 1972), p. 84

[31]Kenneth Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, John Cava, ed. (Cambridge, Massachusetts: The MIT Press), p. 24.

[32]*Ibid.*, p. 25.

[33]Zabonini, p. 16.

[34]"Integration is fundamentally opposed to the perceived necessity for standardization and specialization – two forces that have tremendous impact in today's economies....A more integrated method of production depends on the coming together of trades and artisans, each capable of applying different skills, while nonetheless maintaining an understanding of the whole to which the work aspires." [Zambonini, p. 16.]

[35]Willis, "Valor of Iron," p. 41.

[36]*Ibid.*, p. 41.

[37]*Ibid.*, p. 42.

[38]Zambonini, p. 16.

[39]*Ibid.*, p. 17.

[40]Willis, "Valor of Iron," p. 45.

[41]*Ibid.*, p. 43.

[42]Zambonini, p. 24.

[43]Frampton, *Tectonic Form*. p. 26.

[44]Zambonini, p. 22.

[45]Italo Calvino, *Invisible Cities*. translation by William Weaver (New York: Harcourt Brace Jovanivish, 1974), p. 82.

Building in the Middle of "Nowhere"

CLARE CARDINAL-PETT
Iowa State University

If Jefferson was wrong, America is wrong.

If America is right, Jefferson was right.[1]

In October of 1797, Maria Jefferson Eppes fell through an opening in an unfinished floor of her father's house and sprained her ankle badly. It was her wedding day. The ceremony had taken place in the parlor—one of two rooms at Monticello with a temporary roof.[2]

The Monticello that tourists now visit never existed for Thomas Jefferson, his family, many guests, slaves and employees. A permanent construction site during Jefferson's lifetime, the building and its surrounding landscape was finally "finished" by admirers long after the founding father's death. While it is well documented that the plantation was never financially successful and that the perpetual remodeling of the villa contributed to Jefferson's terminal insolvency,[3] the well maintained Monticello museum tells a very different story to the casual visitor. This paper—a preliminary version of the first chapter in a book of case studies in 19th and 20th century architecture in the United States—presents another image of the utopian shrine. That image, a more dynamic and complex thing, mirrors the man himself and sets the stage for another kind of history.

If my book project has a single major premise, it is this: the working architect has been swept under the rug of aesthetics and ideology; architecture is generally considered to be a problem of artistic intention and cultural expression, not one of social production. I am particularly interested in the issue of everyday work—politics, economics, office sociology, media and construction technologies, and the dialog between designers and builders. The project was inspired by the work of the late Robin Evans, particularly the last paragraph of his essay "Translations from Drawing to Building:"

> *It would be possible, I think, to write a history of Western architecture that would have little to do with style or signification, concentrating instead on the manner of working. A large part of this history would be concerned with the gap between drawing and building.* [4]

Although I am sure Evans had more than working drawings in mind when he wrote this essay, clearly his "other" history assumes an inextricable relationship between thinking and doing, between the immaterial and the material—it assumes that architectural meaning is a consequence of making buildings.

Much has been written about Monticello and its master. The political and personal conflicts of Jefferson are now well represented in popular and scholarly publications. This study does not attempt to add new information to that extensive body. It does, however, acknowledge the fact that Jefferson's public life and his great domestic project embody some important national paradoxes we still prefer not to ponder. The issues of racism, misogyny and anti-urbanism that haunt Monticello are beyond the scope of this project, but they certainly form the backdrop against which this alternative history of architectural practice begins. This first chapter attempts to describe a paradox particular to our profession, the seeds of which Jefferson himself may have planted.

It is important to mention that Jefferson preferred to call himself a farmer. This designation was, perhaps, a rhetorical position. It is fairly well documented that he only puttered in his garden, leaving the manual labor of farming to his slaves. Furthermore, he avoided any actual oversight of agricultural production at the Monticello estate, leaving that work to overseers or privileged slaves.[5] In the case of the villa's design and construction, he did make all his own drawings, personally supervised the work, and occasionally did some actual construction. Monticello was Jefferson's intellectual retreat, figuratively and literally. The house afforded him an escape from that constant debate between his head and his heart.

The psychoanalyst Erik Erikson has described Monticello as a "maternal shrine." Erikson sees Jefferson's mother in the building's recurring octagonal forms and earth-hugging office wings: the house is a bosom, "enclosed, protected, all warm." [6] It is certainly possible to study the building's morphology for signs of Jefferson's psychopathologies. A few features stand out. The traditional dependencies (also known as "offices") of the Virginia plantation such as the kitchen were buried in the earth, in the basement of the main house by Jefferson's Palladian masterplan. This radical departure from the vernacular of discreet "outbuilding" suppresses evidence of the servants necessary to support Jefferson's aristocratic lifestyle. The house appears more freestanding, less dependent. Similarly, when the house was enlarged to accommodate his growing family, Jefferson squeezed the stairs to the second floor

into the villa's poche and hid evidence of the second floor on the elevation. The women and children who occupied the upstairs were as concealed as their servants.

Through successive renovations, Jefferson's bedroom and study became more secluded from the house's primary corridors. He also designed systems of blinds to further shield the rooms from the exterior. It is possible, then, to read into the final form of Monticello, Jefferson's attempts to live alone in the house. Apparently he was unsuccessful because during his Presidency—with a major remodeling of Monticello underway—he began plans for Poplar Forest, a small octagonal retreat for himself in an isolated part of his Bedford County estate.

The recent revelations about Jefferson's affair with Sally Hemmings force reconsideration of Jefferson's desire for solitude and further complicate psychological readings of Jefferson's formal designs. While these issues are certainly significant, it should be pointed out that Monticello reached its final form only at the end of Jefferson's life and, for much of the 60 years he worked on the project—"taking down and putting up"—large parts of the house were uninhabitable. This study argues that formal readings of the Monticello museum oversimplify the story and miss the point. It was the process of design and construction that gave Jefferson shelter, not the physical dwelling.

So it appropriate to begin this investigation somewhere in the middle of the action, in 1802, with the house recently deconstructed and undergoing significant revision and expansion:

> *"...As I suppose Mr. Lilly is digging the Northwest offices and Icehouse I will now give further directions respecting them. The eves [sic] of those offices is [sic] to be of course exactly on the level of those on the South East side of the hill. But as the North West building is chiefly for coach houses, the floor must be sunk 9 feet deep below the bottom of the plate to let a coach go under it. The icehouse is to be dug 16 feet deeper than that. The icehouse is then to be walled, circular, to a height of 4 feet above the office floors, leaving a door on 3 1/2 feet wide on the N.W. side of it. On that height it is to be joisted with 2 [inch] plank, 9 [inches] wide and laid edge up and 9 [inches] clear apart form one another running across the building, or N.W. and S.E. then to be covered with inch plank. By this means it will depend on the roof of the offices for shelter from rain, and these will be a space of about 2 or 3 [inches] (I do not remember exactly) between it's [sic] covering and the joists of the offices. Thus." -from a letter to James Dinsmore from Thomas Jefferson, March 19, 1802.*[7]

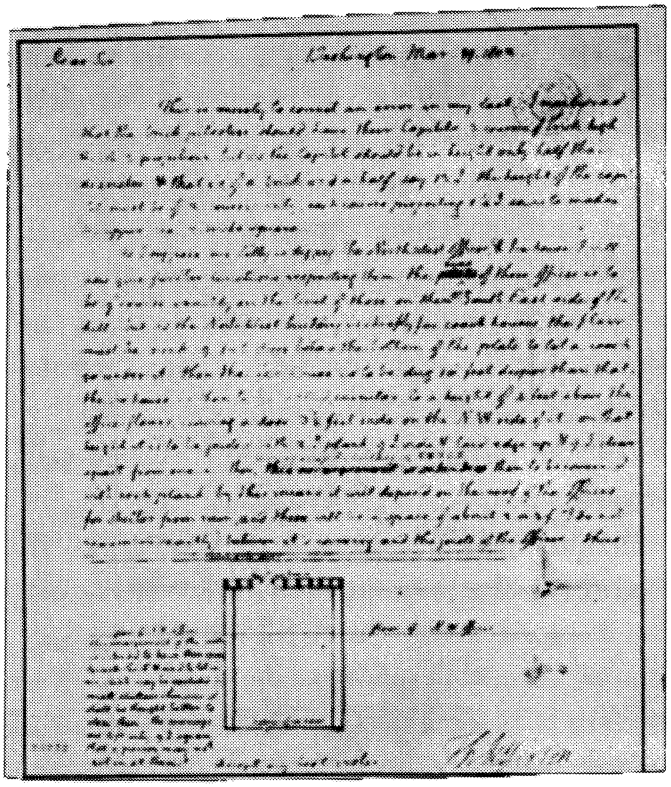


Fig 1. Letter from T. Jefferson to J. Dinsmore, March 19, 1802.

A small simple section of the proposed icehouse takes up the bottom of this one page letter to James Dinsmore, the carpenter Jefferson left in charge of remodeling at Monticello when he assumed his post as President. While Jefferson had previously hired professional craftsmen to work on his dream house, he had personally supervised all aspects of the construction. His relationship with Dinsmore was different. The letters between the two men provide evidence of Jefferson's attempt to remove himself from everyday decision-making and to give more responsibility for the project to his "contractor." As this letter makes painfully clear, Jefferson did not have the professional skills to be an "architect" in the contemporary sense. His instructions are almost entirely verbal. Reading the letter, we can't help but sense the unwritten closing remark above his signature, "Wish I were there with you."

The practice of architecture at the beginning of the 19th century—especially in the United States—was not yet clearly distinguished from that of building construction. So Jefferson's "deficiencies" were shared by many of his contemporaries. The extensive body of conventions that now constitutes architectural construction documentation was in an embryonic state at that time. Calling attention to the "unprofessional" nature of Jefferson's methods would be pointless if it were not for the fact that his architectural expertise was so well respected:

"Mr. Jefferson is the first American who has consulted the Fine Arts to know how to shelter himself from the weather."[8]

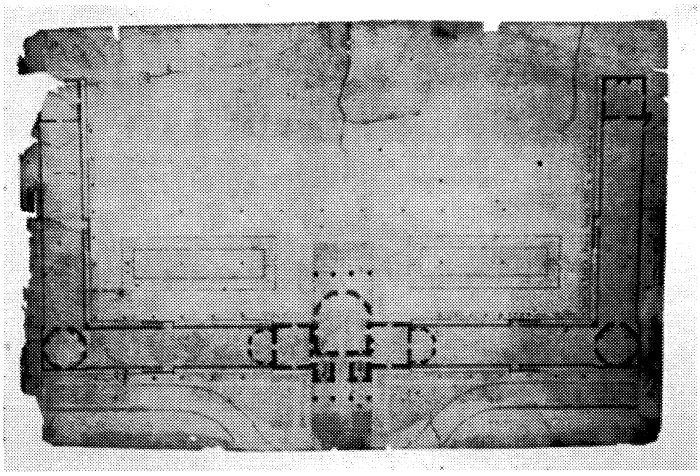


Fig 2. First floor plan with dependencies. before August 4. 1772.

This comment made early in Monticello's history captures the essence of Jefferson's achievements. While it has not been unusual for American architects to have launched their careers with heady designs for their own or relatives' houses, Jefferson may have been the first. Furthermore, Jefferson almost single handedly established his spare form of neo-classicism as the architectural language of the new republic. He did so primarily through the vehicle of Monticello. Jefferson aggressively promoted his architectural ideas using drawings prepared for his dream house. Visitors (friends, enemies, and assorted dignitaries) to his plantation (and there were many over the years) were treated to an explanation of Jefferson's vision for the estate.[9] His early plans for the villa were painstakingly drafted according to the rules laid out in Palladio's patternbook. Jefferson clearly distinguished himself from other amateurs of his generation by tirelessly studying architectural theory. What he built at Monticello, then, is emblematic of his great mythological appeal as a self-made man. In building his own house, he had to teach himself everything from architectural theory to brickmaking.

Of particular importance to this study is the fact that Jefferson taught himself how to make architectural drawings. His father was a surveyor, so he learned basic drafting at an early age. His skills improved dramatically over his long life as evidenced by the comparison of his very first floor plan for Monticello and a sketch for the rotunda at the University of Virginia. Even so, Jefferson never made the sort of polished drawings that were common among professionally trained architects in the early 19th century—particularly among those trained in France. He rarely made a freehand drawing and used wash techniques crudely. He seemed most comfortable with simple pen and ink methods but took to using pencils after his exposure to the fashion during his years in Paris. Despite his limited aptitude for drawing, Jefferson was diligent autodidact, studying both from books and absorbing information from the numerous trained professionals that he met.[10]

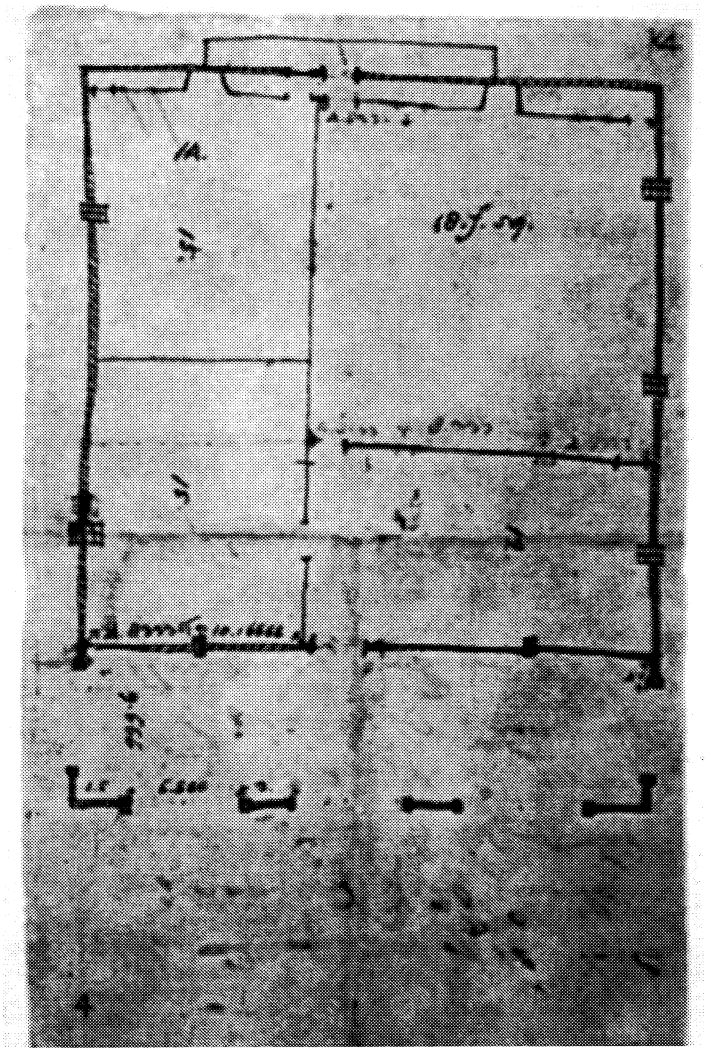


Fig 3. First plan for Monticello. probably 1767.

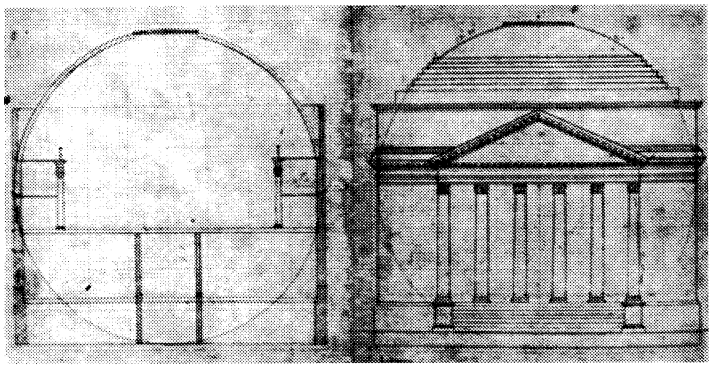


Fig 4. Sketch for the rotunda at the University of Virginia. 1819 or 1820

Jefferson was a compulsive journal-keeper, letter writer, and archivist of his own papers. Consequently, we have been left with a fairly complete record of his public and private documents. It is important to sort out, in the large archive of Jefferson's drawings, notebooks, and letters that reference Monticello, just what constitutes a construction document. Labeling his correspondence with James Dinsmore as such establishes the essential frame of refer-

ence for this inquiry: the amateur's work does not fall into orthodox categories. When we examine Jefferson's private notebooks, however, we are confronted with a dilemma. Since he acted as his own builder for most of the nearly 60 years he worked on this the project, certainly the notebooks serve as a form of detailing. They are also are a record of problem solving and design development. The fugitive boundary between design and construction represented in Jefferson's notebooks is an accurate image of the project. The notebooks, like the construction process, span many decades and paint a picture of the fluid, experimental nature of Jefferson's architectural practice.

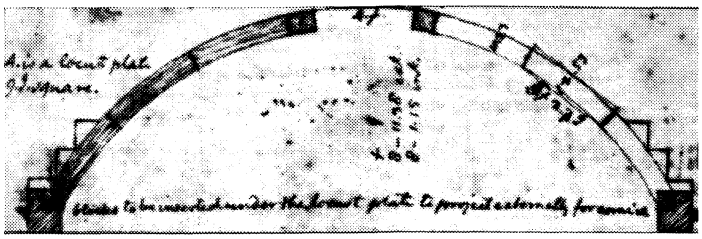


Fig 5. Study for dome construction from notebooks. 1796

It is particularly interesting how much of Jefferson's notebooks are filled with obsessive dimensioning. Born of a religious devotion to Palladian proportioning systems, Jefferson's dimensions are often figured to within 4 or 5 decimal places. This degree of precision was clearly absurd in the context of his actual building, where the margin of error was often as much as 3 inches. So, working back and forth between the ideal and the real, Jefferson made do. The building itself frequently reveals the failure of Jefferson's grasp on reality—most obviously in the case of the false balustrade on the dome: rather than jog the railing awkwardly out around the octagon, its third dimension is reduced to nearly zero, creating the illusion of proportional precision.

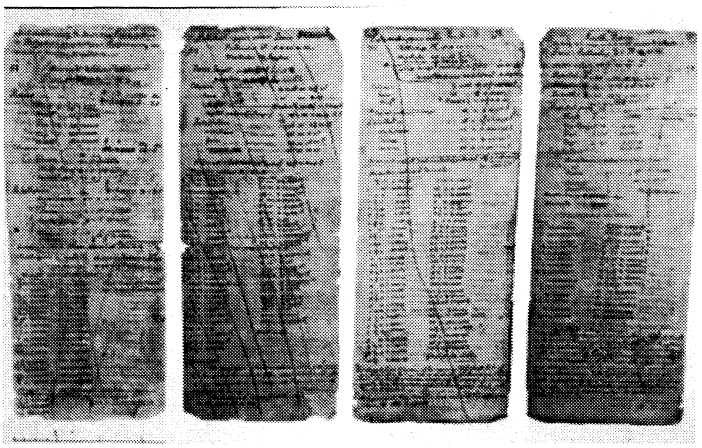


Fig 6. Typical pages from notebooks.

Over the years, Jefferson's difficulty materializing the ideal did not discourage his zealous accounting. In much the same way, his constant financial bookkeeping, a compulsive tabulating of income and expenses, did not forestall his insolvency. Lurking in between the lines of both apparently rational chronicles is the true story: Jefferson worked hard to repress physical reality.

Visitors to the Monticello project never saw Jefferson's journals and account books. They saw only the building under construction and whatever set of formal plans Jefferson had made at the time. By contrast, Jefferson's workmen, most of them unskilled slaves, never saw either. Most of Jefferson's communication with his crew was verbal. The exception to this practice was his use of full-size templates. Jefferson developed much facility with this particular type of construction document. Those that survive count as some of Jefferson's most captivating architectural drawings. The drawings, and the details they generated, were derivative of plates in Jefferson's respectable library of European precedents. In the form of the template, Jefferson's dematerialized classicism had some efficacy in actual construction. In the remote mountains of Virginia, he was able to translate stone into wood. While this practice was not unusual in the colonial Americas, Jefferson's high profile made the alchemy seem virtuous.

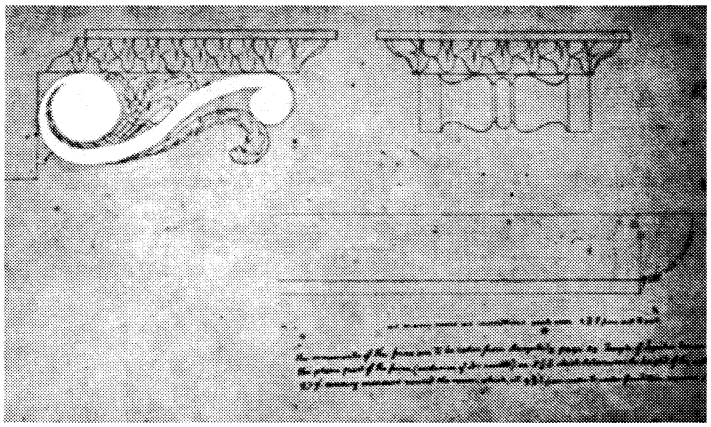


Fig 7. Full size dining room cornice details with cutout for template. 1775 or later.

Trained carpenters were comfortable with the ancient and common practice of template-guided work. While it was difficult for Jefferson to hire trained carpenters and masons to work at his remote Monticello site, he managed to do so occasionally and he used these professionals to help him train his slaves. While some of Jefferson's ornamental details were manufactured in urban centers like Philadelphia (which is where many of his trained workmen were hired), much was made on site. Over time, his combination of workmen trained in European carpentry methods and journeymen slaves became very effective. In Jefferson's later years, the slave John Hemmings made furniture, carriages, and built much of Jefferson's retreat at Poplar Forest.[11]

In addition to templates for ornamental details, Jefferson made a few drawings that are prototypical of contemporary construction documentation. For example, a section through the office wing at a scale of 1" equals 2', describes Jefferson's proposal for roofing the spaces below the promenades. This drawing was made in 1772,

more than 20 years before construction of the offices began and does not denote what was finally built. It is likely that Jefferson never showed this drawing to anyone. At the time he made it, he did not have any workmen capable of making use of such a sophisticated diagram. He didn't have that luxury until James Dinsmore was hired at the end of the 18th century. Drawings such as this one would have been common in professional offices at that time. The fact that Jefferson spent so much time on this particular drawing further illustrates his desire to be more than a mere amateur. The labor required to make this drawing was, in Jefferson's case, certainly excessive. The effort seems especially poignant because it produced a useless document.

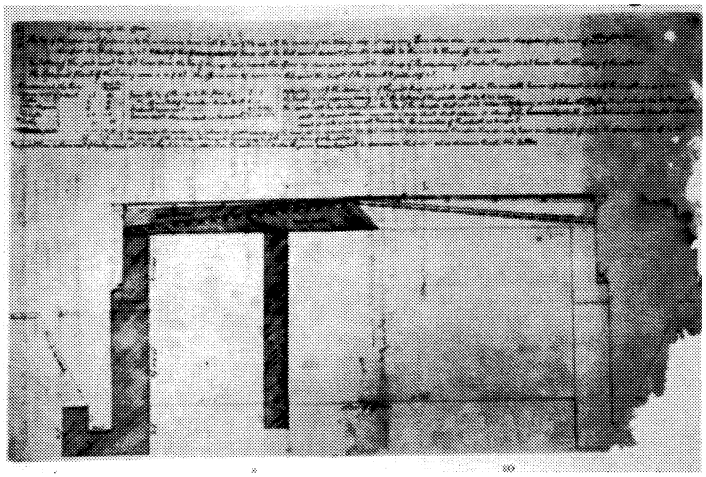


Fig 8. A section across the dependencies, before August 4. 1772.

The office section drawing prefigures future conventions. This drawing does not actively engage the act of construction the way a template does. In keeping with modern practice, the drawing coordinates a set of dimensions and a collection of components. It presents a static diagram of a complex finished product. The drawing is an orthographic armature for information, not a guide for fabrication. Masquerading as a picture of the finished product, the orthographic armature removes the architect from the labor of construction. Built on paper, the artifact defies gravity and materiality. It is possible to make a construction document of this type that does not "work" in the physical world. The template establishes dynamic and physical relationships from eye to hand to tool to material; the relationships described in an orthographic armature are exclusively visual. The gap between drawing and building established by the orthographic armature distinguishes architect from builder.

Jefferson's methods of production at Monticello leave a record of his remarkable capacity for self-education but they also reveal his dependency on orthodoxy. He did not invent, he transplanted. His public promotion of European conventions of design and drawing helped establish the foundation for our contemporary distinction between designer and builder and did much to propel the movement towards professionalization of the practice in the United States. In popular mythology, however, the remote and quixotic project, Monticello, affirms Jefferson's image as the consummate do-it-yourselfer. It is in the unconventional construction documentation, Jefferson's notebooks and letter archive that we find affirmation of that persona.

> *...You expressed a wish to have the sashes for Poplar Forest made of walnut. If you still desire it you will please to let me know that we may have the walnut got to kiln dry along with the plank. I would beg leave however to observe that I am a[f]fraid there is none to be had about here but what is so much given to plank that it will render it very unfit for that purpose...* James Dinsmore to Thomas Jefferson October 16, 1807.[12]

The dispassionate orthographic drawings of the idealized villa describe none of the difficulties that building in the middle of nowhere presented. They present the improbable as accomplished fact. Jefferson spent an inordinate amount of time on those drawings. He superimposed a rational and abstract habit of mind on that which was often beyond his grasp. In a similar way he superimposed the orthogonal grid on the Louisiana Purchase, as a symbol of democracy and as if nothing were there. The architecture profession's particular form of the orthographic armature has evolved since Jefferson's time. It is at once an extreme oversimplification of physical reality and laborious act of accounting. The profession could profit from taking an irreverent look at the hegemony of the orthographic in construction documentation practice. It begins with an irreverent look at Thomas Jefferson's Monticello.

If Jefferson was wrong, America is wrong.

If America is right, Jefferson was right.

NOTES

[1]James Parton, as quoted in Ellis, Joseph J., *American Sphinx* (New York: Alfred A. Knopf, 1997).

[2]James Bear and Edwin Betts, eds., *The Family Letters of Thomas Jefferson* (Columbia, MI: University of Missouri Press, 1966) pg. 156. Elizabeth Langhorne, *Monticello: A Family Story* (Chapel Hill: Algonquin Books, 1987) pg. 87.

