Living Like the Jetsons: The Impact of Information Technology on the American Landscape

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INTRODUCTION

> Cyberspace is opening up, and the rush to claim and settle it is on. We are entering an era of electronically extended bodies living at the intersection points of the physical and virtual worlds, of occupation and interaction through telepresence as well as through physical presence, of mutant architectural forms that emerge from the telecommunications-induced fragmentation and recombination of traditional architectural types, and of new, soft cities that parallel, complement, and sometimes compete with our existing urban concentration of brick, concrete, and steel.
>
> — William J. Mitchell, *City of Bits*, p.167

Much has been written on the emergence of cyberspace and its impact on society, the economy, and our everyday life. Indeed, many technological inventions such as steam engines, electricity, automobiles, airplanes and computers have significantly altered our cultural landscape, and have changed how we interact with our environment. Regardless of whether we welcome these changes or condemn them, most of us will agree that information technology will affect the way we live, work and communicate with each other. The question as to the degree of these changes, however, still remains.

As technology has become more opaque - its workings removed from our comprehension into little gray boxes or abstracted to code burned into CD ROM's — "the public increasingly [has had] to rely on *images* of technology for its understanding of both technology and progress."[1] It is thus not surprising that cinema and television play a major role in how we envision the future.[2] Most of these films and television programs presented viewers with time-honored scenarios such as good versus evil or humanity versus technology. This trend to play out familiar conflicts in future environs continues, albeit the constant improvement and miniaturization of sophisticated technological gadgets. If we believe the predictions of recent science-fiction shows, we can expect to spend our days fighting for survival in a dystopian environment. Entire downtowns will be converted into gigantic prisons where warring factions deprived of the most basic services inhabit the streets, alleyways, and sewers (*Escape from New York*). Or, due to technological progress and the greenhouse gases that accompany it, the polar ice cap will melt entirely covering the Earth's surface with water (*Waterworld*). In case we are able to escape the beleaguered home planet in search of the good life in the "Off World" (*Bladerunner*), or even better, seek an inter-stellar adventure somewhere in the galaxy (*Startrek, Deep Space 9, Babylon 5*), technology will provide a relatively safe, clean and comfortable environment. Food will be replicated to cater to our individual tastes, and our living quarters will always be clean and

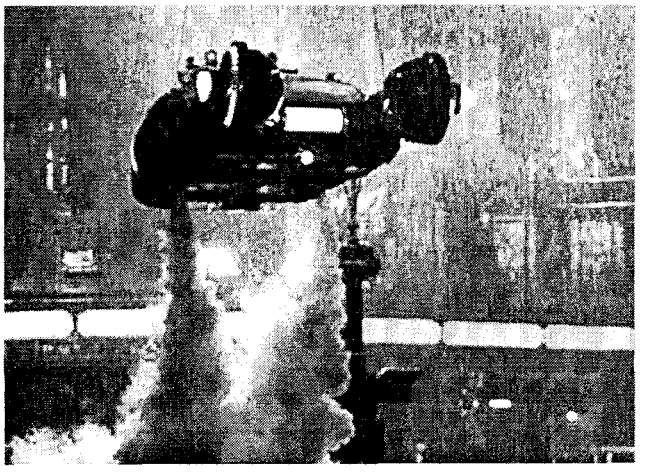

Fig. 1. Bladerunner: Dystopia and technology.

accommodating. Unless we are exploring new worlds, making first contact with new civilizations, or searching for scientific knowledge, we will be able to visit our offspring conveniently located in educational facilities a few decks away, and will have ample time to socialize with others in the "Promenade," a setting not unlike present-day suburban malls.

But what if we are neither hero nor crook? Will the future still be as exciting as depicted in these movies? Although many science fiction shows introduce spectators to the latest technological accomplishments, their settings are generally removed as far as possible from everyday life. Surprisingly little visual imagery is devoted to technology's impact on the average citizen. *The Jetsons*, a cartoon that aired almost uninterrupted from 1962 until the present, is one of the few television shows that has dealt with everyday life in an average 21st century community. If we compare this vision for a future society with present conditions and predictions regarding technological progress, we should be able to create a more complete storyline as to what the future might hold. And despite the many promises that always accompany technological progress, this future might actually be boring, and less of a New Frontier than we have imagined.

THE JETSONS

Since the 1960's, *The Jetsons* has fed our fascination with technological gadgetry and futuristic environments. Twenty-four shows were produced between 1962 and 1963. They aired for fifteen consecutive years on all three major networks. In 1984-85 and 1987-

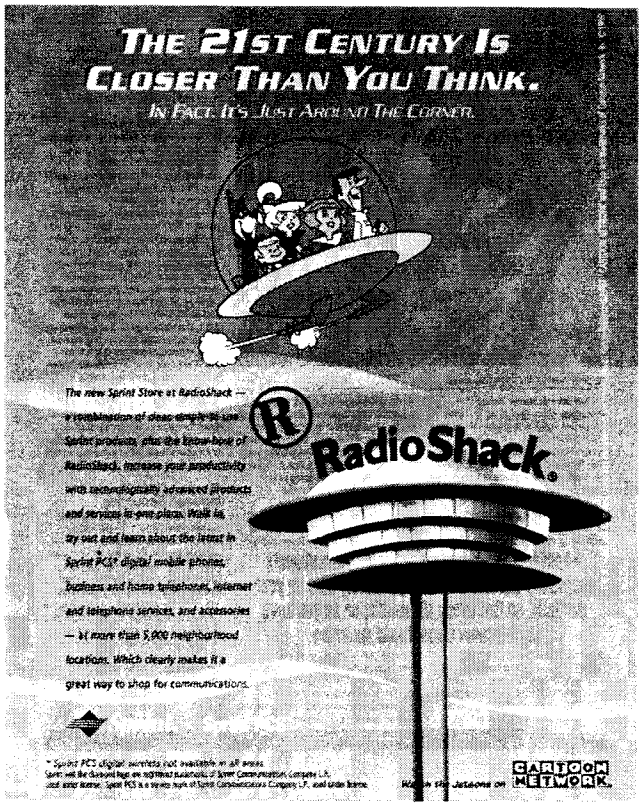

Fig. 2. Advertisement.

88, fifty-one additional episodes were produced for syndication. In addition, the cartoon characters starred in two movies, *The Jetsons meet The Flintstones* (1987) and *The Jetsons - The Movie* (1990). Most recently, an electronics retail chain has resurrected the Jetsons' characters in its advertisement campaign for cellular phones and pagers.

In an attempt to repeat the success they had had with *The Flintstones*, the Hanna-Barbara studios simply repeated their trick of projecting contemporary society into another era, this time into the future rather than the Stone Age. Although the show takes place in the 21st century, the characters reflect the conventions and assumptions prevalent in the early 60's. George is the sole breadwinner, working three days a week at Spacely Sprockets. His wife, Jane, is a homemaker, always looking for ways to make life as pleasant as possible for George. The kids, Elroy and Judy, go to school, and exhibit behavior that fits the stereotypes of suburban kids in the early 60's: the ten-year-old boy is brilliant at space sciences and always ready for adventures, while his 16-year-old sister is mostly interested in boys, clothing, shopping and going out. The producers obviously didn't believe that the ready availability of futuristic technological gadgets would have a major impact on social patterns, relationships or demographic trends.

Although we will soon enter the 21st century, our society today looks nothing like the one portrayed in *The Jetsons*. Since the show first went on the air, we have experienced a shift away from the male as the sole breadwinner, increased opportunities for women in the workforce, and a general blurring of the traditional male and female roles. The proportion of women in the labor force has been steadily rising throughout the 20th century — from 20% in 1900 to 26% in 1940 to 29% in 1950. The 1970's witnessed even more employment opportunities for women, which pushed the numbers up to 42.5% in 1980 and 44% in 1985. It is estimated that by the year 2000, 47% of the labor force will be comprised of women.[3] Although we can speculate that some of the more recent opportunities for women have resulted from the emergence of information technologies in the workplace, this cannot account for the drastic increase of working women between 1950 and 1980. The trend towards an almost equal participation in the labor force has been accompanied by shifts in educational patterns. By 1996 more females had attained a high school diploma than males. A 1996 survey by the United States Bureau of the Census indicates that 77% of the females received a high school diploma compared to 76.3% of the males. These changes most likely have their roots in the political and social upheaval that occurred in the 1960's, as well as in the emergence of the feminist movement and the newfound freedom associated with the times. It is interesting to note that the reshaping of society originated during a time when telecommunication was in its infancy, and where smart homes or smart machines were still a product of the imagination.