[3]See, for example, Joseph J. Ellis, *American Sphinx*, Jack McLaughlin, *Jefferson and Monticello* (New York: Henry Holt and Co., 1988).

[4]Robin Evans, "Translations from Drawing to Building," *AA Files* No. 12 (Summer, 1986).

[5]See Joseph J. Ellis, *American Sphinx*, pg. 142.

[6]Jack McLaughlin, *Jefferson and Monticello*, pg. 62.

[7]*Thomas Jefferson Papers*, Library of Congress Manuscript Division—now available online through the Library of Congress website.

[8]Marquis de Chastellux, a commander of the French army and member of the French Academy, visited Jefferson at Monticello in the spring of 1782 and published an account of his stay. A selection of Travels in America is available in Julian Boyd et al, eds., the *Papers of Thomas Jefferson* (Princeton: Princeton Press, 1950-)

[9]see Jack McLaughlin, *Jefferson and Monticello*

[10]Fiske Kimball, Thomas Jefferson, Architect (New York: Da Capo Press, 1968). In 1916, the architectural historian Fiske Kimball published an invaluable study of Jefferson's drawings that included a detailed accounting of his use of instruments and paper. I am particularly indebted to Kimball's scholarship. This study would not be possible without the information it provides.

[11]See Jack McLaughlin, *Jefferson and Monticello*. chapters 3 and 4.

[12]In the Jefferson Collection at the Massachusetts Historical Society. Many thanks to the staff for their research help.

STRUCTURES

Moderator: Denis Hector, University of Miami

Invention and Memory

RICHARD KROEKER
Dalhousie University
no manuscript available at press time

A Study of Form:

Mutually Supported Stick Structures

VITO BERTIN
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The Chinese University of Hong Kong

It's About This Nail:

Ethics, Justice, and Architecture's Material Realization

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INTRODUCTION

An interesting aspect of structures is the particular way in which short elements combine together to create an assemblage capable of spanning a distance much greater than the length of any of the individual elements. A truss is an obvious example of this kind of structural logic. But what are the specific characteristics that define the class of structures to which the truss belongs? In a pure sense, a truss is a structure with a triangulated pattern of pin connected, axial force members in which all supported loads are applied exclusively at the joints. This description identifies the characteristics of the type, enabling us to group together a diverse range of structural forms whose geometry and other features fit the criteria. In this way we use morphology to categorize known structures that all share common attributes. On the other hand, it is possible for morphology to lead to the *discovery* of new structures by predicting the existence of forms based on the generation of a range of parametric combinations.

This paper examines a special class of structures which, like the truss, are composed of short elements forming an assemblage that can span a greater distance than the length of the largest individual component. But unlike the truss these structures do not rely on connections at the joints to transfer loads, and the relationship between individual elements is characterized by a unique condition of mutuality.

Several authors[1] have examined structures similar in nature which are referred to in the literature as *reciprocal frames*[2]. However, the distinction between structures with or without connections is unclear and generally not discussed. For example, regarding the beam framing system proposed by Serlio in Book 1 of *The Five Books of Architecture* written between 1537 and 1547[3], mentioned in a paper by Melaragno[4], the role of the connectors, which are visible in the drawing, is not mentioned, nor are certain geometrical issues regarding the assembly of the framing examined. Our own investigation was triggered by a four beam structure made by students on the occasion of a built project shown in figure 2, after which we came across these other studies.

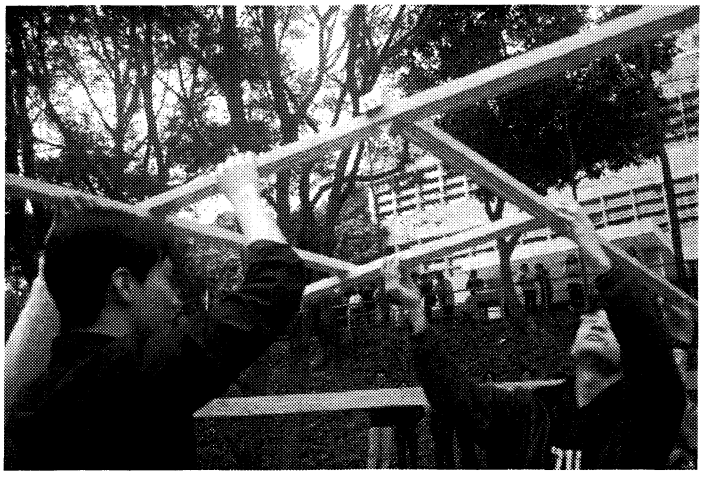

Figure 1: Lever beams in student project

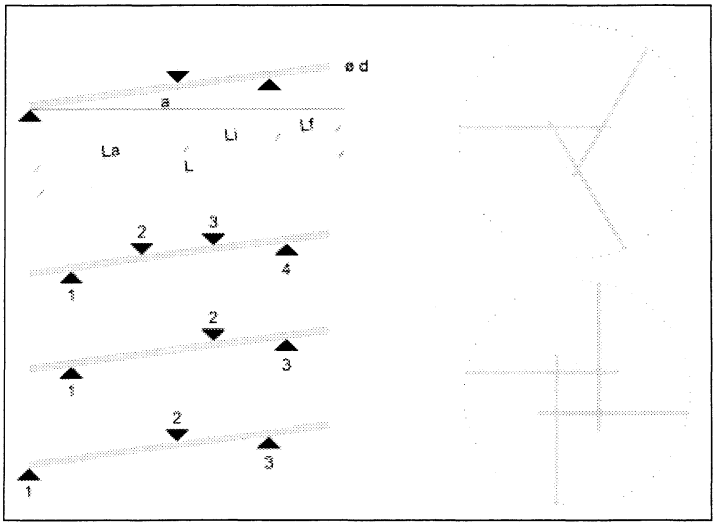

Figure 2: Lever beam variations and basic units

Aside from Serlio, other examples of suspended beam structures have appeared throughout history and have been studied by David Yeomans[5]. There are also a number of built contemporary works. These are primarily three dimensional roof structures, the best known among them being the timber roof structure of the Seiwa Bunraku Puppet Theatre in Kumamoto Prefecture of southern Japan, designed by Kazuhiro Ishii[6]. Ishii has also designed several private residences using the reciprocal frame principle, such as the Enomoto residence[7].

DESCRIPTION OF LEVER BEAM STRUCTURES

Within the class of mutually supporting stick structures, to which reciprocal frames also belong, we examine more closely a subclass which we will refer to as *lever beam structures*. Mutually supporting stick structures can span longer distances than their individual elements acting alone, and fulfil the requirement that their elements both support and be supported by others at the same time. Lever beam structures have to fulfil the additional requirement that no connectors are used to transfer loads, although connectors might be used for keeping elements in position. We call this subclass lever beam structures because the lever beam best describes the structural behaviour of an individual element.

Figure 2 illustrates the lever beam which is the principle mechanism of load transfer and the basic element underlying all the structures in this class. The lever beam is a straight, rigid element with one end resting on the ground (1) and the other supported by a beam (3). Somewhere in between the beam supports another beam (2). The beam is in equilibrium if the clockwise moment created by the weight of the beam being supported at (2) is balanced by a counter moment caused by the reaction of the supporting beam at (3). The closer that the supported beam (2) is to (3), the larger will be the portion of its load that is transferred to the beam at (3).

This relationship of forces can be described by several geometrical parameters which are listed below. The values of these parameters determine much of the variation in form of these structures, independent from the actual cross- and longitudinal sections of the beam. The important role of the beam section will be investigated in a future study. For now we consider only straight beams with a circular cross section.

GEOMETRICAL PARAMETERS:

Diameter d

Beam Length $L (= L_A + L_I + L_F)$

Anchor Length L_A

Interior Length L_I

Free Length L_F

Angle of inclination a

We explore the question of possible forms which lever beam structures can take on two levels. First we look at the formation of units and then how such units can be expanded to create larger structures. The smallest lever beam structure is formed by two beams which support each other. This can only be done with non straight beams, or with straight beams and connectors. The smallest structure which falls into the limitations of this study consists of three beams. We consider this as a possible basic unit shown in figure 2. Other basic units can be formed by any number of beams, characterised by a regular polygon in the centre of the structure having the same number of sides as it has beams, as illustrated in figure 4 top. Non symmetrical units can also be formed. For the study of the unit and its expansion we use as an example a symmetrical unit of four beams.

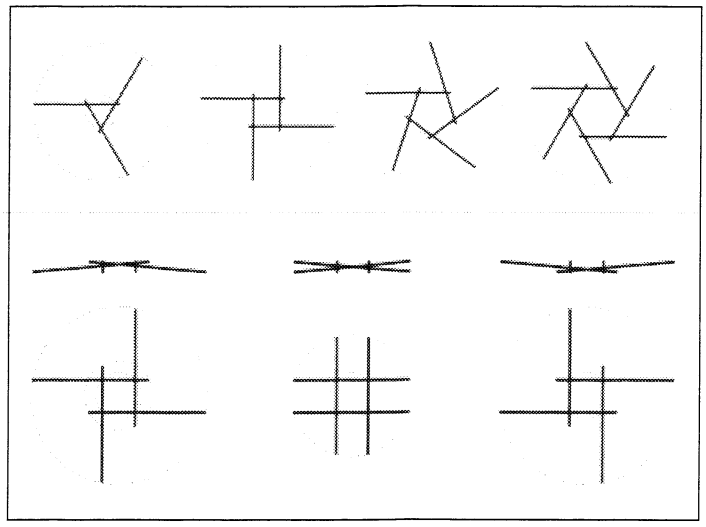

Figure 3: Table of parameters for transformations

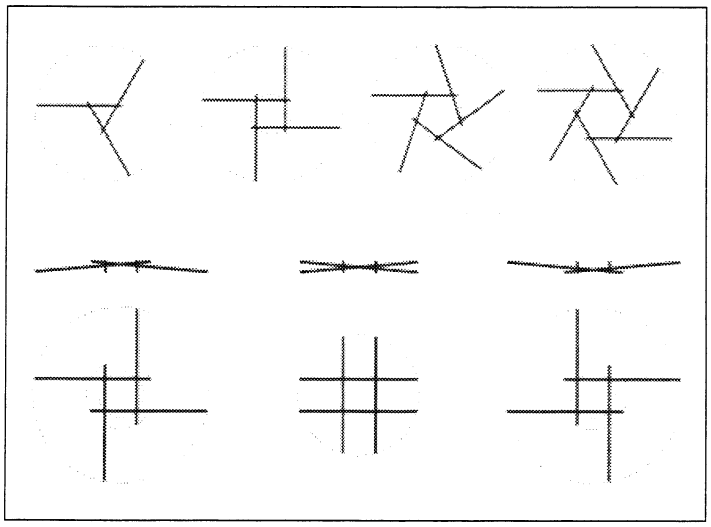

Figure 4: Stick numbers in unit / Transformation D

TRANSFORMATIONS BASED ON PARAMETRIC RELATIONSHIPS

To investigate possible forms we look at the transformations which result from changing values of parameters. This can also give an understanding of the dependencies among the parameters. If a table like in figure 3 is created in which the various parameters defined above are the rows, then the columns can represent different combinations of fixed and variable parameters; an "X" representing a parameter that is fixed and unchanging (e.g. the length of a beam segment) and an "0" indicating a parameter that changes (e.g. the diameter of the stick beams). A careful examination of each potential combination leads to the observation that some combinations are possible (indicated with a "Y" for yes) while others are not ("N" for no).

As an example, consider column D in figure 3. This combination indicates that the overall length of the stick beam (L), the length of the interior segment of the beam (L_I), the angle of inclination (a), and the stick diameter (d) are all fixed. That leaves only the lengths of the anchor and free segments (L_A and L_F), as variables. That is, they are allowed to change in order to accommodate any transformation of the basic unit form. If the position of the supported beam on each stick beam is shifted towards the ground, for instance, and the length of the interior segment is held constant, then the length of the free end will increase, as figure 4 bottom illustrates. But it can be shown that the angle of inclination will remain constant. It"s as if the stick beams are sliding through the joints, retaining their angle of inclination. The area inscribed by the stick beams keeps its shape and the basic unit retains its integrity. The position of the anchor points on the ground, however, moves closer together and one begins to notice a more prominent transformation: the basic unit changes from a "tepee" form in which the sticks are leaning together in an upright orientation, to what might be described as an "umbrella" form in which the stick beams cantilever out from a central position. This transformation has been tested with physical models and can be viewed in an animated computer model simulation.

A second transformation of the basic four member unit is represented by column E in figure 3, illustrated in figure 5 bottom. In this case the overall length (L), free length (L_F), and stick diameter (d) stay fixed while the remaining parameters, (L_A), (L_I), and (a) can vary. The resulting transformation makes the structure appear to flatten as the anchor segment length decreases, which also results in the distance between the points of support (anchor points) becoming smaller. The circumscribed square interior area increases in size like the aperture opening of a camera.

This kind of transformation recalls certain examples of kinetic or unfolding architecture. One can imagine that such structures involving the physical transformation of a basic unit could be designed if the stability of the moving structure were assured. Some studies have been made using configurations similar to those described above[8].

A final example demonstrates the effect of stick diameter on the overall shape. If we consider the parameters in column F in figure 3 (L, L_F, and a fixed; L_A, L_I and d variable), once again we discover a transformation which preserves the integrity of the basic unit while allowing its form to change. As the diameter of the stick beams is made to increase, the position of the supported beam will migrate towards the anchor end or ground provided the angle of inclination is held constant. Conversely if the position of the supported beam were held constant (that is, L_I, and thus L_A if L_F remains fixed), then the angle of inclination would have to increase as the diameter of the stick increases in order to preserve the integrity of the unit. The latter represents the transformation implicit in the parameters of column G in figure 3.

GENERATION OF COMPLEX FORMS

There seem to be innumerable possible forms of structures with more than one unit. It would therefore be interesting to categorize the forms and patterns. We make a first step by suggesting two methods which generate such patterns from a unit. But we know

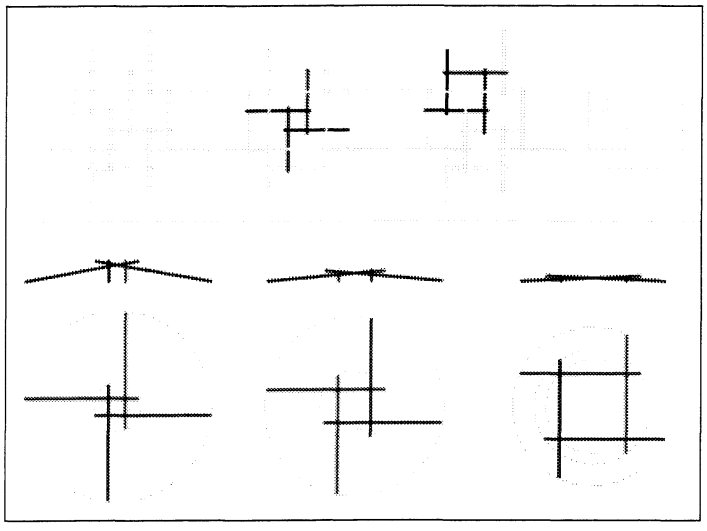

Figure 5: Perimeter expansion / Transformation E

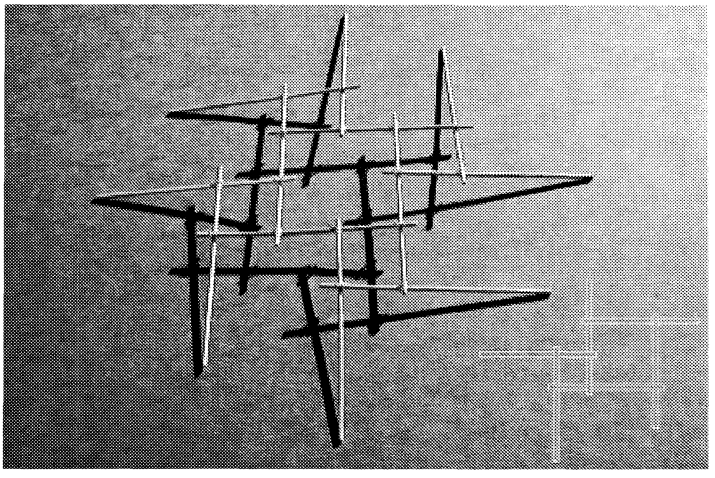

Figure 6: Model of expanded unit / Unit combination

that other categories exist which we will explore at another occasion. The two methods that will be discussed are referred to as *perimeter expansion* and *interior densification.*

Perimeter expansion describes a method that combines basic units in a simple additive way to create new and larger structures, or adds additional elements to the periphery of a structure starting with a unit so that new units are formed to which existing and new elements contribute. For example, consider four identical basic lever beam units connected together to form the composition illustrated in figure 5 top. It can be seen that for each basic unit two anchor legs previously resting on the ground are now supported in the air by the stick beam leg of another unit. Of these two, one of the stick beams must support an extra beam on what was previously the anchor length (L_A) segment of the beam. Also, one of the remaining two anchor legs must support an additional interior beam. By this process, the units are lifted causing the structure to curve up slightly more. If this procedure is continued with more units added in successive rings to the perimeter, the structure grows not only in span width but also in height, forming a shallow dome shape, as the model in figure 6 illustrates.

In the process of generating complex forms, variations of the lever beam principle emerge for some of the elements, here in all interior elements. They are illustrated in figure 2. This is because the geometric pattern requires the support of an extra beam. This will increase the amount of load and hence bending on the stick as the length has not changed. However, the amount of load may be less due to a greater distribution of load points throughout the entire structure.

Observing the pattern of expansion as illustrated in the plan view diagrams of figure 5 top, we can see a fifth unit in the centre, formed by one stick each of the original four units. This unit is entirely suspended within the structure. But apart from these units with a small square in the centre, we can also see units formed around big squares. Looking at the occurrence of two possible basic units in these structures, we can find a smallest possible expansion consisting of one of the two units and two other sticks, which complete the second unit, as the insert of figure 6 shows. And we see the pattern underlying this structure, a tiling of the plane with squares of two sizes.

Figure 7 shows how this tiling can be derived from a regular tiling of the plane with squares. By rotating and expanding the edges of the squares, these become smaller as another set of squares grows at the original nodes. Generalising this observation, it can be shown, that any tiling of the plane with convex polygons can be transformed to a pattern which can be implemented as a lever beam structure. Readers familiar with the geometry of tensegrity structures may note that an interesting correspondence can be seen between this process and the generation of a tensegrity structure from any convex polyhedron. In the case of the lever beam structure, however, the underlying pattern belongs to the geometry of the plane. But since the structure approximates a spherical surface, some geometry distortion must be absorbed within the structure.

A second method of creating more complex forms involves densification through the addition of extra members. In any given lever beam structure, additional beams can be inserted between members or added to the perimeter. In either case, the tendency will be towards increasing the density of the structure in terms of the number of members per area. Figure 8 shows such a series of densifications.

These two methods are not exhaustive, as we know other lever beam structures not falling into these two subclasses. This is one of the topics of further studies already started.

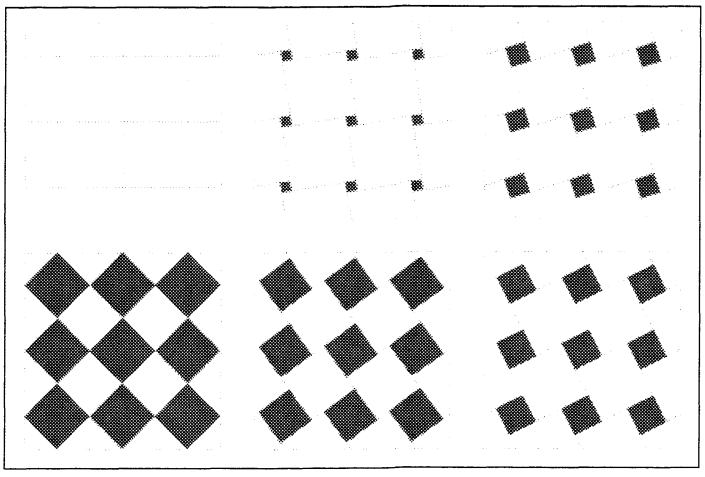

Figure 7: Generating structures from tiling patterns

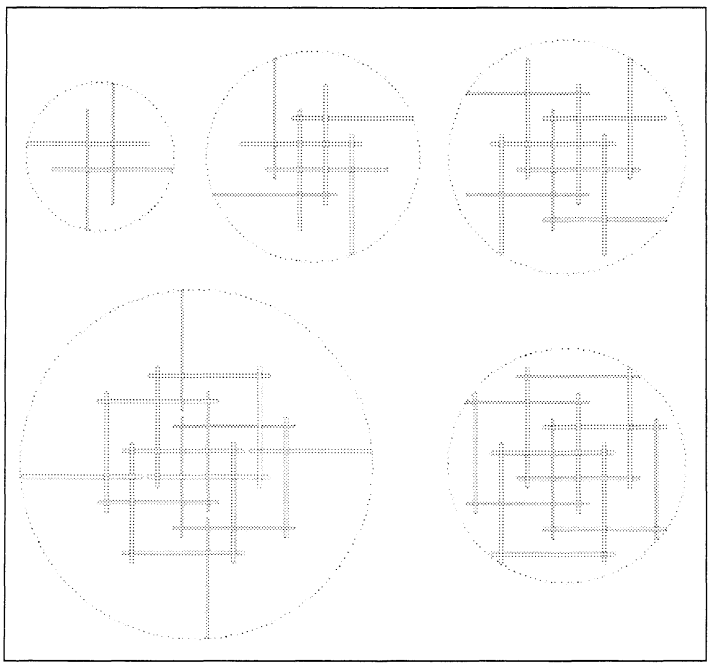

Figure 8: Interior densification sequence

BAMBOO STICK STRUCTURES

After investigating mutually supported stick structures in small-scale models to gain an understanding of the geometric and formal relationships, two large or full-scale constructions were attempted. Bamboo was used for these full-scale experiments because they are easily available in Hong Kong where scaffolding and temporary structures are still made from bamboo. Bamboo members are strong in the axial direction and possess good bending strength due to their hollow sectional shape. Since bamboo is lightweight, the construction of large structures can be accomplished by two or three persons without special bracing and temporary supports. One disadvantage of using bamboo is the variation of diameter, and the variation in strength not only between rods but within each rod. We tried to overcome this by selection of similar rods ad sorting the cut sticks for using in equivalent parts of the structure.

The structure shown in figures 9 and 10 with a span of approximately 10 meters was built using bamboo rods 1.5 m long and 4 cm in diameter. Beginning with a hexagonal basic unit, further members were added by successive perimeter additions until the structure reached the target span. Plastic ties were used on every joint to hold the members in place during construction. Upon completion it was observed that the ties were not needed for most of the joints in the upper portion of the dome where friction forces kept the bamboo sticks from sliding. On the steeper regions of the perimeter, however, the ties may have increased the friction to maintain the position of the members. The arching form of the structure caused by the accumulation of inclined lever beams resulted in a rise of about 1.7 m, about 25% less than predicted based on the small scale model studies.

Although no precision load testing or deflection measurement was attempted for this study, the bamboo dome structure was observed under the load of its own weight and a distributed loading consisting of 15 kg weights attached at 20 locations, evenly spread throughout the structure. Despite the preliminary character of the load testing, the full-scale construction none the less offered some interesting insights into the performance and constructive logic of mutually supported beam structures. First it was observed that the assembly process was straightforward and rapid, allowing the structure to be completed in just a few hours. The geometry of the structure was stable and the deadweight of the members provided enough bearing force to maintain the tightness of the overlapped joints. Second, the overall shape of the structure was regular and evenly arched attesting to the consistency of the geometric relationships. Individual members exhibited some curvature due to bending, however, this bending was evenly distributed throughout the structure. Third, the outward thrust of the anchoring stick members at the base was so small that the friction of the sticks on the grassy ground was enough to prevent movement, and no damage of the ground could be detected. Finally, failure of the system under loading occurred when the weakest member buckled due to increased bending forces. The failure created a large "hole" in the dome but did not lead to total collapse of the structure, revealing an inherent ability of the system to redistribute forces.

CONCLUSION

Following the research efforts of other investigators of reciprocal frames, this study attempted to define the characteristics and properties of a particular class of mutually supported beam structures, and to begin to understand the relationships between the geometric parameters of the system and its structural form. The principle of the lever beam and the generating pattern of the basic unit were identified as the primary "building" components of this class of structures. Employing a morphological method of analysis, parametric relationships, and the transformations they imply, were used to better understand the range of possible forms. Several cases were studied in detail using diagrams, small-scale physical models, and animated computer models. This resulted not so much in the discovery of new forms but in the uncovering of formal relationships that guide the process of transformation, from which an infinite number of form possibilities can be obtained. Finally, two full-scale structures using bamboo rods for the beams were built on an

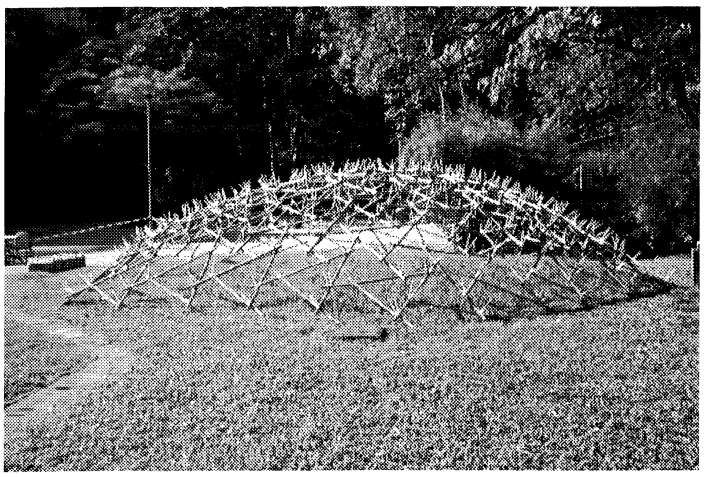

Figure 9: Overall view of built bamboo structure

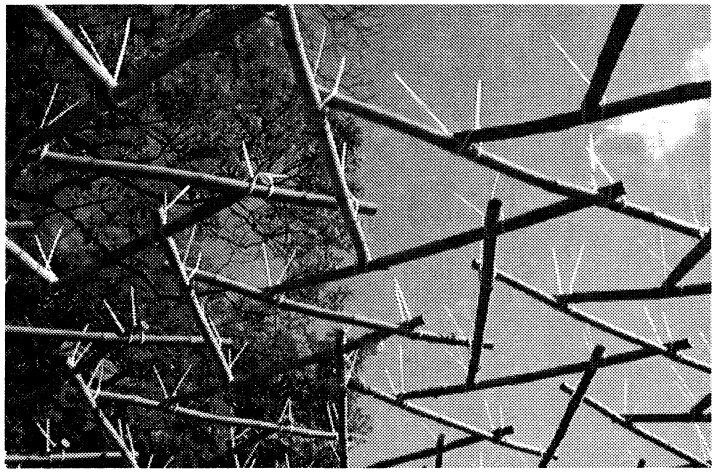

Figure 10: View of bamboo structure from inside

open site for testing the method of assembly and for observing qualitatively the behaviour and performance of the system.

Summarising the main clarifications and discoveries, we list can the following points:

- Lever beam as principle with variations
- Beams considered as elements
- Units used as building components
- Parameters of unit geometry
- One clearly defined subclass
- Plane/sphere geometry ambiguity
- Reversibility as tepee or umbrella

In addition to these conclusions, the study raised several questions that might be explored in the future. Regarding the relationship between the small scale model and full scale construction, further research needs to be made to better understand the effects of scaling up. Regarding the possible forms, we hope to still find other definable subclasses to accommodate other patterns. Further, the preliminary study of alternative beam sections and the articulation of the joints seem promising to reveal even other interesting aspects of lever beam structures.

This study has focused only on mutually supported beam structures that are three dimensional and non-directional. It is also possible to envision expansion of the basic unit in a single direction and thereby obtain a separate subclass of vault forms. There already exist historical precedents for this in the Chinese rainbow arch bridges, an example of which can be seen in a scroll painting of the twelfth century[9] of which a detail is shown in figure 11. It is interesting to compare this bridge with a sketch of a proposed bridge by Leonardo da Vinci[10], as the occurrence of a similar idea in two different cultures.

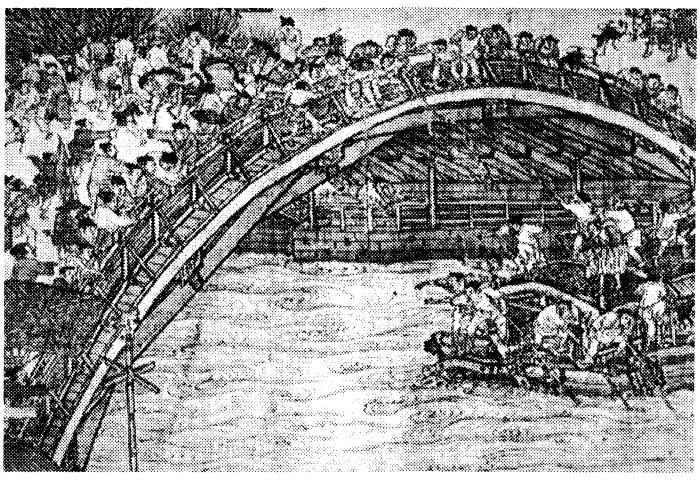

Figure 11: Partial view of Chinese rainbow bridge

NOTES

[1]See studies by John C. Chilton et al. For example, "Morphology of Reciprocal Frame Three Dimensional Grillage Structures," *Proceedings of the IASS-ASCE International Symposium*, 1994.

[2]The name "Reciprocal Frame" belongs to a system patented in the United Kingdom. It is described by Chilton as "a three-dimensional beam grillage system structural system... in which each beam in the grillage both supports and in turn is supported by the other beams in the structure (reciprocally)."

[3]Sebastiano Serlio, *The Five Books of Architecture* (New York: Dover Publications Inc., 1982).

[4]Michele Melaragno, "Trabeations: Vernacular Structures Emerging From the Historical Past," *Architectural Science Review* Volume 39 (1996): 49-57.

[5]David Yeomans, "The Serlio floor and its derivations," *Architectural Research Quarterly* Spring (1997): 74-83.

[6]*Japanese Architecture III* (London: Academy Editions, 1994).

[7]Ishii Katzuhiro, *Ishii Katzuhiro* (Tokyo: Kajima Shuppankai, 1991).

[8]J. C. Chilton, B. S. Choo, & O. Popovic, "Reciprocal Frame Retractable Roofs," *Spatial Structures: Heritage. Present and Future. Proceedings of the IASS Symposium* (1995): 467-74.

[9]Scroll painting "Qingming shang he tu" (Going up the River during the Qingming Festival) by Zhang Zeduan, 12th century as reproduced in Zhang Anzhi, *Qingming shanghe tu*, Renmin meishu chuban she, 1997. The reconstruction of the Rainbow Bridge type was the subject of a recent PBS film video (1999).

[10]The sketch by Leonardo da Vinci is found in the *Atlantic Notebook*, sheet 22 front, which is in the Biblioteca Ambrosiana, Milan. It describes a suspended beam arch bridge which bears remarkable similarity to the Rainbow Bridge. An illustration of the bridge appeared on the rear cover of *Spatial Structures: Heritage. Present and Future.* Proceedings of the IASS International Symposium, 1995.

REFERENCES

Chilton, John C.; Choo, Ban Seng; and Yu, Jia. "Morphology of Reciprocal Frame Three Dimensional Grillage Structures," *Proceedings of the IASS-ASCE International Symposium* (1994): 1065-74.

Chilton, John C.; Choo, B. S.; and Popovic, O. "Reciprocal Frame Retractable Roofs," *Spatial Structures: Heritage. Present and Future. Proceedings of the IASS Symposium* (1995): 467-74.

Japanese Architecture III. London: Academy Editions, 1994.

Katzuhiro, Ishii. *Ishii Katzuhiro.* Tokyo: Kajima Shuppankai, 1991.

Melaragno, Michele. "Structural Morphology in Architectural Education," *Conceptual Design of Structures: Proceedings of the IASS Symposium* (1996): 528-34.

Melaragno, Michele. "Trabeations: Vernacular Structures Emerging From the Historical Past," *Architectural Science Review* Volume 39 (1996): 49-57.

Popovic, O; Chilton, John C.; and Choo, B. S. "Rapid construction of modular buildings using "Reciprocal Frame"," *Second International Conference on Mobile and Rapidly Assembled Structures.* (1996): 73-82.

Serlio,Sebastiano. *The Five Books of Architecture.* New York: Dover Publications Inc., 1982.

Yeomans, David. "The Serlio floor and its derivations," *Architectural Research Quarterly* Spring (1997): 74-83.

It's About This Nail:
Ethics, Justice, and Architecture's Material Realization

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Iowa State University

Parts Content Information for vehicles in this carline: US/Can. 7%; Mexico 45%; Germany 35%. For this vehicle: Engine. Germany; Transmission. Argentina; Final Assembly Point: Puebla. Mexico. Note: Parts content does not include final assembly costs. Gasoline economy rating: City. 28 mpg; Highway. 31 mpg.
—Content and Fuel Economy Labels on a 2000 VW Beetle GLS

Head: China; Handle: United States; Assembly: Mexico
—Content Label on a Stanley Tools 'DynaGrip' Hammer for sale at The Home Depot

MATERIALS AND ETHICS

Nails are, as are virtually all other architectural construction materials and assemblies, *geopolitical-economic parts* of buildings. Along the path from architectural dreams and desires to deserts, from architectural conception and development to completion and inhabitation, points are reached at which tectonic design choices are made about the actual materials, the design detailing of their joinery, and methods of assembly that will be incorporated in a home, a church, a university building, a corporate headquarters, an Olympic Stadium. Although the scale and international visibility of these types of structures arguably moves along a rising vector, the physical realization of each is largely an international construction not unlike the VW Beetle and the Stanley Hammer, both of which are multi-national and multi-continental in their origin. A trip down the aisle at The Home Depot yields ubiquitous nails, screws, bolts and other fasteners originating in Mexico, Brazil, Korea, Taiwan, Japan and China.

Wherever you are reading this — in hard copy or digital format — you are some *place*: in a room or building, an airplane, or garden. Whatever the ideological origination of the design of that place, whatever its construction roots, its aesthetic qualities or its meaning to you and others, it is a material realization of human design intent for habitat – architecture. This paper explores ethical aspects of that *material realization.*

When we consider the work of paradigmatic masters, for example, Louis Kahn, Le Corbusier, Mies van der Rohe, or Frank Lloyd Wright, we experience their architecture fully realized through their extant works. We carry with us, to varying degrees, perceptions of their place in history and their theoretical approach to architecture, their aesthetic and tectonic sensibilities. It is manifest as well in their writings, their offices/ateliers/schools and critical commentaries regarding their oeuvre. What I wish to explore is not the ideological, aesthetic or perceptual roles of materials and assemblies in architectural work, nor the ethics of structural and safety integrity in construction, but, rather, the conditions of ethics that pertain to materials and assemblies themselves — their origination, production, and use.

As they had well before the advent of Modernism, construction materials and assemblies in the contemporary world arise in international systems of production. For example, in his overview of post-industrial revolution construction assemblies Cecil Elliott points out:

> *The materials that have been used to construct buildings during the last three centuries were already present in ancient and medieval times. The change, in essence, has been largely in the development of mechanized methods for manufacturing them and in the networks of commerce that have made raw and finished products available.... [Giving rise to] Industrial 'empires' and competition (so fierce the terms of warfare were often used to describe it).... [Aspects included]...enlargement of scale, which extended markets.... [and] ...reward in the medals presented to competing manufacturers at the international expositions....*[1]

And he presents them as neutral fabrication media:

> *This study gathers together stories of the production of building materials and the development of building equipment and other systems. These are the media in which architects work. They constitute the array of possibilities from which architects, builders and investors make the choices that largely define the nature of a building....*[2]

But, are materials and assemblies the neutral matter of architecture? Raw materials are mined in one nation; transported to another where they are refined and or milled; then shipped again to a third

where they are machined into finished products for installation in buildings. After a final shipment, workers at the construction site incorporate the materials and assemblies into a building. All along the production path exists a collection of governing laws, legal contracts, exchanges of wealth and property rights transfers. What originates as bauxite in Guinea is installed in Ann Arbor as an aluminum frame curtain wall.

This is not a pure "resources|materials|economics" formula. The political-social-labor-economic-ecological terrain's within which any modern construction takes place bear within them constraints and opportunities not only for ethical choices but justice as well. To select and specify aluminum curtain wall is to select and specify a material product for architectural realization that in itself has profound ethical implications. These occur at the intersection of environmental degradation, labor production, property holdings, and wealth.

Is it possible to specify materials and assemblies systems throughout a building that are ecologically benign; that use no materials from corrupt political or corporate regimes, or from locales lacking environmental protection laws, or from those with intransigent impoverishment of working people; and that utilize local labor during construction thus contributing to communal well-being? In an ethics interview J. Max Bond reflects:

> *...we try to understand the economic implications of material selection: Whose economy is being served? ... [As well as] Impact on local economy and labor in particular; cultural references of importance to building sponsors and users ... who might be affected by our choices.*[3]

Implicit in the preceding are questions and judgments about what is "good" or "just" with regard to the origination and use of a product. Ought this to be a concern of the architect? Should it influence aspects of architectural education? Do ethical claims regarding material production necessarily conflict with or impede design?

Without discounting the value of "a-tectonic" avant-gardism and speculation about virtual architecture,[4] the position taken here is that architecture is intrinsically kinesthetic/physical/experiential! And from this, that in the origination of construction materials and assemblies and in their application, there is a substantial field of ethical concerns that should parallel other architectural concerns that are much more typically on the surface such as program, function, ideological or rhetorical positions, and aesthetics. Among the many examples of these latter two approaches are classic works by Kenneth Frampton, and Colin Rowe and Robert Slutsky. Frampton explores material constructions in terms of their poetics:

> *... this study seeks to mediate and enrich the priority given to space by a reconsideration of the constructional and structural modes by which, of necessity, it has to be achieved.... I am not alluding to the mere revelation of constructional technique but rather its expressive potential. Inasmuch as the tectonic amounts to a poetics of construction it is art, but in this respect the artistic dimension is neither figurative or abstract....building is as tectonic and tactile in character as it is scenographic and visual....*[5]

Rowe and Slutsky explore an aesthetics of transparency in architecture through apprehension:

> *Therefore, at the beginning of any inquiry into transparency, a basic distinction must perhaps be established. Transparency may be an inherent quality of substance — as in wire mesh or glass curtain wall, or it may be an inherent quality of organization...: and one might for this reason distinguish between a real or* literal *and a* phenomenal *or seeming transparency.*[6]

And:

> *... in this present article it is proposed ... to concentrate attention, not upon the three-dimensional or spatial aspects of phenomenal transparency, but as far as possible upon its two-dimensional manifestations — upon phenomenal transparency as pattern.*[7]

The issues in construction materials and assemblies for Elliott are invention and systems of production linked to emergent new architectural form; for Frampton they are rhetorical; for Rowe and Slutsky, perceptual and aesthetic. The referent works are classics in the discourse of architectural 'matter.' Bond's brief comments are closer to the themes of this paper: making ethical material choices based upon assessment of a more fully complex situation of human affairs within which aesthetic experience is but one (though vitally important) aspect.

MATERIALS AND ARCHITECTURAL REALIZATION

Architecture is a material production. Stating that architecture is material production does not deny the critical power of architectural thought and speculation. It is only that such speculation in drawing, text, modeling, film and other media, and virtual reality simulation is *architectural* — of architecture — and a stimulation to imagination and action, but it is not architecture in the sense commonly understood and as defined here: the designed and built inhabitable landscape. That landscape tends to be large, certainly larger than human beings, and demands many resources for its accomplishment.

That accomplishment uses global resources upon which all are dependent. This aspect of material production leads to a consideration of the matter of construction materials themselves. Construction materials have certain characteristics and qualities. Knowing about materials and how to utilize them for various construction purposes in order to realize a design vision is an aspect of the special knowledge architects are expected to master. It constitutes a *virtue* ethics.

As with so much else in the modern architectural curriculum, precursors to materials, assemblies and construction methods courses are found in Vitruvius, Alberti and Palladio.[8] Vitruvius addresses basic building materials and methods in Book II (stone, brick, tim-

ber, mortar and wall construction), and finish materials in Book VII (stucco, frescoes, and pigments). Vitruvius in the introduction to Book II:

> *I thought it best to postpone this [discussion of proportion and symmetry] until after I had treated the practical merits of the materials out of which, when they are brought together, buildings are constructed with due regard to the* proper *kind of material for each part, and until I had shown of what natural elements those materials are composed.*[9] *(italics added)*

He continues reflection on the purposes of Book II in Chapter I:

> *... but in this [book] I shall discuss the use of the building materials which nature provides. For this book does not show of what architecture is composed, but treats of the origin of the building art, how it was fostered, and how it made* progress, *step by step, until it reached its present* perfection.[10] *(italics added)*

Alberti covers similar ground in his Book II which addresses materials, and Book III which provides a guide to construction methods and assemblies. Alberti also indicates the reason he dedicates Book III to construction:

> *The construction of a building does not entail just setting stone on stone, and aggregate on aggregate, ... for, because the parts are different, so too the materials and methods of construction vary quite radically. ... We must now inquire what is* appropriate *in each case.*[11] *(italics added)*

In his Book I, Palladio not only discusses building materials and methods, expanding them to cover metals, but also includes his own illustrations. He, too, explains his intent:

> *... in the first [book] shall be treated of the preparation of the materials, and when prepared, how, and in what manner, they* ought to be *put to use, from the foundation up to the roof: where those precepts shall be, that are universal, and* ought to be *observed in all edifices, as well private and publick.*[12] *(emphasis added)*

The terms of material construction: 'proper', 'progress', 'perfection', 'appropriate', and 'ought to be' are value terms that define the quality of excellence (the Classical Greek *areté*), or *ethical virtue.*

These examples indicate the historical depth and richness of thought regarding material production that underlies contemporary construction. An ethical duty is incurred either individually or collectively when designing and constructing buildings and infrastructure with respect to resource utilization and sustainable patterns of settlement and construction, and with respect to personal health and physical safety. In the centuries since these treatises were published, design and construction have been separated, with the architect almost exclusively focusing on design. But, the architect remains responsible for the structural integrity of building designs and for designing and selecting the construction assemblies through which buildings are realized. Thus, the contemporary architect, no less than earlier architects, is bound to mastering this material production aspect of his or her craft, not only as a skill, but as an ethical mandate.

A MATERIAL CASE: PRODUCTION, REUSE, AND LEGACY

Vitruvius' demand for "durability" is an *a priori* deontic claim about the positive virtues (the ethical *good*) of architecture – an essential condition for building to be architecture. But even absent that claim or other claims from architecture's ideologies such as "truth in materials," or "technology ought to be an expression of our time," the context of a material selection contains a situational ethics. Client sponsorship, building project purposes, the economic wealth and labor condition of the societies affected by the construction, other social needs, etc., frame that situation.

Upon first consideration, it may seem that the material assembly "aluminum frame curtain wall" is ethically neutral. After all, it is one among uncountable construction products available in contemporary society. It is legal to produce and legal to purchase. Yet, it, along with all of those other products arises in particular circumstances. For aluminum those circumstances include a complete system of mining and transportation, the mining of bauxite and the management of tailings "waste" product, its smelting into aluminum (an energy intensive process), another complete system of fabrication and machining, and of course, selection and construction – activities virtually always international in scope. Curtain walls also incorporate a range of other materials such as glass, insulation, sealant, and joint fittings. Most often we are inclined to think in terms of the aesthetics, constructibility, cost, or the suitability to expressing or extending an ideological or rhetorical concept when thinking of a curtain wall system.

Aluminum and other contemporary construction materials do not exist except within technological societies of a certain complexity. They utilize global material resources and energy – they are not ecologically neutral and can be weighed against the embedded material/energy in other basic materials. Some types of construction grade aluminum are recyclable and aluminum does not deteriorate nor pollute as much as other products after installed. Financial resource flows that pay for processing bauxite into aluminum and machined materials, and the labor system that delivers it (adding value and stabilizing livelihoods), are also inherent in the product.

Everyday, all over the world, architects sit down to select and specify building materials and building systems for projects as diverse as back-porch additions and Olympic stadiums. Is it too onerous a thought to burden these parochial and local choices conceived and perceived as pertaining to appearance, durability, cost and constructibility with the weight of justice? Each building material or assembly that is installed in a new building arises in a particular process that transforms natural or recycled resources into usable material. The production labor, corporate and national exchange, trade, and installation labor systems by which materials are produced have embedded within them not only business and legal

implications, but also ethical ones. In what way do these architectural choices pertain to justice?[13]

SPECIFYING RECYCLABLE CONSTRUCTION MATERIALS

Aluminum is a mainstay of contemporary construction systems. It is used for surface panels, glazing systems, curtain wall and storefront systems, etc. It is light, workable, does not rust, holds sharp definition formally.

It is also extremely resource intensive to extract and refine in production. Mining often takes place in "invisible" parts of the world: 59% of the mined bauxite ore originates in western Australia, central Brazil, and Guinea, and none of the world's top ten ore producers are in North America. Then of course, it is refined and milled into final usable forms. As consumers, the US and Canada are first and fourth respectively in aluminum production. In the manner that aluminum cans can be recycled, certain aluminum building products, which are a bit more first-cost intensive, are also recyclable.

In our contemporary global economy, how is the use of single-use disposable, as opposed to recyclable, construction materials justified? Are there other ethical/justice implications inherent in basic construction materials?

There are those who pursue the issue of the ethical standing of the environment, per se. Here we may assert that even considering ecosystem earth as a productive source to support human endeavors with no ethical standing, there is at least one matter of ethical consequentialist concern: if we deplete earth, what is next for humankind? A *StarTrek*-like existence in starships in search of a new world? A hope (wish?) that technological advances will keep us ahead of depletion? Consider that it is the general public, not architects, who pushed for, and passed, environmental legislation in the US and Europe.

One of the technological systems that we have mastered is the extraction, production, use, and recycling of various earth resources, including those that go into buildings. As a matter of logic, it would seem that given the numbers of people on earth, the inequities of access to goods and life quality that need to be addressed, and the rates of use of resources, that we ought to at least recycle materials when possible. Can doing otherwise be justified?

Matters of international economic justice, environmental justice, and global inequalities with respect to access to life's goods are major areas of discourse. Many products being used in the richest third of the world (the largest refiner of bauxite into aluminum is the US), originate in less developed nations. They are part of those nations' national product. Without turning this into a geo-political debate regarding the WTO, clearly, building products and enterprises are part of such globally connected markets. Banking systems and financing in the developed world favor "least first cost" and secure investment systems: a rate of return on investment is needed. The difficulty is that the investment cost and rate of return on architectural projects, both private and public, are often drawn too narrowly: at the limit of the immediate open-market first-cost transaction at hand without regard to environmental degradation or long term operations consequences.

If contracting entities have reached what each considers to be legal, fair exchanges — has justice been served? Even if one or both parties operates in a political landscape without environmental protection laws, or labor rights laws? Depletion of global resources, inequities in global labor rates, befouling the environment (in places conveniently out of sight from North America), rather than being ameliorated are often being exacerbated. Witness the Texaco TV advertisement (aired regularly during the winter of 2000) that shows geologists hugging and tasting rocks at the most pristine of wilderness sites searching for oil and then pans away from the wilderness to speak optimistically about finding the energy to meet society's needs. One can alternatively tune in to *CBS 60 Minutes* to see an exposé on the degradation caused by Texaco's pipelines and production facilities in the Andes and Amazon. Tellingly, Texaco's advertising campaign in the summer of 2000 showed ecologists on the same sites speaking about protecting the environment while it is mined to fuel progress.

This may seem to play fast and loose with generally acknowledged "hidden" environmental costs. Nonetheless, landscape construction (civil and architectural) is among the US's largest industries. From within architecture, sustainable environmental design practices such as: reusing and recycling buildings and building materials, designing buildings for more efficient use of energy, making them more energy neutral, proposing urban development patterns that are less infrastructure intensive, etc., are strategies that we currently have available that do not decrease living standards and choice. They affect non-renewable resources, renewable resources, environmental impacts, labor expenditure and international exchanges. With the possibility of specifying recyclable materials as a matter of architectural choice, is it just not too? Who would you define as the affected parties with respect to the ethics and justice of the social-political-legal-economic process of architectural realization?

INCLUDING ETHICS IN THE MATERIALS MIX

The focus of the preceding case was perhaps an easy mark: sustainable design practices as exhibited through material design choices. And this is no small matter of concern: for example, the 2000 Sydney Olympic venues, while not receiving nearly the architectural design coverage of Barcelona, in fact were significantly advanced in utilizing reusable resources, designed for solar enhanced operational efficiency and environmental neutrality with respect to waste management, while arriving at bold memorable forms that will remain as a positive imprint on the city.[14] In the context of the presented case and in other areas of the paper, multiple areas of the ethics embedded in construction material and systems choices emerged:

- Environmental Sustainability: This includes a range of public and private potentialities with respect to plant, animal and/or physical resources including strict preservation, 'enlightened' management for beneficial use with minimal degradation, ecological degradation or depletion.

- Labor Equity: Many materials are extracted and/or refined in economies dependent upon sweat shops or payment of less than living wages. Moreover, the triage of world economics tends to keep economic powers (governmental and corporate) powerful while creating a less than even playing field for 3rd world economies.[15]

- Governmental Context: Questionable human rights conditions and/or corruption affect many production economies.

- Property and Wealth Controls: Are circumstances of extreme deficiency the only situations in which an ethical concern arises? If: corruption, labor inequity, and human degradation exist – given that some economic activity benefit trickles down — is it not better to *not* make these an issue of architecture, but rather to pursue rectifying these politically? When ought we (as a nation or as a corporation or profession) cross the line to explicit action such as international embargoing of Cuba and Iraq, or creating 'social choice' investment portfolios such as those that led to withdrawal of investments from South Africa?

These concerns are intractable only if we allow them to remain so. But clearly they are larger than any one architectural project. Yet, the proposition raised here is that the embedded ethics and social justice of the material realization of architecture ought to augment the more typically considered design influences and expectations. In the academic setting, the issue may simply be to incorporate a continuous awareness of the justice impacts of architectural fabrication into the curriculum, and in practice to work toward making aesthetic and poetic choices that are also ethical and just.

NOTES

[1]Cecil D. Elliott, *Technics and Architecture: The Development of Materials and Systems for Buildings* (Cambridge: MIT Press, 1992), 2.

[2]Ibid., vi.

[3]John Perkins and Peter Coombe, "On Ethics: J. Max Bond and John Whiteman," *Practices*, v2, Spring 1993, Bond interview, 35-39.

[4]*Architecture*, June 1997, issue dedicated to "Digital Worlds." Page 85: "Virtual Environments, unbound by gravity and unhindered by economics, have turned today's architects into spatial Magellan's." Three years later, *Architecture*, September 2000, p. 93, the editors address translation into constructible habitats: "Digital architecture is straddling the line between vision and reality. ... The technical intricacies of how to build a computer age architecture, and what the results should look like, are quandaries occupying some of the keenest minds in contemporary architecture."

[5]Kenneth Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, ed. John Cava (Cambridge: MIT Press, 1995), 2.

[6]Colin Rowe and Robert Slutsky, "Transparency: Literal and Phenomenal," in *The Mathematics of the Ideal Villa and Other Essays*, Colin Rowe (Cambridge: MIT Press, 1976), 159-183, quote on 161.

[7]Colin Rowe and Robert Slutsky, "Transparency: Literal and Phenomenal (Part 2)," in *Architecture Culture 1943-1968: A Documentary Anthology*, ed. Joan Ockman, collab. Edward Eigen (New York: Columbia Books of Architecture/Rizzoli, 1996), 205-225, quote on 206.

[8]Gregory Palermo. The series of treatise citations is excerpted and revised from material originally developed by Palermo for *Ethics and the Practice of Architecture*, Barry Wasserman, Patrick Sullivan and Gregory Palermo (New York: John Wiley & Sons, 2000), pp. 82-85.

[9]Vitruvius, *The Ten Books of Architecture*, (1st-C, BCE), trans. Morris Hicky Morgan, (Harvard University Press, 1914), reprint (New York: Dover, 1960), 36.

[10]Ibid., 41.

[11]Leon Battista Alberti, *On the Art of Building in Ten Books*, (1452), trans. Joseph Rykwert, Neil Leach, and Robert Tavernor (Cambridge: MIT Press, 1988), 61.