LOCATION

> Whether in the middle of the city or deep in the mountains, the signals arriving from satellites are the same.
>
> — Kazuhiro Ishii

Although *The Jetsons* seems stuck in the 60's when one views its characters, it does provide an interesting picture of future living conditions. Orbit City, their place of residence, has no specific location other than somewhere on planet earth. It displays neither particular climatic conditions nor natural landmarks that could give it an identity. Even its generic name indicates that it could be anywhere. All we see is an endless array of structures, each raised on a central column, whose base never appears. We can only assume that these bases are anchored onto the surface of the planet. It looks, as if, in the future, location is not an issue.

This sentiment is shared by many experts in the field. In his writings, Kazuhiro Ishii's observes that information technology such as cellular phones, fax machines and internet links allows us to communicate with others from any location imaginable, be it a primitive hut in the woods, a remote farm in Idaho, or a penthouse in Tokyo. Bill Mitchell takes this idea one step further by arguing that, due to the proliferation of information technology, there is in effect "no such thing as a better address."[4] For him, it seems, all places are equal.

Both scholars, however, fail to mention that it was earlier technological inventions that started the process by which different locations became more and more alike. For some time, railroads, cars and planes have allowed us to travel great distances relatively quickly. They have made a variety of goods available regardless of season or place of origin. The telephone and television have also long been used to disperse information almost immediately. In addition, the invention of air-conditioning has helped erase the different lifestyle between northern and southern regions.[5] As a result, contemporary travelers encounter sameness wherever they go, finding similar goods and services in standardized environments.

The emergence of digital information technology has most certainly contributed to the standardization of our environment. Ready access to information and data wherever a hookup is available allows for the increased mobility of both companies and employees. According to the Office of Technology Assessment, "technology is connecting economic activities, enabling them to be physically farther apart, reducing the competitive advantage of high-cost, congested urban locations, and allowing people and businesses more (but not total) freedom to choose where they will live and work."[6] As a result, workplaces have been and will be increasingly shifting away from facilities in the central business district to suburban homes or hotel offices.[7] Should the trend towards suburban sprawl and remote edge city locations continue, we will be left with metropolitan areas as nondescript as Orbit City.

Fig. 3. Standardized suburban homes.

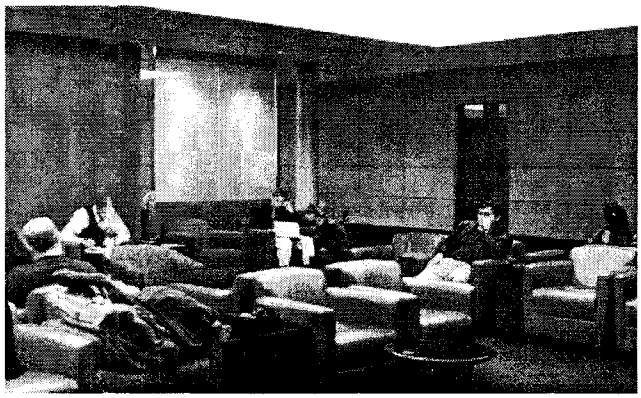

Fig. 4. Standardized airport lounge.