[12]Andrea Palladio, *The Four Books of Architecture* (1570), trans. Isaac Ware (London: 1738), new intro. by Adolf K. Placzek, facsimile reprint of Ware ed. (New York: Dover, 1965).

[13]Gregory Palermo. The case example and subsequent analysis in this section is adapted and revised from material first developed by Palermo in "Architecture as Environmentally Embedded Social and Material Justice," Frances Bronet, guest ed., Daniel Sullivan, ed., *Contemporary Justice Review*, in production.

[14]Bill Bryson, "Sydney: On Top of the World Down Under," *National Geographic*, v198, n2, August 2000, 2-25. Green architecture is discussed on p. 18. The map supplement "Sydney Olympic Park: The Green Games," highlights the sustainability features built into the Olympic venues: new construction materials made of recycled waste, solar energy systems for the Olympic village and main boulevards, the capture and reuse of storm water for irrigation, protection of habitat, etc. For a mixed design review, see Anne Susskind, "Sydney," *Architectural Record*, June 2000, 55-ff.

[15]For a concise discussion, see Karen Lebacqz, *Six Theories of Justice: Perspectives from Philosophical and Theological Ethics* (Minneapolis: Augsburg Publishing House, 1986). Chapters 2, 4, and 6 identify social inequities and compare the justice perspectives of John Rawls, the National Conference of Catholic Bishops and the Marxist liberation theologian Jose Porfirio Miranda that attempt to redress them.

The Mobile Home and the Invention of the House-Machine

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Taking the mobile home as a case study and exemplar of the late-capitalist, technological vernacular, this paper focuses the "problem" of manufactured housing through the lens of modernism and modern architecture. The tension in modernism between "the ephemeral and the fleeting with the eternal and the immutable"[1] has instigated a series of conflicts in our conception of dwelling that can be read in the mobile home. Likewise, the intertwined social and formal agendas of modern architecture are especially evident in the aestheticizing of technology and function, two determinant factors of the contemporary mobile home. Yet in the face of the pervasive reality of manufactured housing and in spite of certain glaring social and environmental conditions which thereto appertain, the mobile home has been mostly absent from the concerns of cultural criticism and architectural discourse. Part of a larger study, this paper picks up the modernist threads of the mobile home lineage and traces the inter-linked developmental trajectories that come together in the contemporary manufactured home.

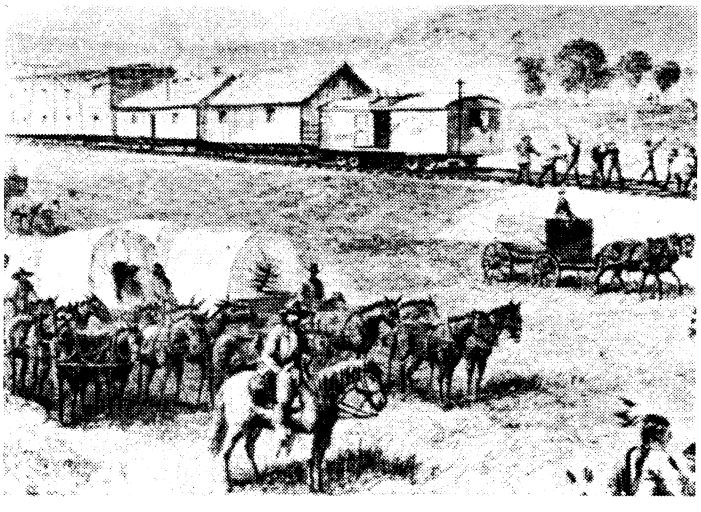

Fig. 1. "Maisons mobiles des pionniers américains." Techniques et Architecture. *November 1945.*

An article in a 1945 edition of the French journal *Techniques et Architecture* focusing upon American construction innovations and methods paid special attention to what it called the *Maisons Mobile*, the factory-built mobile home then gaining ground as both a recreational and long-term housing solution in the aftermath of World War II.[2] An illustration at the head of the article suggests a genealogy for that industrialized domicile in the redolent scene of the American frontier (figure 1). The caption reads "Maisons mobiles des pionniers américains" (Mobile homes of the American pioneers). In the foreground, we see a caravan of Conestoga wagons, scouts, and families with all their belongings in tow presumably on their 19th Century trek westward to claim a piece of the wild frontier; in the middle-ground, there is a farmer on a wagon, apparently filled with some harvest of grain, the Conestoga wagon having been converted at the end of its journey to other utilitarian purposes; and in the background, there is a crew laying railroad track, and following behind them a curious assemblage of dwellings on wheels, mobile dormitories and mess halls for the construction workers.[3] In the extreme lower-right corner, we see the Indians receding from the picture, having packed their tepees, we imagine, for transport to other lands.

As this example suggests, the temporary or movable dwelling has a rich history on this continent, deriving from both indigenous and European heritages, as well as from the speculative motives of nascent capitalists and New World entrepreneurs.[4] The image is unattributed (and appears to be cropped from an original), but we can interpret it in this setting as an allegorical depiction of transient dwelling in the westward migration across the American continent. While this portrayal of the mobile home, as contextualized by the French architectural journalists, would seem like mere fodder for mythologizing the American West, the forms represented here are also material facts that suggest something about the paradox of dwelling: the conflicting values of freedom and oppression, of mobility and rootedness that define simultaneous poles of modern experience. It is ironic as well that French architectural journalists should be looking toward a romanticized narrative of American continental expansion as the historical precedent for the mobile home which, in its own way, realizes the modernist thesis about the technological transformation of dwelling.

Comparison between European and American attitudes toward modernization can be useful, therefore, for assessing the hybridizations that were achieved in their respective domestic realms between the forms of the house and the machine. On both the European and American continents, enthusiasm for the machine, as

well as antipathies toward it, shaped the development of mass production housing, whether considered in the terms of those modernist estates intended for housing the European masses or of the suburban villas that multiplied to accommodate a burgeoning American middle class. The mobile home can be interpreted as a peculiar example of the intersection of those two housing models, manifesting both the ideals and failures of socialist and capitalist development.

One convenient source for tracing the modernist genealogy of the mobile home is in the work and polemical writings of Swiss-French architect Le Corbusier from the 1920s. Le Corbusier's famous declaration that "a house is a machine for living in" has been cited by both his defenders and opponents as a modernist rallying cry for a new architecture founded upon rational scientific principles as exemplified in machine technology.[5] In his manifesto, *Towards a New Architecture*, Le Corbusier extols the virtues of airplanes, automobiles, and ships as paradigms of functionalism, reason, economy, efficiency, and mass production. Le Corbusier applies that model of modern production to the problem of building and, in so doing, sharply criticizes the entrenched styles of the architectural academies. Le Corbusier praises, by contrast, the work of his generation of engineers who, unencumbered by the weight of history and tradition, are unselfconsciously constructing the infrastructure of the modern reality. Le Corbusier entreats architects to seize upon the engineer's example as the inspiration for a new architectural embodiment for the age, imbuing it with the architect's poetic capacity for imagining form, space, and light.

As a means of metaphorizing the anachronistic conditions of urban, architectural, and industrial design, Le Corbusier repeatedly posits the refrain of "eyes which do not see" as the cause of a symptomatic blindness toward the rational and expressive potentials of modern technology. As illustration, Le Corbusier presents photographs of agricultural and industrial structures in North America; and in chapters devoted to steamships, airplanes, and automobiles, he attempts to shift our attitudes about the house, our definitions of dwelling, and the functional requirements for habitation. In the steamship, he sees a well-planned city that floats; in the airplane, the solution to a problem well-stated; and in the automobile, a principle for production based upon the standardization and mass-production of parts. By contrast, he says, our cities and houses are encumbered by the fact that "[t]he problem of the house has not yet been stated."[6]

In his own formulation of the problem, Le Corbusier enumerates functional principles to guide the design of the house and elaborates a "manual of the dwelling" that combines expectations with instructions on hygiene, furnishings, storage, child rearing, light, ventilation, and economy. The effect of this new dwelling would be to eliminate all superfluity from the processes of daily life, to bring them into alignment with the efficiencies exemplified in the field of industrial production. Thus re-conceptualized as a product of rational planning and mass production, the house is a unit in the constitution of a new, lighter, and more adaptable social order intended to overturn the oppressive weight of received tradition. Lionizing this turn toward rationality, Le Corbusier states that:

> *"A house will no longer be this solidly-built thing which sets out to defy time and decay, and which is an expensive luxury by which wealth can be shown: it will be a tool as the motor-car is becoming a tool. The house will no longer be an archaic entity, heavily rooted in the soil by deep foundations, built 'firm and strong,' the object of the devotion on which the cult of the family and the race has so long been concentrated."*[7]

The machines that Le Corbusier chooses to carry his message of domestic transformation are all exemplars of a new mode of experience, a dwelling-in-motion that encapsulates the modernist obsession with movement and time. The steamship, the airplane, the automobile are all tools, or are becoming tools, which extend the domain of industrialization. Similarly, the domain of the house is instrumentally linked to the establishment of a new social order that fuses industrial reason with everyday life. Is it any surprise, therefore, that Le Corbusier's prototype of the new "House-Tool" is conceived as a hybrid of house and car? He called this architectural minotaur "Maison Citrohan" (figure 2):

> *"'Citrohan' (not to say Citroën). That is to say, a house like a motor-car, conceived and carried out like an omnibus or a ship's cabin. The actual needs of the dwelling can be formulated and demand their solution. We must fight against the old-world house, which made a bad use of space. We must look upon the house as a machine for living in or as a tool. . . . There is no shame in living in a house without a pointed roof, with walls as smooth as sheet iron, with windows like those of factories. And one* can *be proud of having a house as serviceable as a typewriter."*[8]

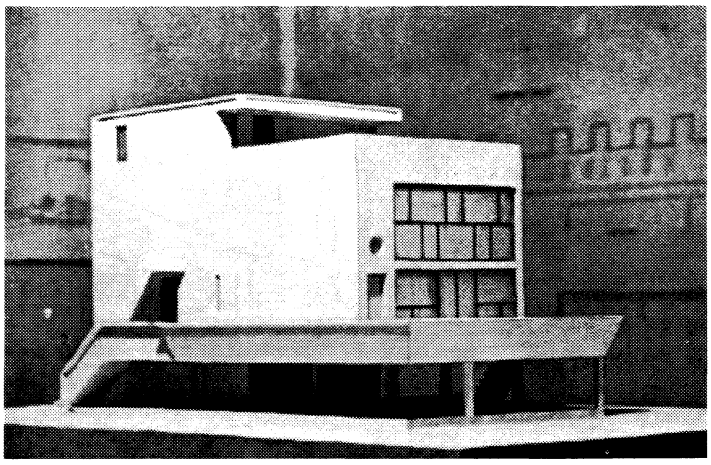

Fig. 2. Maison Citrohan. LeCorbusier. Towards a New Architecture, *1931.*

While the name "Maison Citrohan" may seem no more than a pun, it is interesting to note the precedents that Le Corbusier had himself drawn upon in making this typological fusion of house and machine.[8] According to historian Reyner Banham, Le Corbusier was aware as early as 1919 of the development of two prefabricated housing prototypes developed by the Voisin Company in an attempt to utilize their excess production capacity available from the completion of their aircraft contracts after World War I (figure 3).[10] Le Corbusier featured the Maisons Voisin in the pages of the sec-

ond issue of *L'Esprit Nouveau*, his review dedicated to promoting a range of interests pertaining to progressive culture.[11] Le Corbusier enthusiastically embraced the Voisin approach to the mass assembly of these wood-framed structures within a controlled factory setting, writing:

> *"... impossible to wait on the slow collaboration of the successive efforts of excavator, mason, carpenter, joiner, tiler, plumber...*houses must go up all of piece, made by machine tools in a factory, assembled as Ford assembles cars, on moving conveyor belts *(author's emphasis)."*[12]

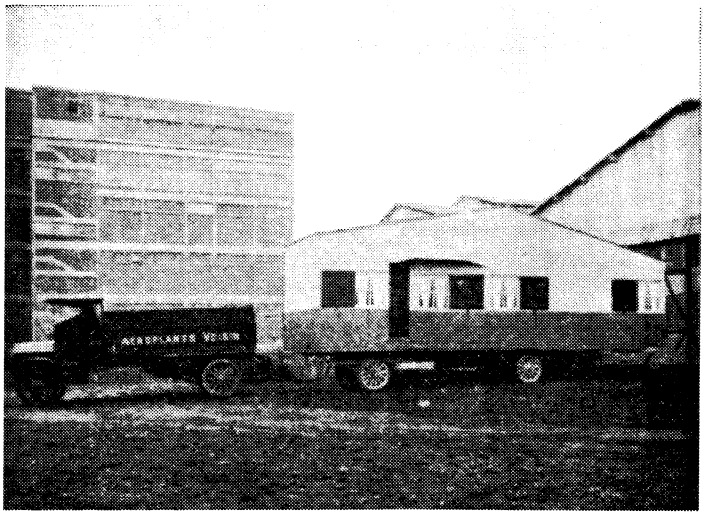

Fig. 3. Maison Voisin. LeCorbusier. L'Esprit Nouveau, *circa 1920.*

The Maison Voisin can be seen as a precedent, then, for Le Corbusier's own Maison Citrohan. Constructed on assembly line principles of airplane and automobile, the Maison Voisin was detached from the ground, lightweight, and mobile. Writes Le Corbusier:

> *"Up till now it seemed that a house must be heavily attached to the soil, by the depth of its foundations, the weight of its thick walls...It is no trick that the* Maison Voisin *is one of the first to mark the exact reversal of this conception....These lightweight houses, supple and strong as car-bodies or airframes, are ingenious in plan: they offer the comforts a wise man might demand. To inhabit such houses one needs the mind of a sage, animated by* L'Esprit Nouveau. *A generation is coming to birth that will know how to live in* Maisons Voisin. *"*[13]

At the same time that he asserts the potential of the machine-made house, Le Corbusier poetically domesticates the airplane, calling it "a little house that can fly and resist the storm." Banham notes that although the Maison Voisin does not appear in *Towards a New Architecture*, it is implicitly present throughout the text in Le Corbusier's arguments for mass production housing. The Maisons Voisin are remarkable in their resemblance to the mobile homes that would gain such a foothold in the United States after World War II. Le Corbusier's own prototype of the "House-Machine," the Maison Citrohan, as well as the epochal Villa Savoye of 1929-31, achieve an analogous, albeit metaphorical, mobility by being raised above the ground on *pilotis* and gain their "lightness" from construction executed in a manner to suggest an aesthetic of factory production.

For all of his rhetorical display, Le Corbusier was successful in crystallizing, in the form of the Maison Citrohan and in the polemic of the "House-Machine," a suggestive set of qualities capable of motivating the dialectic of modern architecture. What is foremost evident in Le Corbusier's argument in *Towards a New Architecture* is that something is being opposed: the house as "an archaic entity, heavily rooted in the soil by deep foundations, built 'firm and strong,' the object of the devotion on which the cult of the family and the race has so long been concentrated." What is being opposed is the whole gamut of a lived tradition that found psychic and bodily resonance in things and places. Le Corbusier's "House-Machine" promises to sever those relationships as a matter of social and economic progress. Le Corbusier predicts that:

> *"Machines will lead to a new order both of work and of leisure. Entire cities have to be constructed, or reconstructed, in order to provide a minimum of comfort, for if this is delayed too long, there may be a disturbance of the balance of society. Society is an unstable thing and is cracking under the confusion caused by fifty years of progress which have changed the face of the world more than the last six centuries have done."*[14]

Yet despite his most technocratic pronouncements, Le Corbusier's argument is infused with a longing for the reconciliation of scientific rationality with poetic experience. Interwoven with the idealism of his "architecture, pure creation of the mind" is the material evocation that "passion can create drama from inert stone." Le Corbusier's juxtaposition of reason and passion is an attempt to overcome certain conflicts of modernity, in which the oppressive logic of production seems to negate the liberating conduits of vision and expression provided by those new means.

Nonetheless, Le Corbusier's critics seized upon what they considered the dehumanizing tendencies of his "House-Machine." In a lecture delivered at Princeton University in 1930, Frank Lloyd Wright took-on Le Corbusier's conceptual schema, though never calling him by name. Railing against what he calls "the cardboard house," Wright parodies Le Corbusier's conceit of the house as a machine for living. Wright declares that:

> *"Now, a chair* is *a machine to sit it.*
> *A home* is *a machine to live in.*
> *The human body* is *a machine to be worked by will.*
> *A tree* is *a machine to bear fruit.*
> *A plant* is *a machine to bear flowers and seeds.*
> *And, as I've admitted before somewhere, a heart* is *a suction pump. Does that idea thrill you?"*[15]

Despite his bluster, Wright was himself not reticent to criticize the anachronistic styles of the architectural academies, and he certainly was an innovator in the development and exploitation of new materials and building techniques, so in some regards his criticisms of Le Corbusier may seem ironic. As early as 1901, he had articulated an embrace of the machine as an instrument of modern-

ization in a speech to the Chicago Architectural Club entitled "The Art and Craft of the Machine." In that speech, Wright declared that "in the machine lies the only future of art and craft" and that "the machine was the great forerunner of Democracy."[16] In the early 1900s, Wright's domestic projects gained substantial influence through wide dissemination in popular press such as the *Ladies' Home Journal*, which made Wright's and other architects' model house plans available to the public by mail order.[17] Likewise, Wright's work gained early exposure in Europe and exerted influence on the emergence of modern architecture through exhibition and publication of his projects in Germany in 1910. Wright's visit to Europe at that time and his exposure to projects of the European avant-garde cemented a reciprocal influence in his own work. By the 1930s, however, with the currents of influence again flowing in the opposite direction across the Atlantic, and embarking upon a new phase in his own phenomenal career, Wright struck a resistant pose to the onslaught of European modernism in America. Though included in Philip Johnson and Henry Russell Hitchcock's pivotal exhibition on the International Style at the Museum of Modern Art in 1932, Wright was polemically derisive of the European work, promoting his own approach to an "organic architecture" as the most appropriate alternative for the architecture of the New World.[18]

Wright's criticisms of Le Corbusier were based upon philosophical differences that contrasted his own predilection toward "organic simplicity" in the mingling of culture and nature with his antagonist's attitude toward scientific domination and control.[19] By his words, Wright was concerned, by the 1930s, about the human implications of the modernist boxes and worried that conceiving all of human praxis in mechanistic terms would have the deleterious effect of transforming humanity into that image. Wright suggests that:

> *"...we might now, for a time, make buildings resemble modern bathtubs and aluminum kitchen utensils, or copy pieces of well designed machinery to live in, particularly the liner, the airplane, the streetcar, and the motor bus... And we are afraid we are eventually going to have as citizens machine-made men, corollary to machines, if we don't look out?"*[20]

A similar sentiment had been voiced by Lewis Mumford several years earlier when he evaluated "The Age of the Machine" in the development of American architecture and civilization. He complains that:

> *"The end of a civilization that considers buildings as mere machines is that it considers human beings as mere machine-tenders: it therefore frustrates or diverts the more vital impulses which would lead to the culture of the earth or the intelligent care of the young.... The age of the machine has produced an architecture fit only for lathes and dynamos to dwell in: incomplete and partial in our applications of science, we have forgotten that there is a science of humanity, as well as a science of material things."*[21]

Mumford cites the work of Frank Lloyd Wright as an example of modernist work that, while incorporating the lessons of engineering, does not succumb to an emulation of the appearance of factory or machine. Mumford suggests that Wright's work like "the best modern work does not merely respect the machine: it respects the people who use it."[22]

Thus we can see that at a philosophical level, at least in the examples of Mumford and Wright, there is a deep ambivalence expressed toward the transformative tendencies of modernism; modernism, in this particular formulation, is looked upon with suspicion, as perhaps inevitable but to be guarded against in the preservation of perennial human values. Given Wright's spiritual affiliations with poets Emerson and Whitman and Mumford's narrative of the defeat of Romanticism by Industrialization, we can understand and contextualize the extreme form of anti-urban, anti-technological rhetoric that these arguments produce.[23]

What should be evident is that in the 1930s, at the advent of the era of the travel trailer – precursor to the mobile home – there existed at least these two contrasting attitudes about the relationship between the dwelling and the machine. Le Corbusier's poetic vision emphasized the technological transformation of the house as the realization of a "new spirit" of modern existence. That spirit valorized mobility and the transgression of old boundaries of social convention, and it liberated the building from the fixity of the ground to the extent that the automobile, the steamship, and the airplane were envisioned as new domains of human habitation. Inspired by the Maisons Voisin, houses on wheels manufactured like airplanes, Le Corbusier proposed the Maison Citrohan as an answer to the problem of housing in the industrial age. On the other hand, Wright affirmed the traditional relationship between dwelling and place, exemplifying the ideal of Jeffersonian democracy in the establishment of homesteads and the extension of civilization into the frontier. Contrasting the virtual mobility of Le Corbusier's domestic model, Wright declared that:

> *"Any building for humane purposes should be an elemental, sympathetic feature of the ground, complementary to its nature environment, belonging by kinship to the terrain. A house is not going anywhere, if we can help it. We hope it is going to stay right where it is for a long, long time. It is not yet anyway even a moving van. Certain houses for Los Angeles may yet become vans and roll off most anywhere or everywhere, which is something else again* and far from a bad idea for certain classes of our population *(emphasis added)."*[24]

For Wright, civilization demands fixity and roots, and he idealizes the house as a reflection of that ontological order. The house as a moving van, the mobile home, might only be appropriate, he suggests, for people of a particular *class*. Notwithstanding Wright's prophecies of the spontaneous emergence in the United States of an egalitarian culture, which he called Usonia, the specter of a distinct migratory class hangs over his vision of suburban utopia. Wright projected this vision in his 1935 proposal for Broadacre City (figure 4), a dispersed metropolis of distributed social rights integrating the technological reason of automotive transportation, telecommunications, and machine production.[25] In the southwest quadrant of Wright's master plan, on the edge of Broadacre City between small industry and the markets, we find what would have

been by then a ubiquitous feature of the physical landscape: the "tourist camp," precursor of the trailer park.[26]

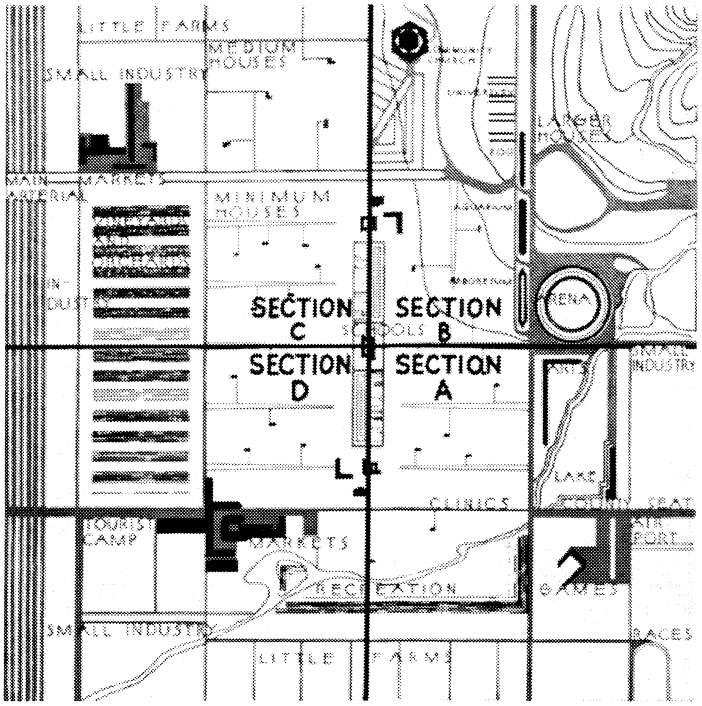

Fig. 4. Plan for Broadacre City, circa 1935. Notice the provision for "tourist camps" in the lower left quadrant. Frank Lloyd Wright. When Democracy Builds. *1945.*

In conclusion, therefore, this study registers the degree of ambivalence toward modernism and modernity that is evident in this country and that is revealed through the simultaneous social aversion toward and economic necessity of the manufactured house. Together, the idea and the image of the house trailer or mobile home elicit a kind of collective love / hate relationship that transcends reason. A final example, again drawn from history of the Great Plains, further materializes this dichotomy. As a requirement for homesteading in the West, settlers were expected to construct permanent shelters on their tracts of land. Often, the covered wagons or tents would serve as temporary shelters while the more permanent ones were constructed. One form of shelter, however, was associated with unscrupulous landgrabbers. Small, chicken-coop sized dwellings were constructed which "could be put on wheels and moved from one claim to another as needed, allowing the claimant to swear that a building stood upon his land."[27]

Whether it is a form of elitism pitting high culture against a technological vernacular; or the manifestation of class and regional antipathies; or even the expression of cultural prejudices regarding the dynamics of rootedness, mobility, and property values; it is evident that more is at stake in the mix than the mere choice between competing housing alternatives. Mobility, as an attribute of modernism, is both a promise and a threat, and the mobile home / manufactured house materializes that duality. As the manufactured house increasingly emulates the scenography of the suburban house, the suburban house – through its optimized construction techniques and geography of sprawl – looks more and more like the stereotypical mobile home. The mobile home, as repository of both positive and negative attributes of modernism, is symbolic of the social and spatial conflicts that pervade our itinerant landscape. For millions of Americans, it is also the place where they live everyday.

NOTES

[1]Charles Baudelaire, "The Painter of Modern Life," 1863 cited in David Harvey, *The Condition of Postmodernity* (Cambridge, MA: Blackwell), 10. Harvey characterizes modernity in terms of its oscillation between the opposing poles of transience and stability, which he argues conditioned the trajectory of Western cultural development.

[2]"Maisons Mobiles en Bois," *Techniques et Architecture*, (November 1945): 140.

[3]J.B. Jackson has described these structures as box houses, which were often used to accommodate railroad workers and other transient laborers. Box houses were one room wide, one storey tall, constructed without an internal frame, and were often transported by rail. John Brinckerhoff Jackson, *Discovering the Vernacular Landscape* (New Haven: Yale University Press, 1984), 98-99.

[4]Daniel J. Boorstin, *The Americans: The National Experience* (New York: Random House, 1965), 148-152. In the second volume of his American history trilogy, Boorstin cites the fact that prefabricated houses were shipped to the American continent from Europe as early as the 17th Century. The development of the balloon frame in the 19th Century allowed further advances in domestic standardization and greatly eased the process of assembly – and disassembly. Boorstin comments that "[e]ven before the invention of the balloon frame, foreign visitors had been amazed at how Americans moved their buildings about."

[5]Le Corbusier, *Towards a New Architecture*, trans. Frederick Etchells (1931, reprint NewYork: Dover Publications, Inc., 1986), 95. The classical canon of architecture, as received from the Roman-era treatise of Marcus Vitruvius Pollio, posits an analogical relationship among the body, the building, and the cosmos with the building serving as mediator between the microcosmic and macrocosmic domains. Le Corbusier's architectural theory, while establishing a dialectical opposition with certain formal attributes of classical order, nonetheless advances an argument for the reinterpretation of the "Lessons of Rome" based upon contemporary problems and means. In Le Corbusier's formulation, the role of the architect, ancient or modern, is to reconcile available technology and its rationality with the emotion and sensuality of the human body.

[6]Ibid., 110.

[7]Ibid., 237-263.

[8]Ibid., 240-241.

[9]Gilbert Herbert has noted that despite German architect and educator Walter Gropius' early proposals for mass produced housing in 1910, and Le Corbusier's possible familiarity with them, "...it is Le Corbusier, not Gropius, who ignites the imagination of a generation of architects; it is not the reasoned arguments of Gropius but the stimulating force of Le Corbusier's visual images, and the evocative power of his prose, that leads the Modern Movement in its drive for industrialization and standardization." See Gilbert Herbert. *The Dream of the Factory-Made House* (Cambridge, MA: The MIT Press, 1984), 38-39.

[10]Reyner Banham, *Theory and Design in the First Machine Age*, 2nd ed. (Cambridge, MA: The MIT Press, 1960), 221-222.

[11]Ibid., 208.

[12]Ibid., 222.

[13]Ibid.

[14]Le Corbusier, *Towards a New Architecture*, 101.

[15]F.L. Wright, "The Cardboard House," in *The Future of Architecture* (New York: New American Library, 1953), 159.

[16]F.L. Wright, "The Art and Craft of the Machine" (1901) in *Frank Lloyd Wright Collected Writings*, vol. 1, ed. Bruce Brooks Pfeiffer (New York: Rizzoli, 1992), 59.

[17]See for example G. Wright, *Building the Dream*, 158-176 for a discussion of the role that women's journals played in promoting the modernization of the American home.

[18]Leonardo Benevelo, *History of Modern Architecture*, vol. 1 (Cambridge, MA: The MIT Press, 1971), 247. For a discussion of this middle period of Wright's architectural career, see Sigfried Giedion, *Space. Time and Architecture* 5th ed. (Cambridge, MA: Harvard University Press, 1941), 396-427; Peter Blake, *The Master Builders* (New York: Alfred A Knopf, 1960), 352-356; Kenneth Frampton, *Modern Architecture: A Critical History*, 3rd ed. (London: Thames & Hudson, 1980), 186-191; and James Marston Fitch, *American Building: The Historical Forces that Shaped It*, 2nd ed. (Boston: Houghton Mifflin Company, 1947), 220-228.

[19]Henri Lefebvre, *The Production of Space*, trans. Donald Nicholson-Smith (Oxford: Blackwell, 1991), 43. Lefebvre states that: "It is arguable, for instance, that Frank Lloyd Wright endorsed a communitarian representational space deriving from biblical and Protestant tradition, whereas Le Corbusier was working towards a technicist, scientific and intellectualized representation of space."

[20]F.L. Wright, "The Cardboard House," 145-146.

[21]Lewis Mumford, *Sticks and Stones: A Study of American Architecture and Civilization* (1924; reprint, New York: Dover Publications, Inc., 1955), 187-188. It is only fair to note that in his 1954 introduction, Mumford backed away from these quasi-Luddite views, explaining, "...in the spring of 1923, meeting Patrick Geddes in New York for the first time, I fell under the spell of his sharp critical reaction against our machine-ridden civilization; and when I came to write this chapter [on "The Age of the Machine"] shortly after, I had not yet arrived at the balanced judgment I sought to achieve, in 1934, in *Technics and Civilization*."

[22]Ibid., 182.

[23]Wright's affinity for the Romantic poets is well-established, and he often quoted them. See, for example, his introduction to *When Democracy Builds* (Chicago: University of Chicago Press, 1945), i. In *Sticks and Stones*, Mumford devotes an entire chapter to "The Defeat of Romanticism."

[24]F.L. Wright, "The Cardboard House," 144.

[25]Kenneth Frampton cites Meyer Shapiro's critique of Broadacre City and its class implications: "[Wright] foresees, in fact, the poverty of these new feudal settlements when he provides that the worker set up his own factory-made house, part by part, according to his means, beginning with a toilet and a kitchen, and adding other rooms as he earns his means by his labor in the factory." Frampton, *Modern Architecture*, 186-191.

[26]F.L. Wright, "Broadacre City: A New Community Plan" (1935), in *The City Reader*, ed. Richard T. LeGates and Frederick Stout (London: Routledge, 1996), 379.

[27]Paul Oliver, ed., *The Encyclopedia of Vernacular Architecture Worldwide*, vol. 3 (Cambridge: Cambridge University Press, 1997), 1883.

BUCKY FULLER, CANDELA, AND F.L. WRIGHT: COMMONALITIES

Moderator: Alvaro Malo, University of Arizona

Fuller's Technological Utopianism is No Utopia

NATHANIEL COLEMAN
Wentworth Institute of Technology

Experiment:

Proving the Supposed Arbitrary Original

URSULA EMERY MCCLURE
Louisiana State University

Energetic Geometries:

The Dymaxion Map and the Transformation of Buckminster Fuller's Radical Pragmatism

THOMAS W. LESLIE
Iowa State University

Fuller's Technological Utopianism is No Utopia

NATHANIEL COLEMAN
Wentworth Institute of Technology

Yes, surely! and if others can see it as I have seen it, it may be called a vision rather than a dream.[1]

—*William Morris*

BUCKY FULLER AND BELLAMY

Let us, too, at least give ourselves a chance to vote to commit ourselves earnestly for the Design Science Decade approach to attaining Utopia. This moment of realization that it must be Utopia or Oblivion coincides exactly with the discovery by man that for the first time in history Utopia is, at least, physically possible of human attainment.[2]

—*Buckminster Fuller*

Inventor-architect Buckminster Fuller (1895-1983) proposed technological puritanism as the pathway to imminent utopia. Realization of this better world depends upon harnessing the remarkable productive capacity of a highly developed military-industrial complex, especially its aptitude for doing *more-with-less*. According to Fuller, the immense military build-up during the quarter century between 1945-1970 powered a technological advance, which had an unanticipated benefit to civilian life: a flood of consumer gadgets entering homes. These events, he imagined, promised a universally high standard of living that would assure world population survival. Ultimately, Fuller's proposal lacks a socio-political dimension: he believed that utopia *will* arrive as soon as industrial capacity shifts from arms development and manufacture to a focused preoccupation with the bio-technical conditions of planetary existence. He also argued that this shift alone, through what he called "design science revolution," would bring about the conditions he longed for. Fuller stressed that beyond managing lives free of want maximization of abundance would render all politics irrelevant. According to him, technological utopia would assure survival of the human species and its planetary home through what he called *ephemeralization*: doing more with less. Thus, Fuller's utopia is technological rather than social: he imagined that technology alone could alter conditions for the better. Beyond this, his social program is reductive and vague.

The weakest link in Fuller's program is the absence of some articulated method for shifting human interest away from military build-up toward maximizing abundance in the service of human comfort and survival. He must have believed that rationality would somehow win out over human passions, and that human beings would inevitably choose *his* world for a life without war and politics. There is, though, no suggestion of how these fundamental transformations are to occur. Instead, Fuller posits them as self-evident benefits of unintended ephemeralization, which is a product of the very industry he hoped to replace. Yet, because the design-science of military build-up makes possible abundance and a standard of living unimaginable prior to the 20th century, all of life ought to be modeled on its accomplishments. Developments associated with Aerospace technology, particularly the Russian-American space race, are among the most beneficial of these accomplishments. This is why Fuller proposed that dwellings should be air delivered by bombs that would plant them in the earth. Furthermore, these housing units would be self-contained and self-sustaining, in much the same way that airplanes and space capsules are.

In short, Fuller's program for "Utopia or Oblivion" is a proposal of economic efficiency that science and design threads through every aspect of human existence. His utopia is a state built upon maximization of a technological capacity for ephemeralization. In this utopian setting, it is possible to satisfy all desires, except for war and politics, which, in any event, abundance renders immediately obsolete. If Utopia is not achievable, oblivion is certain to be the outcome: a world of politics and military build-up *must* be self-annihilating.

Fuller's two possibilities, either survival through abundance, or annihilation as a result of political conflict, do sometimes seem to be the only options available to the human race. After all, for much of the period after the Second World War, the human race lived in daily fear that one or the other of the superpowers would obliterate the planet. It is also true that military competition between the superpowers made necessary a military build-up that ultimately bankrupted the Soviet Union, resulting in the fall of its political system. In the USA, this military build-up facilitated establishment of a war-like mentality that privileges economy and efficiency above all other values. Amongst it consequences have been development of a remarkable federal highway system, a dwindling of cities, and a rejection of ideas concerning social welfare. Now that nuclear annihilation no longer seems imminent, maximization of

abundance has become the only goal of almost all nations—regardless of the radical transformations this imposes on every day existence.

Faith in production overvalues the quantitative (scientific and industrial) while it undervalues the qualitative (social and emotional). So, in a sense, Fuller is correct: with the threat of oblivion abated, most humans appear happy enough to either exist in, or work toward, a utopia of affluence promising convenience. There may be nothing wrong with this; after all, the liberal dream has long been that self-interest and acquisitive desire would become a prophylactic against armed conflict and self-destruction. Passion and visions of a whole may be dangerous, but the coolness of scientists and the problem-solving competence of managers or industrial designers, portrayed as universal ideals of existence, guarantee only a smallness of conception and a blandness of result that negates the social in favor of the technical.

In sum, Fuller's utopia is a prognosis, not a utopia, which it shares with technological utopianism generally. It is a kind of futurology grounded so firmly in the present that what he envisioned was a version of existing reality extended into the future. As a glorification of a nearly verifiable potential already held within present reality, Fuller's utopia proposes little genuine change. This is a major shortcoming of technological utopianism: what it envisions will usually come to pass as a matter of course, but with no great overall benefit for individual or social life. Frampton recognizes this limitation when he argues that Fuller "could not bring himself to acknowledge that architecture and planning must, of necessity, address themselves to the class struggle."[3] This incapacity is also understandable in less doctrinaire, but nonetheless related terms, as a fundamental blindness to the social and emotional (rational and irrational) dimension of human being. It is a position that harbors the belief that optimization is capable of bringing about contentment. As a paean to optimized technology, Fuller's technological utopianism is far less critical of what *is* than the utopian potential explored in this paper.

BELLAMY AND MORRIS

Technological utopianism has a long tradition, especially in the USA where an ethos of progress is nearly interchangeable with earlier notions about perfectibility. During the 19th century, notions of possibility became inextricably entangled with desires for ever expanding material progress, a conflation encouraged in large part by the industrial revolution and Westward expansion. The stories of this positivist dream include technological utopias. One of the most popular of these stories was Edward Bellamy's (1850-1898) *Looking Backward* (1888), which is in many ways a precursor of Fuller's ideas.

As a well-known representative of technological utopianism, Bellamy's *Looking Backwards* provides an opportunity to elaborate on how such utopias are fundamentally different from the notion of utopia discussed in this paper. Additionally, their shared genre links Fuller to Bellamy across time. Similarly, a contemporary of Bellamy's, William Morris (1834-1896), illustrates a contrasting vision of utopia in his *News From Nowhere* (1890), which is nearer in spirit to this study.

Bellamy's book, with its dream of optimized technology and an industrial army of productive economic units, predates Fuller's vision of the liberating potential of *design science*, as much as it apparently underpins it. Bellamy's book and Fuller's beliefs, summarized in his essay "Utopia or Oblivion" (1964), share a similar faith in *progress*—human potential to *manage* resources and gain *total* control of the universe. Morris's utopia is suspicious of progress and the mechanization of life.

Morris argued against Bellamy's belief that *organized* work of *any* kind is liberation. For Morris it is not the *quantity* of work (production) that is crucial but rather the *quality* (character) of the experience of labor that is most significant. Disalienated labor, such as Morris calls for, demands a social context made up of its practice, as well as by the setting *of* and *for* this; work under these conditions is not so much optimized as humane. Whatever its limitations, *News from Nowhere*, proposed by its author as a corrective to Bellamy's *Looking Backward*, articulates a call for a human realm made out of engaged experience and interdependency based on a more complex social foundation than work (or productivity) alone can provide.

A crucial difference between Morris's thinking and Bellamy's, and between Fuller's and the kind of utopias discussed later, exists between how *centralization* and *decentralization* are treated. Centralizing perspectives envision utopia as immanent, as a potential that could shortly be brought into being by some calculated effort. This type of thinking characterizes Bellamy's writing—not to mention Marx's and Engels', whose project, far more than Bellamy's, is grounded in a combination of political action and optimized industrialization. Bellamy recognizes utopic promise in technology alone, much as Fuller does. What *all* these projects share is a vision of a world where conflict is at a minimum and unmet need is nonexistent, thus it is the character of the result that distinguishes them.

Marx and Engels in common with Bellamy believed that centralization is key for realization of utopia, whereas Morris (and Ruskin) saw decentralization as necessary for restoration of a good (disalienated) society.[4] Fuller views centralization as inevitable because for him the universe is finite—and thus controllable. Mastery of nature and world unification are inevitable. A spreading energy grid is, for Fuller, both example and catalyst of this. Because the sources of electricity are linked globally, industrialization and with it the *good life* will follow; recognition of this by *world citizens* will ultimately render politicians and individual nations obsolete. With the disappearance of both war will cease—*all* as a benefit of globalized industrial production. Such a view of immanent reality, although updated by Fuller, is akin to the world presented by Bellamy in *Looking Backward*. Morris's difficulties with Bellamy's book are argued in the following:

> *The only safe way of reading a Utopia is to consider it as the expression of the temperament of its author. So looked at, Mr.*

Bellamy's Utopia must still be called very interesting as it is constructed with due economical knowledge, and with much adroitness, and of course his temperament is that of many thousands of people. This temperament may be called the unmixed modern one, unhistoric and unartistic.[5]

Morris draws attention to three points: 1. Bellamy's based his utopia on an extension of present technique (economics); 2. As such, what Bellamy proposed was conformity to status-quo brought to an extreme; and 3. Because of the first two, Bellamy's utopia emphasizes progress to the exclusion of tradition and imagination. A fourth point, the first Morris makes, warns against reading utopia's apart from their authors. Although this limits the universality of such expression, it also hints at a crucial emotional dimension often lost when a utopia is looked at as a *game plan*. Morris's warning is applicable to utopias generally, including his own. It is the first three points, though, which are most important for distinguishing characteristics that illuminate the limitations of Bellamy and Fuller's technological utopias.

Bellamy believed that his project was a viable blueprint for a better life. His utopia requires extreme centralization that makes the nation "the sole producer of all sorts of commodities." Much like Fuller, centralization would continue to expand until an "eventual unification of the world as one nation" is complete. This would have "economic advantages over the present system of autonomous nations," as a natural result of management efficiency. This nation, and the world-nation to follow, will be led by "the general-in-chief, who is the President," who gained his position by passing through all the grades of "the industrial army;" a body responsible for the production of all goods in a manner akin to Fuller's vision *of doing infinitely more-with-less*. Bellamy argued that his utopia would be "a paradise of order, equity, and felicity." Its inhabitants would be docile workers trained for the jobs they could best perform.[6] Morris, though, derived little comfort from Bellamy's statement that, "*Looking Backward* was written in the belief that the Golden Age lies before us, not behind us, and isn't far away."[7] Morris writes:

In short, a machine-life is the best which Mr. Bellamy can imagine for us on all sides: it is not to be wondered at then that his only idea of making labor tolerable is to decrease the amount of it by means of fresh and ever fresh developments of machinery. . .... I believe that the ideal of the future does not point to the lessening of men's energy by the reduction of labour to a minimum, but rather the reduction of pain in labour *to a minimum.*[8]

By making a sharp distinction between quantity of labor and the character of labor, Morris positions *quality* of experience as the central concern of utopia. Bellamy's and, by extension, Fuller's unwillingness to address this issue, beyond prognostication of optimized survival as a result of world resource management and human effort in work, calls attention to the exclusively technological, rather than social, dimension of their thinking.

As it was for Gropius during the early days of the Bauhaus, architecture was (and could become again) a model for disalienated social experience. Because of this, architecture has the potential to embody numerous characteristics in common with *good societies*. It shelters the other arts and life while it makes a place for them. Art and life form architecture, and it informs them. And architecture is a result of communal effort. Morris articulates this unified conception of architecture, art, and society in the following:

A work of architecture is a harmonious co-operative work of art, inclusive of all the serious arts . . . Now, these works of art are man's expression of the value of life, and also the production of them makes his life of value: and since they can only be produced by the general goodwill and help of the public, their continuous production, or the existence of the true Art of Architecture, betokens a society which, whatever elements of change it may bear within it, may be called stable, since it is founded on the happy exercise of the energies of the most useful part of its population.[9]

As optimistic as he was when he began working, once Morris acknowledged the failure of art and craft to bring about social change, he came to believe that realization of a good society could only come about after violent revolution. The disappointing fact that the high quality of his firm's crafts effectively priced them out of reach by all but the rich fed this conviction. In *News from Nowhere*, Morris depicts a newly re-unified society that rises out of the ashes of the old one—brought down by revolution. In the book he describes a utopia that responds to the instability of the latter half of the nineteenth century by proposing a future society rooted in an apparently more stable past—the medieval. When he wrote *News From Nowhere*, Morris saw terrible misery all around him arising side by side with the factory system, the development of sham needs for an excess of poor quality goods, and the final destruction of craft's traditional role by industrialization. Throughout, he argued that a radical transformation of existing conditions must occur before society can again become a ground of renewal for labor, art, and craft.

TECHNOLOGICAL UTOPIAS ARE NOT SOCIAL UTOPIAS

Morris's disillusionment and subsequent radicalization paralleled his coming within the orbit of Marx's influence. His earlier belief that a joy of labor in craft production could, on its own, disalienate society at large transformed into a conviction that exemplary works of art can only arise out of a stable society. And a return of the stability necessary for exemplary art and life to emerge is only possible through a violent overthrow of conditions that encourage instability by overvaluing progress. Morris's forward-looking stance from a radically conservative position in the past is a utopian paradox that he presents and Northrop Fry sorted out:

It looks as though it were the distinctive social function of the creative mind to move in the opposite direction from the politico-economic one. This means that he [William Morris as a Creative mind] may have to face the charge of being reactionary, but cultural developments in time, as in space, seem to go in opposition to the political and economic currents. The creative tendency is toward the prerevolutionary, back to a time when, so to speak, Socrates and Jesus are still alive, when ideas are still

disturbing and unpredictable and when society is less vainglorious about the solidity of its structure and the permanence of its historical situation.[10]

Frye's objective is to establish *return to a time of potential in order to go forward* as a general theme of reform. By doing this, he prepares a frame for examining Morris's reform project as a particular development of this theme. In short, reformers project their thought back to a time when potential wholeness could be wrought from uncertain conditions. By doing so, they gain a position from where they can see a *truly* reformed future. For Morris, this time resides with the medieval:

Morris's 'medievalism' has precisely this quality about it of moving backward from the present to a vantage point at which the real future can be more clearly seen. I have noticed from my study of the Bible how these backward-moving pastoral myths seem to be the other side of a genuinely prophetic vision, looking beyond the captivities of Egypt and Babylon to a recovery of long lost innocence. The fact that the innocence may not have been lost but simply never possessed does not impair the validity of the vision: in fact it strengthens it.[11]

Recapture of conditions long lost that never *actually* existed may, according to Frye, be the most distinctive characteristic that distinguishes utopias with a *thick* social dimension from technological utopias with their tendency toward schematic extension of present conditions and emphasis on economic and technological potential. If the first express hope by situating desire for the future as the recovery of a lost past, the second attempt to supersede the present by following it to what appears its most extreme and logical end. Frank E. Manuel makes a very specific distinction between Utopian thought and other types of projects. His definition is neither too restrictive nor does it impose a checklist of quantifiable determinants for recognizing utopias, what it does do, though, is make it quite clear that what Bellamy and Fuller envision is *not* utopia:

The utopia should perhaps be distinguished from the religious millennium because it comes to pass not as an act of grace, but through human will and effort. But neither specific reforms of a limited nature nor mere prognostications of the invention of new technological gadgetry need be admitted. Calendar reform as such would not qualify as utopian: but calendar reform that pretended to effect a basic transformation of the human condition might be.[12]

Morris models a utopian temperament of the kind argued for in this paper. But my objective in the preceding is not so much to propose Morris as the prototype of utopian thinking, rather, he provides a framework for thinking about the role of utopian imagination in the invention of architecture, which he embodied and Manuel describes above.

A paradox of Morris's utopia—and of utopias generally—is that they propose radical changes that would overturn existing conditions if they came about; at the same moment, utopias envision a time of calm when individuals will no longer be alienated from one another, their cities, the earth, or their labors. The apparently radical objective of utopia—overthrow and transformation of the present—actually veils a much more conservative, in the sense of traditional, interpretation of social conditions—a quality shared as much by Marx as by Morris, but not by Bellamy or Fuller.

NOTES

[1]William Morris, "News From Nowhere" (1890), in *News from Nowhereand Other Writings* (London: Penguin, 1993), 239

[2]Buckminster Fuller, "Utopia or Oblivion" (1964?), in *Utopia or Oblivion: the Prospects for Humanity* (New York: Bantam Books, 1969) 292

[3]Kenneth Frampton, *Modern Architecture: A Critical History*, 3rd. ed. (London: Thames and Hudson, 1992), 191

[4]The writings I am considering here include John Ruskin "The Nature of Gothic" (1853), "Unto This Last" (1862), in *Unto This Last and Other Writings*, in ed. Clive Wilmer (London: Penguin, 1985), 77-109, 161-228. William Morris, "News From Nowhere" (1890), "The Lesser Arts" (1882), "Gothic Architecture" (1893), "Review of Looking Backward" (1889), "Preface to Nature of Gothic" (1892), "Foreword to Utopia" (1893) in *News From Nowhere and Other Writings*, ed. Clive Wilmer, (London: Penguin, 1993), 43-228, 233-254, 331-348, 353-358, 367-369, 373-375. Edward Bellamy, *Looking Backward* (1888), ed. Cecilia Tichi, London, Penguin, 1986. Karl Marx and Friedrich Engels, *The Communist Manifesto* (1888), trans. S. Moore (New York: Washington Square Press, 1964), "Socialism: Utopian and Scientific" (1892), trans. E. Aveling, "Critique of the Gotha Program" (1875), in *Marx & Engels: Basic Writings on Politics and Philosophy*, ed. Lewis S. Feuer (New York: Doubleday, 1959), 68-111, 112-132.

[5]William Morris, "Review of Looking Backward" (1889), in *News From Nowhere and Other Writings*, ed. Clive Wilmer (London: Penguin, 1993) 354

[6]Edward Bellamy, *Looking Backward* (1888), ed. Cecelia Tichi (London: Penguin, 1985), 83, 117, 144

[7]Ibid. 234

[8]William Morris, "Review of Looking Backward" (1889), in *News From Nowhere and Other Writings*, ed. Clive Wilmer (London: Penguin, 1993) 357

[9]Ibid., "Gothic Architecture" (1889), 331

[10]Northrop Frye, "The Meeting of Past and Future in William Morris"(1982), in *Myth and Metaphor*, ed. R. D. Denham (Charlottesville: University Press of Virginia, (1991) 1990), 337-338

[11]Ibid., 337-338

[12]Frank E. Manuel, "Toward a Psychological history of Utopias in *Utopias and Utopian Thought* (Boston, MA: Houghton Mifflin Co) p. 70

Experiment:
Proving the Supposed Arbitrary Original

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Louisiana State University

In 1954, Felix Candela introduced the notion of the Supposed Arbitrary Original. What follows shall be a discussion of this notion and its' relevance to contemporary practice and education.

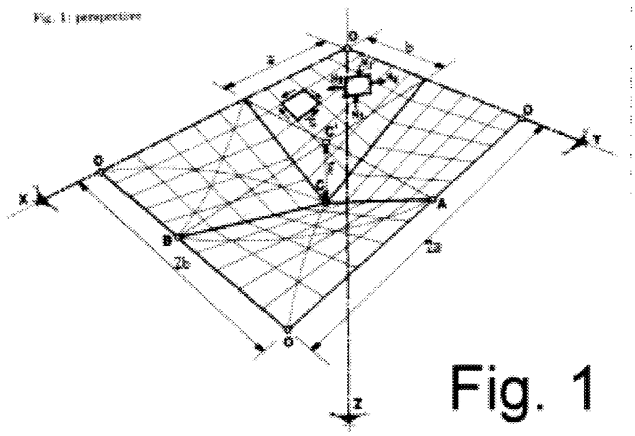


Fig. 1

"It is forgotten that mathematics is only a means,... but that the rigidity and precision of mathematical reasoning can not guarantee us the exactness of the results of its application because we must always begin from a supposed arbitrary original." [1]

—Candela

We possess a standardized kit; we choose from bricks, wood balloon frame and standard steel sections. As a result, the imaginative forms we see on the boards, in reality, often dull by comparison. It is time to question the materials kit the same way we question building forms. By experimenting with the kit, questioning the standards, we can substantiate new construction methodologies and as a result, realize the Supposed Arbitrary Original through the very real experiment of building. A scientist proposes a hypothesis as provisional conjecture to guide an investigation in light of established facts. To prove the hypothesis, the Supposed Arbitrary Original, one experiments. To experiment is the act of testing a supposition in order to discover something not yet known. Will it pass? Will it fail? How does one judge the results? By testing until the point of failure, the scientist can establish the parameters of the supposition. What makes it true and what makes it false? As a premise, building design professions also begin with the Supposed Arbitrary Original: I have an idea; I want to build it. Unfortunately, it seems we have forgotten what it means to experiment.