SETTLEMENT PATTERNS

> The 21st Century will be the age of the non-city. The globalization of the economy, liberalization in the financial sector, and the decreasing significance of borders has undermined the benefits of centralization. As a result, the concentration of energy in cities has begun to decline. Without the resources needed for maintenance and repair, cities begin to wear out and come unraveled, becoming the wasteland at the end of prosperity.
>
> — Kazuhiro Ishii

In his program statement for the 9th Takiron International Design Competition, Kazuhiro Ishii predicts what settlement patterns for the next century will not be — those of a city — and asks participants to envision such a non-city. One possible vision for the next century already exists in *The Jetsons* where the built environment consists of multiple structures raised off the ground by a column of sorts. Each structure is dedicated to a single use, be it residential (2,000 residents sharing a circular apartment complex), commercial (single shopping mall platform with multiple stores), educational (high school complex with domed sports arena) or industrial (Sprockets Industries). Only larger entities such as convention centers and amusement parks (Las Venus) warrant their own little planet. Each of the monofunctional structures is surrounded by airspace — the macadam of the future — and crowded with spacecrafts that form a sea of slowly moving vehicles, similar to our present-day traffic congestion. Indeed, Orbit City exhibits growth patterns strikingly similar to current trends in American urbanism. Suburban sprawl has continued to swallow huge tracts of virgin land, replacing former wildlife preserves or farmland with built environments, which like in Orbit City, are dedicated to commerce, housing, or entertainment.[8]

Fig. 5. Sprawl in Las Vegas.

We have yet to see whether this trend towards further sprawl and decentralization will continue. A study conducted by Sherry Ahrentzen suggests that home-based work may induce finer-grained, higher density urban patterns, due to the need for facilities and services instrumental to the work tasks. To the over one-hundred telecommuters surveyed in her study, a convenient location close to downtown as well as close proximity to a copy center, post office, office supply store and library became more important.[9] Ms. Anderson concluded that the character and amenities provided by a neighborhood would most likely become more important, "since one of the most commonly expressed concerns of working at home is the feeling of social isolation."[10] Given the likely need for more services within residential walking distance, low-density development can no longer be supported. In fact, some communities such as Portland, Oregon, already question the economic sustainability of sprawl, because "the cost to make roads and sewers gets to a point where it doesn't work."[11] And the Bank of America has complained that sprawl in California has created "enormous social, environmental and economic costs, which, until now, have been hidden, ignored, or quietly borne by society."[12]

TYPE

> But when telecommunication through lickety-split bits on the infobahn supplements or replaces movement of bodies along circulation paths, and when telepresence substitutes for face-to-face contact among the participants in activities, the spatial linkages that we have come to expect are loosened. ... Rooms and buildings will henceforth be seen as sites where bits meet the body-where digital information is translated into visual, auditory, tactile, or otherwise perceptible form, and, conversely, where bodily actions are sensed and converted into digital information. ... In the end, buildings will become computer interfaces and computer interfaces will become buildings.
>
> — William J. Mitchell, *City of Bits*, p.104-5

In his chapter on recombinant architecture, Bill Mitchell argues that "now, increasingly, software beats hardware," citing the example of Columbia University, which decided to invest in a super computer and the digitizing of books rather than building a twenty-million dollar addition to its law library.[13] He goes on to predict that information technology will lead to the development of digital counterparts to many traditional building types such as libraries, hospitals, banks, schools, and department stores, causing these types to eventually disappear.

Fig. 6. Automated garden help.

The creators of *The Jetsons*, on the other hand, emphasize the automatization of processes rather then the digitalization of environments where such processes occur. When Jane gets her hair done (Fugitive Fleas, 1984-85 season) she is greeted by an automated receptionist. All services — manicure, facial, styling or, as she calls it, the "works" — are performed by automated arms similar to those found in a car-wash. The children still attend their respective schools, where they are instructed by robots rather than logging into a virtual classroom from home via telecommunication software. Although people are absent in these scenarios, their function having been taken over by automatons, the places where services are performed continue to exists.

Will the notion of type remain a staple in architectural design? Despite Bill Mitchell's prediction, architects will probably continue to design according to building types. It is very unlikely, however, that they will remain as they are, given the impact of information technology on the way businesses produce their goods and services. In the past, technical innovations usually led to completely new building types despite the fact that their shape, form or organization was borrowed from existing structures. For example, as the train became a common means of transportation, it generated a new building type, the terminal station, that successfully combined the volume of the church with the medieval city gate. The automobile has also triggered the development of many hybrids such as drive-in theaters, drive-through lumberyards, stores, restaurants, and banks. Recent telecommunication technology introduces a new piece of

Fig. 7. The digital workplace.

infrastructure into existing building types, from which new hybrids then emerge. A cafe connected to the information highway thus becomes a "cybercafe," while ATM's, no longer physically tied to the bank that operates them, invade every environment where money is needed such as hospitals, department stores, or restaurants.