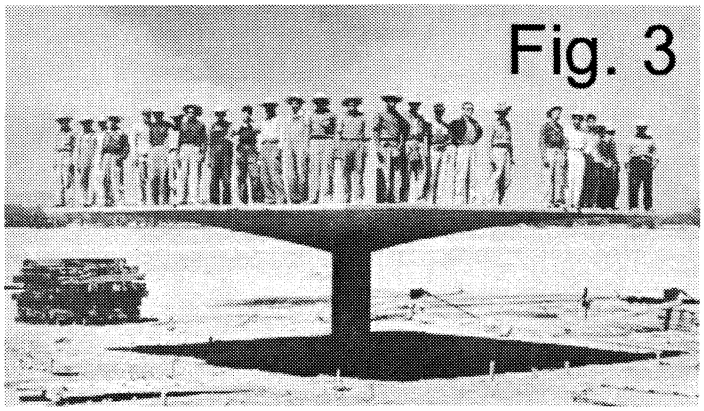
Fig. 2

"I sometimes allow myself to fancy that progress of the structural technique could have taken place by means of the natural evolution of intuitive and experimental methods employed with such amazing success in the Middle Ages and the Renaissance. Perhaps such a development. .....could have led to a better use of the properties of the materials, for the problem might have been approached more openly, without the blind faith that it may be solved by mathematical procedures. The most fitting forms are not, as a general rule, easy to investigate.....; hence their use has been neglected in favor of less appropriate solutions that are easier to analyze." [2]

—Candela

The experimental method provides a structure to explore and investigate the unknown of that which is not understood. It utilizes deductive reasoning to frame, perform, and analyze the experiment. It utilizes inductive reasoning to interpret, conclude, and generalize the results. This combination of accumulated experience (deductive) and personal decision (inductive) to research a hypothesis is applicable to our profession. Architects practice the art and science of designing and erecting buildings: the designing - our hypothesis, the making - our experiment, the building - our proof. Undoubtedly, our profession and education system consistently hypothesize new forms. Instead of making through experimenta-

tion, however, we assume the methods of construction to be predetermined by existing standards and requirements. This assumption belies the hypothesis because the variables it adds to the experiment can corrupt, contradict, and/or subvert the results. If architects are going to substantiate a Supposed Arbitrary Original, they must be willing to experiment towards its proof.



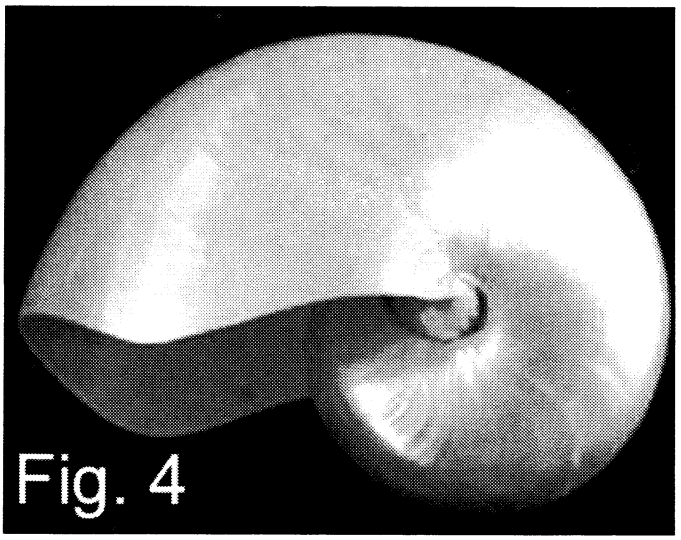
" I am a practical man, because I have no choice. I must be practical in order to survive and therefore I choose only to build structures that I can calculate myself. Of course there are many opinions regarding the question of calculation, and it is a highly personal problem how far one is to calculate. Myself, I believe that if the structure stands up with the simple calculations I make, that is enough."[3]

—Candela

To illustrate how the experimental method is applicable to the profession of architecture one only has to look at Felix Candela. Born in 1910 in Madrid, Spain, he received his architectural education from the Escuela Superior de Architectura de Madrid. While in school he developed a proclivity for geometry and began to tutor his fellow students. This experience coupled with a fascination for the stability of structures gave him the confidence to pursue shell design. Familiarizing himself with the theoretical basis of the current methods of calculation for indeterminate structures, Candela initially felt that mathematics was the key to understanding. In 1936, upon graduation, he received a scholarship to pursue his study. The Spanish civil war came however and he joined the Republican Army. Refusing to join Franco's Spain, in 1939 he was forced to seek safety in Mexico. Upon arrival he was appointed as an architect of a Spanish colony north of Chihuahua, but after a few years the position dissolved. He relocated to Mexico City and worked as a draftsman. As soon as he was able, he brought his family over and with them founded Cubiertas ALA, a roof construction company. It was at this time that his interest in shells resurfaced and he began to experiment.

"Nature's most usual way of performing this function is by means of either rigid shells or elastic membranes. Since this second form can hardly be considered as architectonic, "shell" remains a synonym of space enclosure and the title of this essay (Shell as Space Encloser) appears to be somewhat redundant."[4]

—Candela

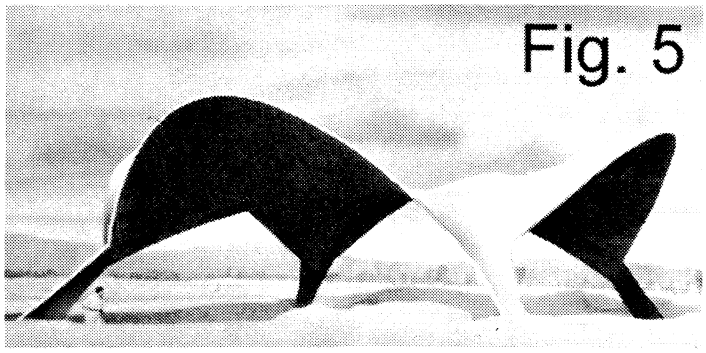


Historically, Candela is described as the multi-faceted practitioner – Architect, Engineer, Builder (Contractor). Candela as the Experimentalist, however, is what defines him. It is his foresight to experiment in the plasticity of form that establishes his contribution to all three of the aforementioned practices. Intrigued with shell design from the onset, he conceived a Supposed Arbitrary Original around the spatial structures of concrete shells. Candela supposed shells could be an economical way to cover space if they were sensibly designed, and concrete was the only practical and economical material that could capture the fluidity of the shell form. In order to prove this to himself, he fervently studied the geometry of the shell and the capabilities of the material, analyzing their relationships in order to bring out the full potential of the structure. He did this acknowledging that since the advent of the Mathematical Theory of Elasticity experimental knowledge no longer validated structural design. It had to be mathematically proved before one could be allowed to occupy it. Finding the mathematics pseudo-scientific and unable to account for the behavior of the material, he almost gave up his research for fear of failure and lack of acceptance. Intuitively inspired, however, by the pictures of Maillart's Zurich Exposition shell, in 1951 he abandoned his caution and began to construct experimental shells. "One must be sure he is building something which can stand."

Following these physical proofs, he received his first public commission, The Cosmic Rays Pavilion for UNAM, the National University of Mexico. In order to allow cosmic rays to penetrate the building, Candela constructed two hyperbolic paraboloidic vaults along a principal parabola that he stiffened with three arches. This form allowed him to pour the thinnest roof that had ever been constructed: 5/8" at the crown increasing to 2" at the springings. The pavilion, though small, had quite a presence and was the first public validation of Candela's Supposed Arbitrary Original. His experiment had paid off and, within the realm of his initial hypothesis, he spent a career developing, enhancing, constructing, and educating.

"The essential function of architecture is to limit a volume from the non-architectural extent of open space, so that within it man may develop his living activities undisturbed by weather inclemency's. The unique feature which distinguishes architecture from other plastic arts is precisely this dealing with internal hollow space."[5]

—Candela



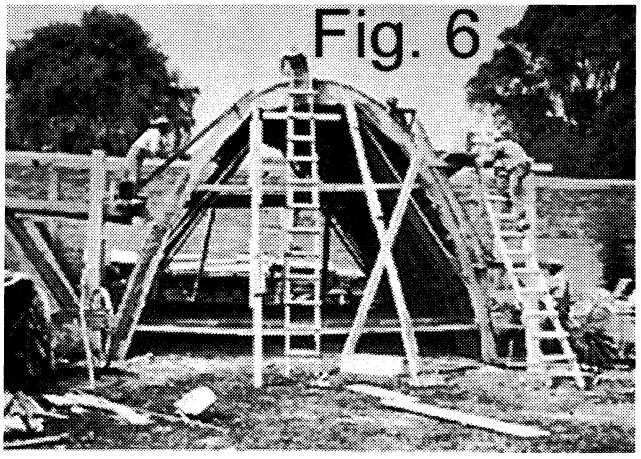
Submitting the winning entry in a competition, Candela's second commission was La Iglesia de la Virgen Milagrosa (1954). This commission, granted because it would be economical to construct, became much more than an efficient structure. Building on the technological knowledge he had acquired from his test shells and the Pavilion, Candela added another variable to his experiment: spirit. Here the hyperbolic paraboloidic shells, clustered like a flock of origami birds, designate the ecclesiastical program. Along the minor axis, they distinguish the nave from the aisles. Along the major axis, their crimped joints ascend towards the altar establishing monumentality. This delineation of spaces combined with the reflection of the stained glass along the ribbed formwork surface and the contorted slender columns that pin this church, almost pure roof, to the ground exhibits Candela's ability to combine structure with poetic expression. As a building, La Virgen Milagrosa can be seen one of the most successful modern spaces to capture the gothic spirit. For Candela, his Supposed Arbitrary Original that shells can provide cover combined with his professional duties to delineate hollow space resulted in an individualistic architectural statement.

"This inquiry has never been more pertinent than now when a monolithic material which can be cast in any desired form has become of common use in building. Reinforced concrete is not only very akin to the stuff of natural shells, but it has even the advantage of being able to withstand substantial stresses. These properties of continuity and tensile strength of reinforced concrete place before us a unique opportunity to emulate the distinctive economy of material of natural methods of enclosing space."[6]

—Candela

As stated in the rules of the experimental method, besides the supposed arbitrary original (for Candela, the shell) and the acquired knowledge (architectural education and research), one must also have the means with which to execute the experiment. For Candela, concrete provided the means of execution. It is a monolithic fluid material able to capture any imagined form and when reinforced it possesses the ability to resist substantial tensile stresses. Candela acknowledged that combined, these qualities emulated the characteristics of natural shells. He also understood that the material was subject to many chance variables and so in order to control them, his experiments had to be full-size. Thus each project was an experiment where, upon completion, he interpreted and generalized the data and then utilized it to inform the next test. One only has to look at one of his later works to see the results of this ever-widening research.

The restaurant, Los Manantiales at Xochilmilco (1958), serves as a prime example. Completed twenty years after his initial test shell, Candela considered it the culmination of his research. A 1 1/2" thin continuous surface undulating in the shape of a lotus flower and spanning 150 feet, Los Manantiales stands free of the cumbersome details that marked his early works. It is edge-free: marred by no rim beams or stiffening ribs. It is all that a shell should be: thin, taut, continuous, graceful, and light.



"Now I am asked to do other things about which I don't know anything. I am being asked to cover very large areas because it is said. 'This man does beautiful small shells': so they ask me to build a 500 ft. shell. Of course I can't do it, I have to begin to think again and this is a terrible problem because thinking is one of the most painful tasks that one can have. It is incredible the amount of work that people do in order to avoid thinking."[7]

—Candela

Seeing Los Manantiales as the proof of his Supposed Arbitrary Original, Candela used the results to complete just a few more concrete shells. For him, the capabilities of the hyperbolic paraboloidic concrete shell had been exhausted. He did not stop experimenting, however, reluctant though he was. In 1964, he collaborated with Enrique Tamborrel and Antonio Peyri to design and construct the Olympic Stadium (1968) for the Mexico City Olympics. Composed of copper plates, steel structure, and concrete struts, this 500' span geodesic dome represented a new phase of experimentation. To adapt to the new circumstances Candela utilized the knowledge acquired from proving his initial hypothesis and enhanced it. For Candela, within the familiarity of anyone's existing realm, new ideas could be supposed and then substanti-

ated. One could argue that the expansion of our realm has outpaced the expansion of our familiarity. In our struggle to grasp the parameters of our new existence, a reliance on certain tangible standards has begun to belie our progressive hypothesis.

"On the other hand, in times of plenty there is a tendency toward mental slothfulness. We have already every conceivable kind of material, and their properties are continually improving. Why should we trouble to look for new forms or worry about design when it is so much easier to demand just a little more resistance of a certain material." [8]

—Candela

It can be said that Candela did not trouble to look for new forms. The forms he began with originated from one genus (nature) and then he placed them in another (architecture). It is only in their assimilation that they evolve into something other: the other, a result of his experiment, his demand for just a little bit more from a material combined with applied imagination and knowledge. Technology advances in the past 20 years have expanded exponentially the origins of the Supposed Arbitrary Original. Revolutionary hypotheses occupy our two-dimensional and three-dimensional virtual worlds. In comparison, Candela's seems childish. Shells make space. At the time, however, it too was considered revolutionary. He had to experiment with making to substantiate his Supposed Arbitrary Original. The experiments served to prove his point. Imagine if the contemporary origins, intents, and forms also experimented with new methods and materials. Together, they would assure the achievement of a determined and desired architectural expression.

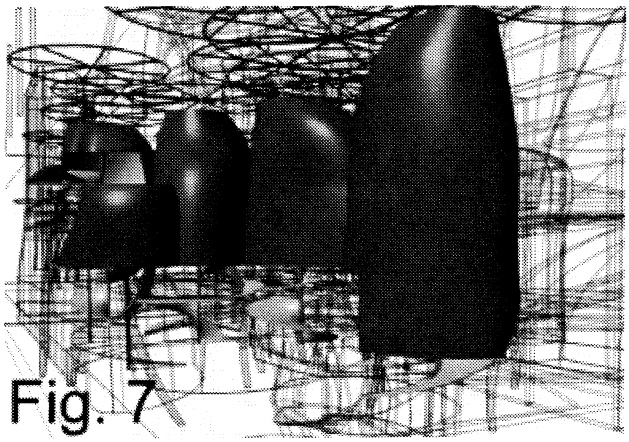


Fig. 7

"Quoting the older aphorism 'Function creates the organ' (which curiously enough links the words that name both outstanding trends of the modern movement) a well known postulate of functionalism states that 'Form follow function'. But architecture is not made with words, and in the practical application of both sentences it is often forgotten that the creation of new forms can only take place by means of structure." [9]

—Candela

In the age of computers, architects Suppose Arbitrary Originals continuously. As hypothesis however, they often seem to be conjectures concerned mostly with testing origins and form and not with testing the physical. This is substantiated by their relegation to virtual reality or if they do in fact get built, the use of the existing construction and materials kits belies the hypothesis. If the proofs of Supposed Arbitrary Originals are the structures we make, the making too must be guided by the supposition. To design and build need not be separate in our profession. For every imagined new environment we must also imagine how it comes to fruition. We must question how we make structures the same way we question origin and intent. Felix Candela was an architect. He had an idea and he wanted to build it. To do so he experimented through making to acquire the knowledge to prove his Supposed Arbitrary Original.

"If a rebel was able to produce such beautiful and sound structures there could be nothing wrong with becoming a rebel myself." [10]

—Candela

HYPOTHESIS

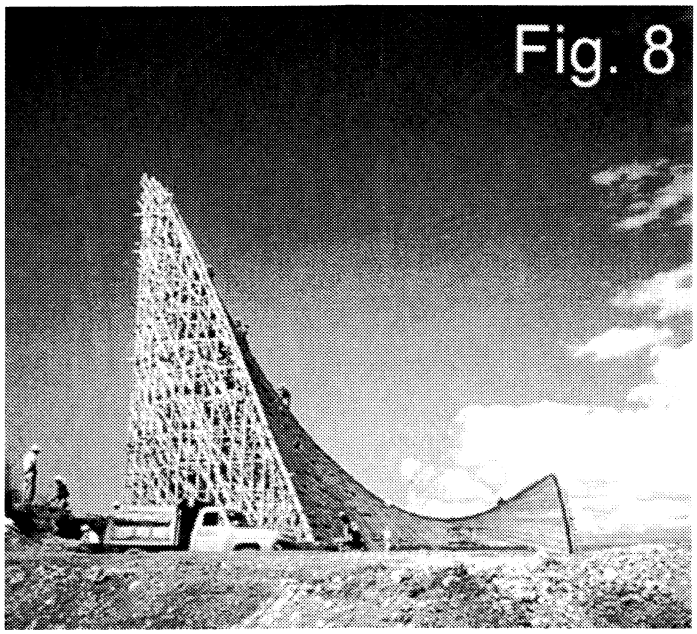
As our access to information becomes hyper-access, the building professions could be on the verge of a construction renaissance. As the creators of boundaries, the protectors from the outside, we are responsible for constructing shelter. In order to transform, reform, and imagine new environments, we must be able to Suppose an Arbitrary Original and be willing to experiment for its *Proof.*

What are the contemporary parameters of proving the Supposed Arbitrary Original?

Does fear of failure (the premise of experimentation) prohibit the questioning of construction materials and methods?

Can we teach future generations to utilize the scientific method of discovery?

How do we gather support for experimentation from our peer professions and industries?



"Man is capable of many kinds of bravery: the least noted of these are the new structures he builds."[11]

—McCoy

NOTES

[1]Felix Candela, "Toward a New Philosophy of Structures," Student Publications of the College of Design, North Carolina State (1954): Vol. 5 # 3, 2-12

[2]Felix Candela, "The Shell as a Space Encloser," Proceeding, Conference on Thin Concrete Shell, MIT (June 1954)

[3]Felix Candela, "Shell Structure Development", The Canadian Architect, (Jan 1967): Vol.12, 33-40

[4]Felix Candela, "The Shell as a Space Encloser," Proceedings, Conference on Thin Concrete Shell, MIT (June 1954)

[5]Ibid

[6]Ibid

[7]Felix Candela, "Shell Structure Development", The Canadian Architect, (Jan 1967): Vol.12, 33-40

[8]Felix Candela, "Toward a New Structure," Architectural Forum, (1956)

[9]Felix Candela, "The Shell as a Space Encloser," Proceedings, Conference on Thin Concrete Shell, MIT (June 1954)

[10]Colin Faber, Candela/ The Shell Builder (Reinhold Publishing Corporation, 1963)

[11]Esther McCoy, "Mexico Revisited (II): The Presence of Candela," Zodiac (1963): Vol.12

ILLUSTRATIONS

Fig. 1 Hyperbolic shell diagram. Colin Faber. Candela/ The Shell Builder (Reinhold Publishing Corporation. 1963)

Fig. 2 Renaissance Alchemists. Author unknown

Fig. 3 Test Umbrella. Colin Faber

Fig 4. Seashell

Fig. 5 Guadalajara Sales Office. Colin Faber

Fig. 6 Test Shell. Colin Faber

Fig. 7 Digital Rendering of a Student Project. Columbia Abstract 95-96

Fig. 8 Formwork for Cuernavaca Chapel. Colin Faber

Energetic Geometries:
The Dymaxion Map and the Transformation of Buckminster Fuller's Radical Pragmatism

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Iowa State University

"Inertia, unchallenged, promotes careless philosophy."
—R. Buckminster Fuller, "Fluid Geography, a Primer for the Airocean World"

R. Buckminster Fuller's appearance on the cover of Time magazine in January, 1964, with a geodesic dome for a head and surrounded by the artifacts of his career, presents us with a complicated figure, for the works displayed fall into an awkward intermediate range between visionary schemes and historical artifacts. Evidence of Fuller's early career, notably the Dymaxion Car and Houses of the 1920s and 1930s, seem quite out of place in the context of the geodesic domes, tensegrity structures, and streaking, futuristic jets filling the rest of the frame. Particularly the car, whose development and spectacular demise bankrupted Fuller entirely in 1936 reminds us of the striking discontinuity between Fuller's pre- and post-war work.

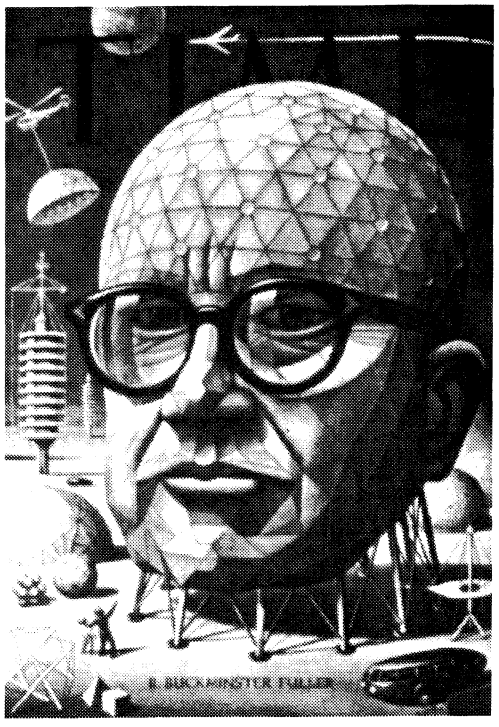

Fig. 1. Time *Magazine, January 10, 1964.*

Such an apparent inconstancy between these two careers—Fuller as the Dymaxion American and as the Geodesic Guru—points toward a fundamental problem in understanding his career and life as a whole. While architectural historians have tended to dismiss his later work as anti-architectural, his disciples have appeared unwilling to critically assess his earlier work, or to meaningfully relate his output to contemporary culture. As I hope to demonstrate, it is precisely the reconciliation of these two modes that presents Fuller in the most sympathetic light. By understanding his work as transitional, that is, placed between the objectivism of the Machine Age and the systematization of the post-war era, one can see Fuller as more deeply rooted in the conception of architecture as a responsive entity to changing technological culture than most designers of his time.

GEODESIC THEMES IN THE DYMAXION PROJECTS

Fuller's career through WWII was almost entirely devoted to the twin precepts of his Dynamic Maximum concept—speed and efficiency. Rooted in his early experience with naval aviation trials, and in the financial failure of the Stockade building system he proposed with his father-in-law, the projects of 1927-46 reflect an almost pathological desire to transform the medieval nature of the construction industry. The early 4-D house, later dubbed the Dymaxion, was Fuller's most complete pairing of naval and aeronautical design with domestic accommodation. "Technology," he would later write, "advances far more rapidly at sea" (1). Fuller's obsession with structural efficiency, here translated into a central mast with guy wires supporting hexagonal floor and ceiling plates, was a neat restatement of nautical and airship engineering principals, in which weight was a primary concern.

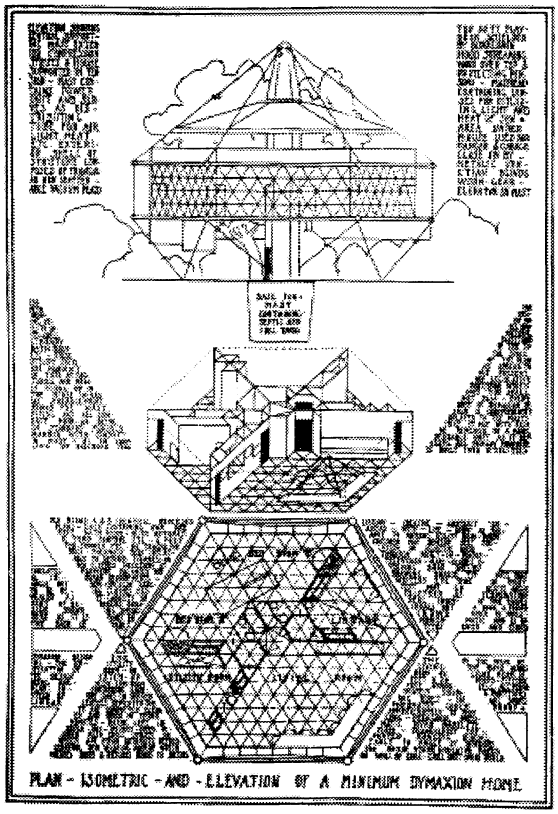

Fig. 2. R. B. Fuller. Minimum Dymaxion Home. 1929.

The equation of the dwelling with air and sea vessels was to have two profound effects on Fuller's development, in addition to a compelling visual influence on his work. First, the notion of a floating structure, buoyant in a fluid air or water ocean, became a major interest. Based in part on his knowledge of airship trials at sea in the 1920s, Fuller began to equate the liquid ocean with the atmosphere—what he would come to refer to as the "Airocean". Early sketches of the Dymaxion vehicle reveal this intent—filled with buoyant gas, the early version of the car would have complemented the mobile delivery of the accompanying Dymaxion House by combining flotation and jet thrust into an "omnimedium" transport.

A second vital ramification of this ship/land/, air/ocean equation was the idea of a transportational network, originally based in Fuller's knowledge of shipping lanes and oceanic geography. The suggested transportation of the early 4-D tower via airship (later replaced by somewhat more feasible aircraft delivery in the Dymaxion House) reveals the first proposal of a global delivery network. No longer constrained by rails or roadways, the omnimedium transports of Fuller's early career were largely informed by the free movements of trans-oceanic shipping and flight. This realization that the world was moving from "wire to wireless" and "track to trackless" was to have a profound influence on his later production, in which the maximization of the economic and social viability of the earth's surface would become paramount (2).

The traditional view of Fuller's career holds that the culmination of this "Dymaxion" period came with the Wichita House of 1944-46. This project, undoubtedly one of his best known and the one that placed him closer to the ideal of the industrialist/architect than any other, does appear to neatly sum up the Dymaxion philosophy and aesthetic, and to essentially clear the slate for Fuller's postwar geodesic investigations. Proposed to the Beechcraft Company, the Wichita House combined Fuller's interest in the efficiency of aeronautical structures and materials with a new found interest in the efficiency of assembly. The resulting package would have been neatly transportable anywhere in the U.S., as evidenced by a "Dymaxion Industrial Strategy Map" derived by Fuller based on distances from production facilities (3). For Fuller, the obvious comparison to his apparently inevitable success was the failure of the industry to accept his earlier "Stockade" building system, and the lightweight construction of the Wichita House can be seen as a powerful challenge to traditional bearing construction (4). In fact, the House was a professional and conceptual dead end for Fuller—panicked on the eve of its mass production, Fuller delayed the project by requiring new studies of the processes involved and the project collapsed. It would instead fall to a radical transformation of the House's stretched skin, combined with the global geometry of Fuller's Airocean concept, to fulfill his hopes of combining transport and lightweight structures into a commercially successful system.

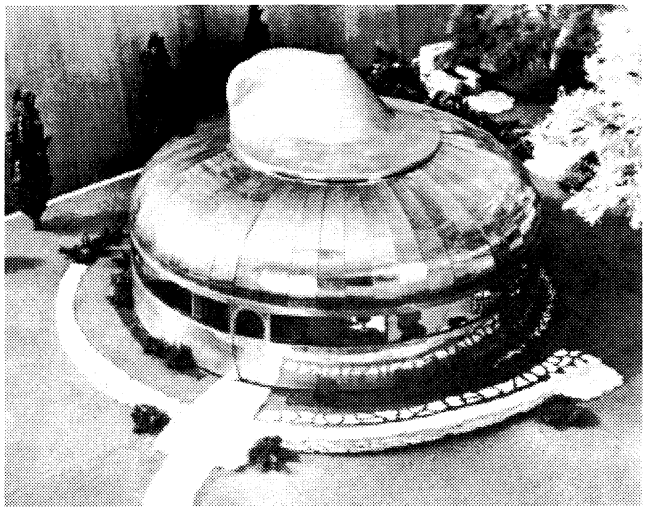

Fig. 3. R. B. Fuller. Wichita House. 1945. Final model.

THE DYMAXION MAP AND THE TRANSITION TO GEODESICS

The seeds of Fuller's later success had in fact, by the time of the Wichita House debacle, already been sown in an often overlooked project for a "Dymaxion Map," published by Life magazine in 1942. It was this exercise in cartography, rather than the more popularized Wichita House, that truly indicated the transition on Fuller's part from the mechanical paradigm of his earlier, "Dymaxion"

projects to the network models of Geodesics. Fuller's map involved a comprehensive view of the Earth's surface, free from distortion, that would eliminate the hierarchy of polar-oriented projections. Traditional cartography had projected landmasses onto map planes from a single point, usually the Earth's center, with the result that distances and shapes away from the point of tangency between the mapping surface and the Earth's sphere were necessarily distorted. Additionally, the classic projections such as the Mercator were often laid out to suit political, rather than geographical, hierarchies. For pre-twentieth century travel and navigation, these projections had sufficed. To Fuller, however, they represented outdated technology and an archaic, western-centered view of global economics. "The world's land masses," he wrote, were now "a one-world island at the bottom of the air-ocean" (5). Mariners could traverse the sky-oceans as well as those of the sea, necessitating recognition of the geometrically efficient great-circle routes of air transport. The great circle was to fundamentally alter the economic geography of the planet, placing a novel importance on the Polar Regions as air traffic routes between the hemispheres—thus rendering the Mercator projection and similar cartographic artifacts obsolete. Fuller described the problem using a typically military example:

> *"People are learning that 'via the North Pole' is the shortest great circle distance from America's midst to the center of population of the world. But when people were told that Tarawa represented the first major gain in the direction of Tokyo, they were not well enough versed in their geography to realize that an announcement that the Marines had taken the North Pole would have put the United States closer to Tokyo's center, and that the Marines were actually further from Tokyo than Chicago is from London" (6).*

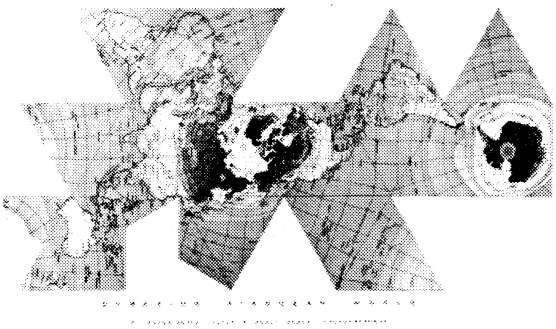

Fig. 4. R. B. Fuller. Dymaxion Airocean World. 1956 version based on icosahedronal geometry.

The original Dymaxion Map consisted of a series of linked squares and triangles, each with sides of 3600 nautical miles. When folded together, these shapes created a rough approximation of a sphere. Within each facet was a locally projected image of the earth's surface, such that a folded map would approximate the appearance of a globe. When unfolded, the map presented in two dimensions a usable representation of the earth's surface without the distortions or cultural focus of traditional cartography. Because each projection was "local", or centered on one facet of the map, no point on the globe would have been more than 2600 miles away from a point with common tangency to both the map and the earth's surface. In the Mercator, the poles—according to Fuller the most important areas in the new Airocean world—were in fact an infinite distance away from the tangent line of the equator, and therefore infinitely distorted. The Map had the additional advantage of suggesting the graphic equivalence of all global regions, opening up the polar areas of the great circle routes to proper geographic understanding.

The Dymaxion Map's importance as a transitional work in Fuller's career lies not only in its cartographic clarity, however, but also in the dual nature of its conception. Derived from his obsessions with naval and aeronautical technology, yet containing within it the seeds of the spherical/faceted geometry of geodesics, the equation of the vehicular, fluid ocean world to the abstract realms of mathematically derived networks marks the fundamental revelation of Fuller's career. Whereas design experiments in fluid motion had previously been confined to the streamlining exercises of Raymond Loewy, Norman Bel Geddes, *et al*, the recognition of the global Airocean network itself as a primary model for architectural production moved Fuller from the visual, stylistic realm into the mathematical. The revelations contained in this project forced Fuller to drop his exercises in comparatively visceral, industrial metaphors, and to pursue what would become his most enduring series of project. No longer based in visual or metaphorical comparisons to fluid vessels, the Geodesic artifacts reveal instead a consuming interest in the abstract, mathematical imperatives such vessels represented on a global level for architecture, urban planning, and design.

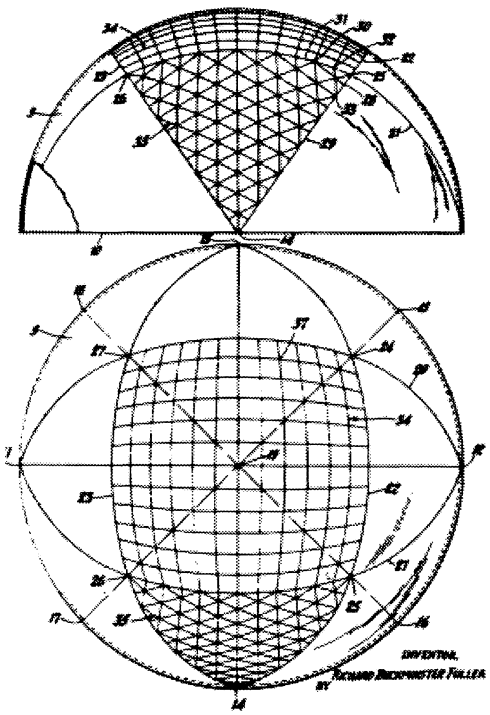

Fig. 5. Dymaxion Map Patent. 1946 showing facets of sphere along great circle routes.

It was during a studio at Black Mountain College in 1948 that Fuller first attempted a "great circle dome", or a structure whose load bearing members took the form of a sphere's arrayed circumferences. By bending flat strips into circles, and attaching them at a series of geometrically determined vertices, Fuller hoped to demonstrate the potential for creating spherical form out of linear members, eliminating the need for complex fabrication of curved components. This idea was an imperfect transformation of the Dymaxion Map into built form, for while it adopted the geographically interesting great circle concept on which the Map was partly based, it failed to match the Map's concept of an efficiently faceted sphere. Instead, the first dome's attempt to use bent linear elements to achieve a spherical form substituted geometrical logic for structural, and the result was a predictable collapse of the entire 45-foot structure upon presentation to the school. The "great circle" members, simple venetian blinds, lacked the structural depth necessary to withstand the gravity and bending forces introduced by the spherical geometry, and when the scaffolding was removed, the sphere simply folded in upon itself (7).

Fuller was to construct or propose a series of transitional domes between 1949 and 1955 that corrected the mistaken structural assumptions of the first great circle dome. The secret lay in Fuller's gradual realization that the great circle geometry, essentially providing statically inefficient *linear* members, could be refined by a system of panelized, triangulated facets that would enable the entire *surface* of a spherical construction to perform structurally. Both gravity and point-live loads would be transferred throughout this system, with tremendous redundancy achieved simply by the number and distribution of panels. The completed dome would therefore act as a monolithically static shape, though with a fraction of the weight, as each panel would substitute a trio of lightweight linear members for a heavier, planar panel. Such a construction would also provide a unique efficiency in that the structure and enclosure could occupy the same space, eliminating the need to allow separate areas for frame and cladding.

Fuller's first series of domes confirmed the parallel development of the geometrical and geographical intents of the Dymaxion Map. Between 1950 and 1955, Fuller led studios at several universities in which the stated program was the construction of a "geoscope", or a sphere onto which the shapes of continents would be projected. When placed such that the locale of the geoscope was aligned vertically under the night sky, an observer could stand within the structure and by looking towards any part of the globe see a portion of the celestial sphere as it would be seen at that site at that moment. Plans for a 200' diameter public geoscope across the East River from the United Nations were drawn up by Fuller, in which military reconnaissance would have played a unique peacetime role, generating precise imagery for display on the map (8). The image of the aircraft in this scenario, caught between mechanical functions of the camera/airframe and electronic location finding methods is a compelling one, as it demonstrated Fuller's growing vacillation regarding contemporary vehicular technology.

GEODESICS AND FULLER'S LATER PHILOSOPHY

The migration of the Geodesic Dome through both industrial and corporate culture in the 1950s and 60s provides a neat overview of Fuller's relationship to the burgeoning military-industrial complex during the era. Initially, his work at MIT drew the interest of the Army, who asked him to carry out a series of experiments involving portable shelters. The easy assembly of the domes in question, and their light weight, made them ideal choices for the purpose, as they could be air-dropped via helicopter and assembled quickly by infantry in a combat situation. These trials led to the dome's ultimate test, in the role of a portable aircraft hangar. Images of these trials, in which helicopters lifted domes out of aircraft carriers, flew them across ocean and surface terrain, deposited them on site, and then landed and taxied into them, were the public's first introduction to the Domes. They were compelling enough on their own to launch Fuller's career as a Geodesic guru, and the realization of the air-delivery method, some thirty years after the 4-D house proposal and only a decade after the Wichita House fiasco remained a powerful illustration for Fuller late into his life.

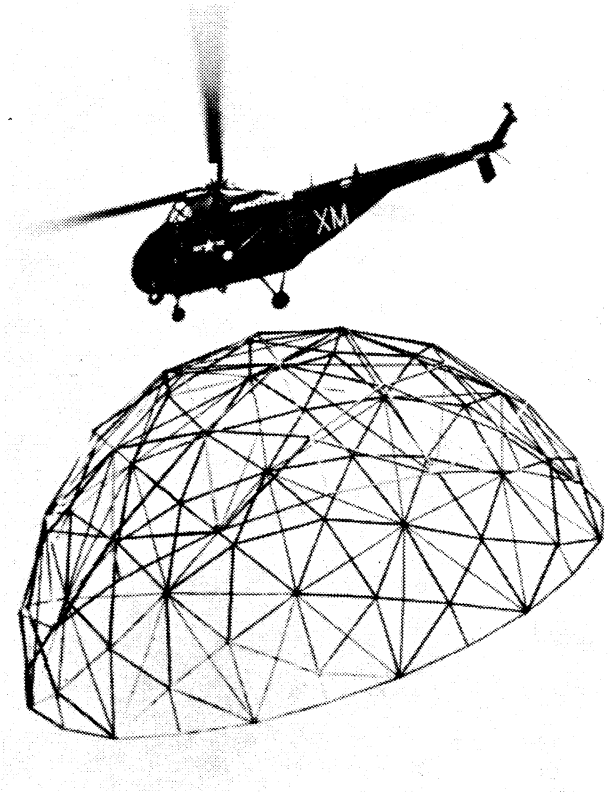

Fig. 6. Military test of Geodesic Dome, ca. 1954.

Geodesic domes were actually installed worldwide as the enclosure of choice along the United States' Distant Early Warning electronic warfare front. The spherical form of the domes provided maximum structural transparency for radar devices scanning the arctic sky for incoming Soviet missiles, and the ability to fly these domes into remote, often-mountainous regions suited the concept perfectly. While the commission of several dozen structures in this

project realized Fuller's concepts of global, great circle delivery, structural efficiency, and mass production, the exponentially increasing technology of the ICBM and the parallel development of global radar systems also found a visual ally in the abstract image of these domes seen against stark arctic landscapes. Their role in the popular perception of the Cold War, including a brief appearance in Stanley Kubrick's Dr. Strangelove, portrayed Fuller's greatest achievement as a purely military advance, an association from which he would gradually distance himself.

Fuller found instant success in the civilian milieu as well. Perhaps the greatest single achievement of the Geodesic concept was the construction in 1957 of the Union Tank Car Dome in Baton Rouge, Louisiana. The structural efficiency of the dome was here demonstrated to dramatic effect by a 384-foot clear span, larger than the previous record spans of St. Peter's in Rome and the Pantheon. By this time, a 100-foot travelling version of the dome had made its first expositionary appearance, delivered by a single DC-4 to a trade fair in Afghanistan, and erected in under 48 hours. The function of symbolic enclosure for economic and cultural exhibits was to become the Dome's most enduring legacy, particularly at Expo 67 in and in a largely forgotten proposal for covering the 1964 World's Fair in New York with a mile-wide dome covering nearly 650 acres (9).

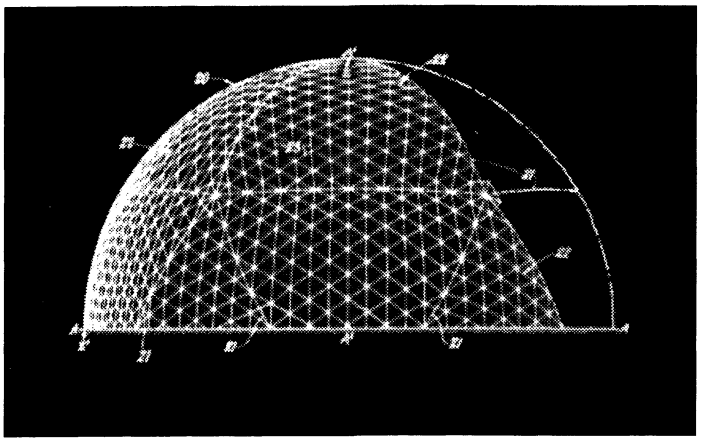

Fig. 7. R. B. Fuller. Geodesic Dome Patent Document. 1954.

One might expect that Fuller, age 65 at the time of his 1959 appointment at Southern Illinois University, would have been content to enjoy the long-overdue success of his industrial vision. Instead, he actually accelerated his theoretical production throughout the 1960s and into the 1970s, during which he proposed his most challenging schemes yet. In 1962, while on a visiting professorship at Harvard Fuller noted that it was a year

> *"...of transition of comprehensive technology from dry land into sea and into sky, from visible to invisible, because more-with-lessing, through transistors, metallurgy, chemistry, electronics, and atomics transfers all basic controls to invisible ranges" (10).*

It is to Fuller's great credit that, having served as self-appointed supervisor of humankind's transition into an industrialized society, he so quickly recognized the massive paradigm shift that occurred in the 1960s. The advent of electronic computing, the exponential advancement of vehicular and infrastructural technologies, and the growing presence of satellite-fed worldwide communications networks all forced Fuller to radically alter his thesis of Dynamic Maximization. Previously concerned primarily with economic and production efficiency, he now embarked on a series of projects which pushed social and ecological factors to the forefront, again seeing his commissioned site as the entire planet, but now understanding that site as far more than the profit-linked vectors of his Dymaxion Strategy and Map. The continuing ephemeralization and global distribution of geodesic structures was matched, on Fuller's part, by a willingness to envision the planet as a collection of dispersed data points—connected to, but not fully represented by, the shipping and transport links of his cartographic projects. Toward this end, it is possible to see his post-1960 work as a vision of a Geodesic world rather than a Dymaxion one, in which the deterministic vectors of infrastructure and capital were to give way to a non-hierarchical, ultimately efficient network of distribution for economic and physical resources. The instantaneity of electronic communication, coupled with rapid advances in air-ocean transport, shrunk the globe of "spaceship earth" even as Fuller's geodesic spheres were expanding their scale and dispersion.

The vision of a resource-engineered "spaceship earth", in which locally dependent communities could rely on the responsible engineering of other sites for their own benefit, was a succinct statement of the "think global, act local" mantra of the burgeoning environmental movement. Intriguingly, the military-industrial complex, once his primary source and client, came to be in Fuller's mind the fundamental evil of American society, the major source of material waste and resource inequality in the world. In response to this inefficiency, Fuller proposed a military-style assault on substandard living conditions throughout the globe, introducing the idea of World-Gaming, or the mathematical modeling of all available inventory and distribution methods, as a counterforce to existing conditions:

> *"A vast overabundance of this...cosmic energy income is now technically impoundable and distributable to humanity by presently known technology. We are not allowed to enjoy this because...government bureaucracies and...big business can't find a way of putting meters between these cosmic energy sources and Earth's passengers, so nothing is done about it." (11)*

Fuller's later philosophy can be usefully broken down into three distinct arguments encompassing the relationship between technology, architecture, and society— the importance of a universally scaled consciousness, the now reconfigured cultural and technical imperatives of ephemerality and velocity, and the demand that all "design" achieve demonstrable socio-objective performance.

The most immediate point of this trinity is that of universality. Based on Fuller's continuing obsession with global geometry, the conception during the 1960s of a planetary architecture was symbolic of the cultural revelation that the entire planet could be considered a site for intervention. Global interdependence would

lead, inevitably, to the environmental colony approach inherent in Fuller's so-called "giant projects":

> *"Today the world is my backyard. 'Where do you live?' and 'What are you?' are progressively less sensible questions. I live on earth at present, and I don't know what I am. I know that I am not a category. I am not a thing—a noun. I seem to be a verb, an evolutionary process—an integral function of the universe" (12).*

The idea of the human population as a system of "verbs on earth" is a compelling one, as it implies not only a global call to ecological action, but also an intricate realization of the geodesic network on an infinitely refined, but planetary scale. The dissemination of humanity as agents of positive change, each representing a point of action on a geodesic "Strategy Map" recalls the ultra-efficient mesh of global colonization proposed by the Wichita House. Here, though, such a non-hierarchical organization displays powerfully the sea change in Fuller's politics, as it simultaneously proposed the interdependence and independence of individuals in a global system.

Fuller's post-1945 work also advanced the two Dymaxion notions of ephemeralization and velocity towards new levels of societal engagement. His earlier projects had focused on lightweight architecture as a pure goal of structural performance and on speed as a factor in the economic viability of the Dymaxion delivery systems. However, after 1945 these ideas became linked in the realm of the subatomic, which Fuller adopted as a basis for an entirely new synthesis of his earlier world views with contemporary achievements in physics. While Fuller had, at best, an incomplete understanding of relativity, its metaphors of constant velocity and flux had profound implications for his architecture. Relativity proposed a post-Newtonian world, in which the stuff of matter was to be relentlessly questioned, leading to the dismissal of statics as a useful tool in theoretical physics. In Fuller's 1970 essay, "Architecture as Sub-Ultra Invisible Reality", he proposed what he saw as the ultimate consequences of relativity in the physical world:

> *"Despite the fact that they fool themselves into believing so, humans do not build structures with materials. As now informed by our electro-magnetic spectrum discoveries, we must recognize that man assembles visible module structures with sub-visible module atomic events. Physics has failed to discover solids, or continuous surfaces, or straight lines, or any solid materials. Physics has discovered only kinetic events. There are no things"(13).*

The transition of the physical world from "things" to "kinetic events" implied not only a new conception of matter, but also a translation of the models upon which architecture might be based. In projects such as the Manhattan Dome, for example, Fuller suggested that the elements of such a structure might be reduced in proportion to such a great extent that they would become invisible, more in the realm of energy links than actual structural members.

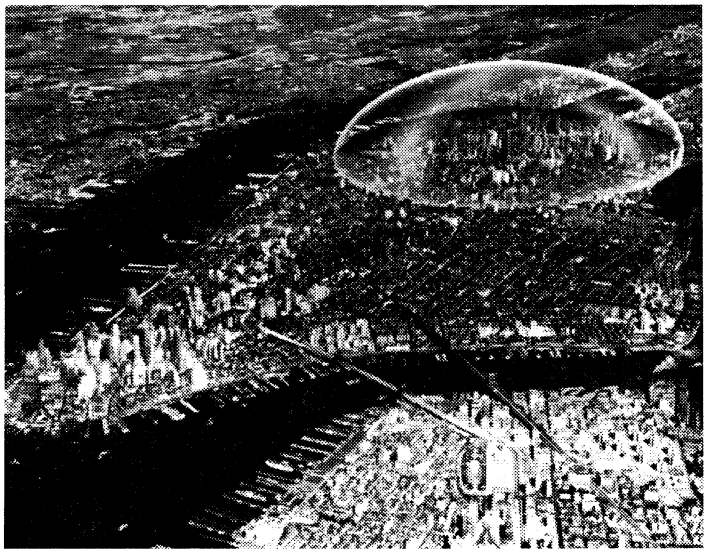

Fig. 8. R. B. Fuller. Proposal for Midtown Manhattan Dome. 1960.

The ends toward which these advances were to be applied could be none other than the benefit of the world's population as a whole, and the idea of a socio-objective performance standard for architecture is what elevated Fuller's thought above mainstream debates over technology and society in the 1960s. Amidst such prodigals as Peter Cook and the Archigram group, or the "drop out" geodesic dome communities of the era, Fuller's developing theory on the potential for engagement with society by an architecturally produced economic efficiency stood as a powerful challenge. Structural and productional ephemerality were, in his view, necessary to provide the maximum benefit to the population with minimum use of resources—"more with lessing," or the economic use of both 'nouns' and 'verbs'. Resources on a shrinking globe, Fuller reasoned, must also be shrinking, and the continued poverty of third world citizens (even, as he pointed out, in the U.S.) became his guiding cause.

One of the consequences of Fuller's socio-objective concern was his rejection of the military-industrial complex, a complete turn of allegiance from his work through the late 1950s. Much as Corbusier had proposed an "aerial assault" on urban issues throughout the 1920s, Fuller in the 1960s proposed a redirection of military effort, or what he termed "World War Gaming" into the global distribution of income and resources—the concept of "World Gaming." The transition from "weaponry" to "livingry", as Fuller put it, would free up enough resources that "all humanity would have the option of becoming enduringly successful" (14).

It is testament to Fuller's all-encompassing vision of 'Spaceship Earth' that, as his design projects were becoming progressively

larger, approaching a global scale, he was simultaneously promoting consciousness on a sub-atomic level. His activist philosophy was a neat analogy to Einstein's equation of physical matter with energy, and this comparison provided an intriguing conclusion to a career that had obsessively pursued questions of matter, velocity, and energy. From his earlier fascination with architecture on a vehicular scale, through his conception of the Dymaxion World as a system of ephemeral networks, to his realization that the material world was actually equivalent to the world of energy, Fuller's thought paired architecture not with artistic movements, but rather with the abstractions of theoretical physics and the absolute realities of the global economy. That these scientific abstractions were to be employed towards social, distinctly anti-political ends reflects the maturity of his thought through the 1960s (15).

Fuller's transition from the "Dymaxion American" to a socially concerned, global sustenance engineer, provides us with a model for architectural production that continues to have validity in contemporary debate. The considered use of technological innovation as a method for distributing or conserving scarce resources is well in line with twenty-first century concerns, and suggests a powerful example for production in today's digital climate. By transforming his production from the hardware-based Dymaxion House, through such resource engineering projects as the Wichita House, and into the realm of globally responsible efforts, Fuller's world view of humankind's relationships to itself and to its received site matured continually. The energetic geometries of the Dymaxion Map provided the key turning point in his career, allowing the mathematical efficiency of his life's work to take into account the global situations of substandard housing, food, etc. The coupling of intellectual production with the recognition of actual global situations should give pause to current practitioners and theoreticians, as it suggests a worldwide responsibility and engagement beyond that which the field currently appears willing to acknowledge.

NOTES

[1]R. Buckminster Fuller. "Fluid Geography, a Primer for the Airocean World." *North Carolina State School of Design Journal* (1954): 42. (Originally printed in *American Neptune*, April, 1944 and included in James Meller, *The Buckminster Fuller Reader*).

[2]"The Dymaxion American," *Time* (January 10, 1964): 47.

[3]Robert Snyder. *Buckminster Fuller. an Autobiographical Monologue/Scenario* (NYC: St. Martin's Press, 1980): 33.

[4]R. Buckminster Fuller. "Designing A New Industry," in Meller, James, ed. *The Buckminster Fuller Reader* (Middlesex: Penguin, 1970): 83.

[5]"The Dymaxion American," *op. cit.* 49.

[6]"Fluid Geography, a Primer for the Airocean World," op. *cit.*_47.

[7]Martin Pawley, *Design Heroes: R. Buckminster Fuller* (London: Harper-Collins, 1990). Fuller characteristically turned this near disaster into a positive outcome, announcing that the studio had, in fact, demonstrated the inherent safety in the concept—the collapse had been slow enough to allow the terrified students within to escape. Pawley fairly relates this incident, as well as the controversy between Fuller and Kenneth Snelson regarding the authorship of the "Tensegrity" concept.

[8]R. B. Fuller and Kiyoshi Kuromiya, *Critical Path*, (London: Hutchinson, 1973). 175.

[9]"The Dymaxion American" *op. cit.* 46.

[10]*Critical Path* 391.

[11]R.B. Fuller, "Guinea Pig B." Introduction to *Inventions: The Patented Works of R. Buckminster Fuller.* (New York: St. Martin's Press, 1983). p. viii.

[12]"The Dymaxion American," *op. cit.* 50.

[13]R. B. Fuller. "Architecture as Sub-Ultra-Invisible Reality," *World Congress of Engineers and Architects 1970*: 15.

[14]*Critical Path*, xxv.

[15]In fact, recent developments in organic chemistry may prove Fuller's vision to be more accurate than he might have even hoped. In the early 1990s, the discovery of new carbon atom formations in the mathematical shapes of geodesic spheres sent excited ripples through the scientific community. The distribution of chemical bond energy along the hyper-efficient geometrical surfaces of these atoms could give them physical properties unlike any other substance known. Christened "fullerenes", the new forms of carbon hold potential as both highly efficient structural materials, and as electric superconductors. Their simultaneous use as physical and energical material would prove Fuller's geodesic concept as precisely as the realization of his "noun-verb" principle, and it would undoubtedly find ecological and social applications at once. "Fullerenes" *Scientific American* (Oct. 1991) 58-59.

BIBLIOGRAPHY

"The Dymaxion American," *Time* (January 10, 1964).

Fuller, R. Buckminster. "Architecture as Sub-Ultra-Invisible Reality," *World Congress of Engineers and Architects 1970.*

Fuller, R. Buckminster. *Inventions: The Patented Works of R. Buckminster Fuller.* (New York: St. Martin's Press, 1983).

Fuller, R. B. and Kiyoshi Kuromiya, *Critical Path*, (London: Hutchinson, 1973)

Fuller, R. Buckminster and Robert Marks. *The Dymaxion World of Buckminster Fuller.* (Garden City, NY: Doubleday, 1960).

Meller, James, ed. *The Buckminster Fuller Reader.* (Middlesex: Penguin, 1970).

Pawley, Martin. *Design Heroes: R. Buckminster Fuller* (London: Harper-Collins, 1990).

Snyder Robert. *Buckminster Fuller. an Autobiographical Monologue/Scenario* (NYC: St. Martin's Press, 1980).

Ward, James. *The Artifacts of R. Buckminster Fuller : a Comprehensive Collection of his Designs and Drawings in Four Volumes.* (New York : Garland, 1984.).

SPECIAL FOCUS SESSIONS

Architecture | Ethics

Junior Faculty Workshop

AIAS Studio Culture Task Force:
Addressing the Health, Safety and Welfare of Architecture Students—
A Town Hall Meeting

Beginning Design Teaching:
An Introduction

Technology and Place

Uneasy Partnership:
Computing and Design (ACADIA)

Community Design:
The Survivors

NEA Funding for Design

Ph.D. Programs in Architecture Schools?
Structures and Supports

Design in K-12 Education

Educating the Architect in the Age of Design-Build

Architectural Publishing

Architectural Research Perspectives in Academia, Government,
and the Nonprofit Sector

Electronic Media and Virtual Education

Writing Workshop

ARCHITECTURE | ETHICS

Moderator: Gregory Palermo, FAIA, Iowa State University

Panelists:

THOMAS FISHER
University of Minnesota

DANIEL FRIEDMAN, AIA
University of Cincinnati

KATERINA RÜEDI
University of Illinois at Chicago

BRIAN SCHERMER, AIA
University of Wisconsin-Milwaukee

Why architecture? Much of architecture's discourse is directed toward its design, its form and beauty, *what* it is and its aesthetic character. And, the manner we go about bringing architecture into being, the *how* and nature of generative methodologies and professional business practices. Historiographic and theoretical perspectives most often focus on the preceding, or upon the content of architecture as a social/cultural/phenomenal matter. The constructed landscape is as ubiquitous as the social/political milieu. We cannot imagine inhabiting the planet without the landscape we have inherited and are going about reshaping. The *why* is simple: architecture has been, is and will remain a *sine qua non* of culture construction.

However, the motivations and values underlying contemporary architecture, as both place and process, may be viewed as parallel to, perhaps coincident with, those of ethics: to pursue and shape 'good' lives and 'better' living, to dwell 'well', personally and as a member of a community. Considering architecture as a discipline of ethics provides expansive grounding to its more often foregrounded pursuits of utilitarian resolution, aesthetic satisfaction, critical provocation and art, craft and teaching/learning, and provision of services — which are the measured attributes through which we determine its virtue. With respect to the various virtues of architecture, in a comment in the September 2000 *AIArchitect* Robert Geddes wondered: "... if we can say that a building is 'aesthetically wrong' why can't we say that a building is 'ethically ugly? Maybe, someday, we might even say that a building is ethically beautiful."

PANELIST ABSTRACTS

We framed this panel of diverse perspectives regarding the intersection of ethics and architecture to foster enriched consideration of the conflated notion architecturelethics. Each panelist has provided an introduction to his or her remarks:

Thomas Fisher will explore "The Ethics of Sustainability." His thesis is that societies that have lived in ways that are more environmentally sustainable have done so, in part, because of widespread ethical norms that modified peoples' material expectations. Those ethical norms have also embodied implicit architectural ideas about how to build more sustainably. He will review four ethical strategies and their architectural implications: moderation (Aristotle), detachment (Epictetus), utility (Bentham) and will power (Nietzsche).

Under the working title "Serving Surface," **Daniel Friedman** belatedly returns to the discourse on structure and decoration with the hope of exercising several local ethical questions. Departing from the Maison Dom-ino, he backtracks briefly to the problem of *Bekleidung*, then forward to the theoretical implications of enclosure in the works of three or four selected twentieth-century architects. His talk will conclude with a tentative interpretation of more recent formal experimentation, particularly projects that incorporate advanced modeling technologies.

In "Dangerous Knowledge: Professionalism and the Social Contract," **Katerina Rüedi** challenges certain positions regarding the architect's professional status and supposed ethics of the good. The professions have traditionally been granted monopoly (protection

of title and protection of practice) over areas of production because of their control of knowledge central to the sustainment of powerful interests — knowledge that can be termed dangerous. In return for monopoly professions in a capitalist economy have been obliged to contain their 'dangerous knowledge' — to act ethically. She will discuss the relationship of ethics, politics, and monopoly to professional education. And, will raise questions about the nature of ethics in a post-monopoly, post-colonial economy and speculate on the implications for architectural education.

Architects increasingly play hybrid roles within the design and construction industry, for example as client representative, developer, construction manager, code enforcer, and so on. **Brian Schermer** asks what kinds of ethical issues are raised when architects straddle different, perhaps conflicting, professional realities in "Hyphenated Architects/Hyphenated Ethics." He will discuss this topic in the context of ethnographic research that he has conducted on one type of hybrid: 'client situated' architects who conduct and manage projects for large organization clients.

JUNIOR FACULTY WORKSHOP

Facilitators: Robert Greenstreet, University of Wisconsin—Milwaukee and Marvin Malecha, North Carolina State University

The Junior Faculty Workshop was developed as part of ACSA's Junior Faculty Initiative and has been offered regularly at the Annual Meeting since 1990. It provides an intensive, two-hour session that focuses on strategic and practical approaches towards successfully developing an academic career, especially focusing on the pre-tenure period.

Topics that will be covered include developing a tenure track plan, balancing research, teaching and service, pacing yourself through tenure track, developing a network and preparing for tenure consideration. The presenters have developed *The Junior Faculty Handbook* in conjunction with the Workshop, a copy of which will be given to all participants.

AIAS Studio Culture Task Force: Addressing the Health, Safety and Welfare of Architecture Students—A Town Hall Meeting

Host: American Institute of Architecture Students

Panelists:

AARON KOCH,
AIAS CHAPTER PRESIDENT
University of Minnesota

NICOLE KUHAR,
NATIONAL VICE PRESIDENT
American Institute of Architecture Students

BRAD LUNZ,
AIAS NATIONAL DIRECTOR
Savannah College of Art and Design

CHRISTINE THEODOROPOULOS,
ACSA LIAISON
University of Oregon

At its December 2000 meeting, the AIAS Board of Directors established a task force to address the health, safety and welfare of architecture students in the studio environment. Whenever this issue is mentioned, students and faculty alike agree that current studio practices are unhealthy and that change is needed. The injuries incurred due to fatigue that result in loss of limb, or sometimes even life, are unconscionable. The psychological stresses placed on a student create an atmosphere in which harassment is prevalent, not only from faculty to students but among the students themselves.

While it is easy to acknowledge that there is a problem, the pressing question is not whom to blame, but how to bring about change. Ultimately, it must be up to the students to take action, to set personal limits and to stick to them. At the same time, schools of architecture must do a better job of letting students know that these limits can exist. In no way does the AIAS purport to eliminate studios. In fact, most would agree that students need to be pushed and tested in order to expand their knowledge base and educational development. However, this development must not occur at the cost of mental, emotional and physical harm. The endless stories of car accidents and severely depressed immune systems due to lack of sleep, exercise and improper nutrition as a result of the pressure must be addressed. We must find a healthy balance for all facets of an architecture student's life—school, homework, work, family, friends, extracurricular activities and community.

The format of this special focus session as a town hall meeting provides attendees with the opportunity to provide their personal insight and comments regarding the culture of studio and to help the AIAS shape this initiative and bring about change.

The AIAS town hall format special focus session was lively and well attended by a number of students, young faculty members and deans who all agreed that there are problems with the current culture of studio that need to be addressed. The consensus of the attendees was that the constant pressure to focus on studio to the exclusion of all else, including sleep, personal life, and other coursework, is the major issue, one that students and faculty are equally responsible for creating and changing. Several participants observed that the studio culture appears to be a form of hazing, a "rite of passage" into the profession that has existed since the beginning of formal architecture education in the United States. Fortunately, it was also acknowledged that this does not make the situation right. Student participants also identified architecture as a passion-driven profession where you can't simply tell an architect to stop drawing. Somewhere there has to be a health compromise, and the session participants were able to identify several

jumping off points for the AIAS/ACSA Task Force on Studio Culture, now in formation. Central issues to investigate include: teaching time management; integrating coursework and emphasizing teamwork similar to what students will encounter in the workforce; recognizing and validating skills beyond design, i.e., leadership; mentoring programs; and competition among both faculty and students. With unanimous acknowledgement of the problem from educators, professionals, and students, now is the time to address the issues and create a healthy and positive studio culture.

BEGINNING DESIGN TEACHING: AN INTRODUCTION

Moderators: José Gamez and Jeffrey Hartnett,
University of Nevada, Las Vegas

Panelists:

PATRICIA KUCKER
University of Virginia

KARL PULJAK
Louisiana Tech University

BETH TAUKE
University at Buffalo, The State University of New York

> "Make the first year and the terminal year great in any curriculum, and the rest will take care of itself."
>
> — *anonymous architectural educator*

We properly talk about "*Technics*", "*Praxis*", "*Civics*", "*Environment*", "*Media*", and "*Historiography*", but what remains to this day is the design studio, in all but a handful of schools, being the hub of the wheel in our architectural education offerings. Our architectural design culture — begun and developed and supported in the academy, and promoted by critics and design publications and awards programs and other facets of the media-culture — is initiated in beginning design studios. We all remember them, fondly or otherwise. They are like a baptism, the ritual invitation to a new life.

The first paper included here thoroughly looks at ways to strategize for the sheer survivability of first year studios within the academy, while the three which follow all, from varying perspectives, attempt to place that teaching in the physicality of the "real" world — in the "place" and community of rural northern Louisiana, in the Renaissance villas and their garden landscapes, in the occupation, and resulting perception, of a hypothetical "wandering interior". However, if there is a bit of nostalgia in these three approaches, one may ask why . . .

We remember them, our beginning design studios, as being offered in a day and time, in a culture and in an environment, in which the world was, or at least seemed, "one" — when time and space were (*much* more) knowable. Of course, from Einstein's Theory of Relativity and quantum physics and that entire revolutionary array of abstractions about the truth of the natural world, a revolutionary movement in architecture sprang forth, Modernism. But then this revolution quickly centered around the use of technology on physical material for practical advantages; i.e. its focus remained on physical reality.

But now that revolutionary tide has been exponentially expanded, with the Age of Information, the Web, with globalization, with the increasingly practicable erasure of the boundaries of space and time.

As explained by Michael Ventura (who uses the word "avalanche" to describe this falling-apart state) in his enlightening book, a series of conversations with James Hillman, entitled "*We've Had a Hundred Years of Psychotherapy, and the World's Getting Worse*", "human beings once woke with the sun and usually went to sleep not long after dark". This went on for perhaps three million years; for the past mere one hundred years, the most basic human experience-of-life has been drastically altered. "We've barely had time to blink twice . . . We've dispensed with what the human nervous system knew as time, and . . . to be lost in time is to be lost in space". This signals the end of *a* world — "the world in which waking and dream are rigidly separate"; we now live ". . . in the time-space of the dream . . . [with its] instantaneous changes, its unpredictable metamorphoses, random violence, archetypal sex; its constant cascade of supercharged imagery; its threatening sense of multiple meaning". For several million years, ". . . this dreamscape surrounded us only in our sleep *or in arts* [my emphasis] . . . Now, in our electronic environment, the dreamworld greets us when we open our eyes". More than one hundred years ago, and for almost all time going back before history ". . . individual daily life was more or less ordered, however unjust or distasteful, and cacophonous cross-purposes were left to be slept through in dreams. But now we live in a technologically hallucinogenic culture that behaves with the sud-

den dynamics of the dream, *that duplicates the conditions of dreaming.* Technology projects the subconscious into countless *things.*" The world is not something clearly "out there"; its and our boundaries now bleed into one another. "What distinguishes the current era is that each individual life is a daily progression through a concrete but fluctuating landscape of the psyche's projections". As can be seen perhaps clearest in my current homeland of Las Vegas,

> *"the surrealism, simultaneity, sexuality, and instantaneous change that occur in our dreams also occur all around us . . . And as Freud was the first to point out. 'In the subconscious there is no time', and without time there can be no space. Without time and space, the traditional filters, channels, and boundaries of human consciousness dissolve . . . It was easy, or so it seems now, to love the world of rigid time and space. The world was a world; it held still long enough to be a world and gave us time to learn to love it. But loving this utter state of flux, where time has been shattered and space has been both elongated and compressed beyond rational dimensions — we want to love it . . . but we do not know how, nobody does . . . Individually, this contemporary environment seems to have been thrust upon us . . . but we've made this world. The very eagerness of the world's embrace of this hallucinogenic technology by the most different sorts of people is evidence of the deepest of longings. For the human psyche is one of the great forces of nature, and what is perhaps most frightening about this space-time technology is that it exposes us to this force within us as nothing else ever has. We are standing in the storm of our own being. We are standing in a world created not by God (except indirectly), but by our psyches . . . It may be our natural habitat. We have willy-nilly broken through all the old rigidities, all the limits we thought were nature itself, and we can never go back."*
>
> *We have banished ourselves from our (second) Garden of Eden. Ventura concludes that "this is the new nature. Dream has become reality."*

Perhaps the best illustration for this phenomenon is the description, by William Mitchell in his book "*City of Bits*", of a rather typical information technology worker in London, viewing the sunset through his grimy window, while simultaneously looking at his computer screen, which displays a "live-feed" view of a window in an empty office, through which the sunrise "over the ochre Palo Alto hills" can be viewed. This "media space", which can "weld two distant office buildings together by adding continuously open, two-way, electronic windows on both ends", effectively creates a "second horizon", along with the increasingly less compelling or at least *competing* "view to the natural horizon". Today, our students live in two worlds; eighteen-year-olds have known no other condition. To have the knowledge and the wisdom, and simply the desire, to "teach beginning design" to students as to how to go about proposing the transformation of the physical world (unless they are ultimately moving into a media-business or to Hollywood after graduation) for the betterment of the human being, the society, and the world-at-large, is a challenging and important task. In particular, the way we define the parameters of these three preceding objects-of-"betterment" is crucial as to what solutions their work may propose.

So, today, how do we teach beginning design students the desirable transformation of *space*, to create desirable human experiences over *time*, the *skill of which is to be their expertise*? Clearly, the computer is not just an innocuous "tool"; it is a prime engine of the new reality. Thomas Friedman, in his important book "*The Lexus and the Olive Tree*", suggests that architecture is, or should be, an "Anti-Internet business", an enterprise which cannot be done over the Internet. How do we use the power and scope of the Information Revolution in the development of proposals and solutions for physical design based on what that Revolution, ironically, is quickly destroying, or at least obscuring and making trivial?

> *"Then indecision brings its own delays,*
>
> *And days are lost lamenting o'er lost days.*
>
> *Are you in earnest? Seize this very minute;*
>
> *What you can do, or dream you can, begin it;*
>
> *Boldness has genius, power and magic in it."*
>
> *— (advice for first year design students and instructors; Johann Wolfgang Goethe, from "Faust", 1808)*

COMMUNITY DESIGN:
THE SURVIVORS

Moderator: Thomas Barrie, Lawrence Technological University

Panelists:

MARK CAMERON
The Neighborhood Design Center, Baltimore, MD

TONY COSTELLO
The Ball State University Community-Based Projects Program

REX CURRY
The Pratt Institute Center for Community and Environmental Development

HENRY SANOFF
The Community Development Group, North Carolina State University

SCOTT TRUEX
Ball State University Community-Based Projects Program

University-based community design programs are an effective means for architectural education to bridge the gap between the academy and the public. They offer students an enriched educational experience while serving the public in areas of architecture, urban design, community development, and planning. At their best, they are potent vehicles through which the context and audience of architectural education can be broadened.

Currently there is a renewed commitment to the public realm and to proactive social responsibility at schools of architecture in North America. Many new approaches to community design, programs and initiatives have been created in recent years. There is a long tradition of community design in architectural education, however, and there are a number of long-established programs that continue to thrive and serve their communities.

This session will provide perspectives on contemporary community design programs with a particular focus on programs that have been sustainable over the long term. Issues such as educational standards, organizational models, project selection criteria, project methodology, student pay and credit concerns, liability issues, scheduling, and deliverables will be addressed — with a particular focus on the overall educational and service goals of community design.

The panelists will make short presentations, which will be followed by questions and discussion. This is an opportunity for educators involved in community design to share experiences and network, and for those considering establishing a community design program to be introduced to a variety of choices. Copies of the *ACSA Sourcebook of Community Design Programs at Schools of Architecture in North America* will be available. The session will be followed by a tour of The Neighborhood Design Center in Baltimore.

NEA Funding for Design

Presenter: Mark Robbins, National Endowment for the Arts

PURPOSE

To present opportunities available to organizations through Design discipline initiatives and grants at the NEA and to stimulate discussion about service to the field. The disciplines represented include Landscape Architecture, Architecture, Fashion, Graphic, Interior, and Industrial Design, Urban Planning, and Preservation.

FORMAT

The event is fairly informal and generally lasts about 90 minutes. Depending on attendance and audience diversity, each person in the room introduces him or herself and says a few words about their program. The number of participants is not fixed, though it's helpful to maintain a small enough group to allow direct interaction. The Director of Design briefly presents current programs and future plans for design at the NEA. This is followed by a discussion with participants about the ways in which the federal agency can best serve their field.

PROGRAMS

The following programs were described during the presentation:

Grants to Organizations

Grants offered to non-profit organizations and public entities that are planning projects which promise to have a major impact on the quality of design in the United States. Previous examples of funded projects include master planning studies, design charettes, exhibitions, lectures, design education programs, design fees for significant projects, and design competitions.

New Public Works

Each year, the NEA offers ten grants of up to $50,000 each to support competitions for projects that will have a major impact on the public realm. Funding includes support for competition advisor fees, juror honoraria, competition publicity, prizes, and other competition costs.

Mayors' Institute on City Design

The Mayors' Institute on City Design brings together mayors and design professionals from around the country to address specific challenges facing contemporary American cities. Sessions typically last two to three days and are often hosted by a local university whose design faculty assist in organization and resource management.

Leadership Initiatives

Leadership initiatives – including the New Public Works initiative above – are programs undertaken outside the regular granting cycles on the NEA. NEA Design is working to develop initiatives in a number of areas, including new schools construction, university-based community design centers, and design education.

Q&A Session

The majority of time will be dedicated to questions about NEA support for design and suggestions from the audience about future directions.

Ph.D. Programs in Architecture Schools?

Structures and Supports

Facilitators: Frances Bronet, Rensselaer Polytechnic Institute and Christine Macy, Dalhousie University

Panelists:

BARBARA ALLEN
Virginia Polytechnic Institute and State University, Washington/ Alexandria Architecture Consortium

JILL BAMBURY
Southern University and A&M College

SARAH BONNEMAISON
Dalhousie University

WAYNE DRUMMOND
University of Nebraska-Lincoln

RODOLPHE EL-KHOURY
University of Toronto

MARIE-ALICE L'HEUREUX
University of California, Berkeley

STEVE PADGET
University of Kansas

STEVEN VAN DESSEL
Rensselaer Polytechnic Institute

A roundtable session on Ph.D. programs generating ideas and guidelines for administrators, faculty and students. The discussion focused on creating and maintaining successful programs. Panelists specifically addressed accessing and developing economic, social and academic resources, based on their own histories as students, faculty and administrators.

DESIGN IN K-12 EDUCATION

Presenter: Meredith Davis, North Carolina State University

A discussion of hands-on strategies for integrating design in the curricula of K-12 schools. The session focused on educating future users of environments, products, and communication about how decisions are made about the built world. Also discussed was the reform of teaching and learning in all K-12 subject areas through the pedagogy of design education.

EDUCATING THE ARCHITECT IN THE AGE OF DESIGN-BUILD

Moderator: George Elvin, University of Illinois at Urbana-Champaign

Panelists:

Panel I

DAVID BAIRD
Louisiana State University

LILY CHI
Cornell University

GEORGE DODDS
University of Tennessee-Knoxville

SUSAN PIEDMONT-PALLADINO
Virginia Polytechnic Institute and State University, Washington/ Alexandria Architecture Consortium

ART SCHALLER
Norwich University

JOE WHEELER
Virginia Polytechnic Institute and State University, Washington/ Alexandria Architecture Consortium

Panel II

JORI ERDMAN
Clemson University

PHILLIP GALLEGOS
University of Colorado

MICHAEL JEMTRUD
Carleton University

STEVEN SCHAFFER
The Pennsylvania State University

GREG TEW
Montana State University

The Design-Build Special Focus Session brought over sixty participants and panelists together for an energetic discussion on the state of the art and future directions in design-build as a teaching method in architectural education. The session began with an intensive examination of the very definition of design-build. As alternative definitions were posed, it quickly became apparent that the term represents a richly varied bundle of ideas and practices within practice and education. The debate then flowed into a discussion of design-build's relationship to other curricular issues in architectural education. Does design-build occupy or advocate a position of resistance to the mainstream curriculum? Does it seek to enrich or critique the mainstream? In fact, as design-build begins to dominate more traditional methods in practice, does it deserve the label "alternative" at all? While debate over terminology

and the pedagogical placement of design-build was extensive, there was considerable agreement on the strengths of design-build. It offers a collaborative environment with interdisciplinary opportunities that foreshadow the collaborative experience of practice, and when it takes students out into their communities to build it opens their eyes to ways of living and dwelling which they may not have experienced otherwise, giving them a deeper understanding of the architect's opportunities and responsibilities for community service. The session ended with a vigorous exchange of opinions on the dynamic between reflection and action in design-build. Is there time for design, construction and theory in a single course? And what is the place of the purely theoretical design-build course? In sum, the discussion opened our eyes to new and different ways of seeing design-build, and opened many new questions which we look forward to exploring further at the upcoming AIA/ACSA conference, "Experiences in Design-Build: The Expanding Dimensions of Practice and Education," September 21-23, in Atlanta, Georgia.

ARCHITECTURAL PUBLISHING

Facilitator: Thomas Fisher, University of Minnesota

Panelists:

THOMAS FISHER
Architectural Research Quarterly

MARK LAMSTER
Princeton Architectural Press

JULIE TRELSTAD
John Wiley & Sons

This panel by three long-time editors in the architectural field, discussed the process by which they seek out, review, edit, and publish articles and book manuscripts. Representing three different types of publishing ventures—a refereed journal, a design and theory oriented book publisher, and a technically oriented trade publisher – the panelists each described their respective operations, how they see publishing changing in coming years, and what that means for faculty and the profession.

Architectural Research Perspectives in Academia, Government, and the Nonprofit Sector

Facilitator: Matthew Nowakowski, Initiative for Architectural Research

Panelists:

JEAN GARDNER
Parsons School of Design

KEVIN KLINGER
University of Cincinnati

MICHAEL O'BRIEN
Virginia Polytechnic Institute and State University

ANNE LAWRASON MARSHALL
University of Idaho

CARLOS MARTÍN, PH.D.
US Department of Housing and Urban Development, Washington, DC

RANDY MASON, PH.D.
University of Maryland

BEVERLY WILLIS, FAIA
Architecture Research Institute, New York City

The purpose of this panel discussion was to provide a forum for a broad spectrum of architectural research projects and perspectives across academia, government agencies, and the nonprofit sector. From digital technologies to issues of "smart growth" and sustainability, architectural research now encompasses cutting edge areas of investigation, as well as traditional areas of research exploration.

In an effort to promote and facilitate research within the architectural community, the Association of Collegiate Schools of Architecture (ACSA), the American Institute of Architects (AIA), and the Architectural Research Centers Consortium (ARCC) established a joint research initiative to provide a singular voice advocating for the varying complexity and breadth of research being conducted by academics, architectural practitioners, and members of the building industry. The Initiative for Architectural Research (IAR) has been charged with three primary objectives:

- Serve as a powerful and active advocate for architectural research;
- Serve as a clearinghouse for information about architectural research; and
- Facilitate research efforts that address specific needs of the architectural profession.

IAR announced the results of a recently completed research study, "Architectural Research Methods Training in Education and Practice: a Pilot Study." This study was supported by IAR with additional funding from AIA and ARCC. This project is a seed study for developing a research proposal for conducting a larger, more comprehensive study that would provide a detailed, wider-ranging assessment of research training and delivery systems to effectively meet the research needs and expectations of architecture practice and industry. As a next step in this vital project, the panel will be asked to provide recommendations for further research and avenues to be explored in future architectural research needs conferences.

Electronic Media and Virtual Education

Moderator: Frances Bronet, Rensselaer Polytechnic Institute

Panelists:

ALFREDO ANDIA
Florida International University

NANCY CHENG
University of Oregon

JERRY FINROW
University of Washington

BRANKO KOLAREVIC
University of Pennsylvania

CURT LAMB
Boston Architectural Center

BRIAN LONSWAY
Rensselaer Polytechnic Institute

CHRISTOPHER MONSON
Mississippi State University

KIM TANZER
University of Florida

LISA TILDER
The Ohio State University

A roundtable session critically examining architectural education as it relates to contemporary technology and developments in virtual instruction including virtual studios, short term computer, non-traditional and international collaborations, course and curriculum management, and accreditation. We focused on examining initiatives, lessons learned and investments for the past and potential trajectory of online education.

WRITING WORKSHOP

Facilitator: Thomas Fisher, University of Minnesota

This writing workshop with Thomas Fisher, Editor of Architectural Research Quarterly and former Editorial Director of Progressive Architecture magazine, looked at the mechanics of writing and discuss its parallels to design. The workshop involved the analysis of writing samples, including those submitted in advance by workshop attendees. We discussed ways of expressing ideas in writing more clearly, forcefully, and effectively, as well as how to craft written work to different audiences. The goal of the workshop was to give attendees specific, concrete advice that they can use to improve their written work and that of their students.