The new technology's impact on traditional building types, however, goes well beyond the creation of new hybrids. It will also determine where future structures will be located, just like the car influenced the location of many previous building types: the street corner for gas stations and fast food restaurants and the urban fringe next to a major thoroughfare for drive-in theaters.[14] In the same vein, information technology will allow many businesses to shift operations to areas with a large, low-wage labor pool. At the same time it will give many people the opportunity to conduct their business from the place of their choice.

@WORK

> . . . I discovered — as did many others — that I no longer had to go to work. Not that I suddenly became idle; it's just that the work now came to me. I did not have to set out every morning for the mine (as generations of my forebears had done), the fields, the factory, or the office; I simply carried a lightweight laptop computer that gave me access to the materials on which I was working, the tools that I required, and the necessary processing power.
>
> — William J. Mitchell, *City of Bits*, p.3

It goes without question that information technology will have a major impact on the way we work, the place where we conduct our work, and the kind of work available. For Bill Mitchell, the new technology has a liberating effect on many in the workforce. They are no longer tied to a specific location and have more flexible hours. In *The Jetsons*, however, technological progress takes the idea of liberation to an extreme by replacing most of the workers with machines. We see an automated work environment where human

Fig. 8. Cyber Cowboys.

employees are a definite minority. Sprockets Industries is run by about six people (the boss, a personal secretary, a data analyst, a production supervisor — George — , a mechanic, and a scientist.) Computers or robots not only assemble all of the products, but also perform most clerical duties and even make managerial decisions. Indeed, the city's entire service sector appears to be staffed by robots: the beauty salon (Fugitive Fleas, 1984/85 season) runs like a fully automated car wash; robot bell boys staff the hotel (Dog Daze Afternoon, 1984/85 season); and in George's home it is robot Rosie who does all the cleaning. Because Sprockets Industries is so fully automated, George only needs to work three days a week. The rest of the time is spent at home with his wife and children or on family outings. He pays a steep price for this privilege, however, by living in constant fear of being replaced by a machine (One Strike You're Out, 1984/85 season). Should he lose his job, only a few professions would be available to him, namely those not performed by robots such as police work, repairs, judicative and executive work or entertainment.

George's fear appears to be well founded.[15] Current predictions by the Bureau of Labor Statistics identify health care and computer-related work as growth areas, while jobs as bookkeepers, typists and copy-machine operators will soon vanish due to increased automation.[16] Indeed, in recent years many employees, especially receptionists, have been replaced by computers. Even professionals such as tax consultants, book keepers, interior decorators, and family lawyers have had to compete with do-it-yourself software applications. Today, most people avoid standing in line for a bank teller by using ATM's for their financial transactions. And retail chains are experimenting with scanning devices that would allow customers to ring up purchases on their own rather than waiting for an available check-out person. In addition, searchable databases are slowly replacing librarians, while book and record stores are investing in the digital infrastructure necessary for on-line sales via the internet. In time this could lead to their abandoning traditional stores and sales personal altogether.

Just as information technology has already made certain kinds of work obsolete, it will most likely do away with the traditional distinction between blue and white-collar workers. According to former Labor Secretary Robert Reich, future employment will be divided into three categories: symbolic analysts, technicians, and personal service workers.[17] The first category will include lawyers, doctors, investment bankers and some teachers, a group of professionals, who will telecommute "from town to town practicing their craft for a variety of clients."[18] This type of consulting has already begun to take root in today's society. Interestingly enough, some analysts have likened it to "a return to the guild system of the Middle Ages." Others have described this trend as a return to the myth of the American frontier. "People are out there with their laptops and cellular telephones, riding the range, prospecting, being cowboys and cowgirls again."[19] In this category, the future is not straying very far from the past.

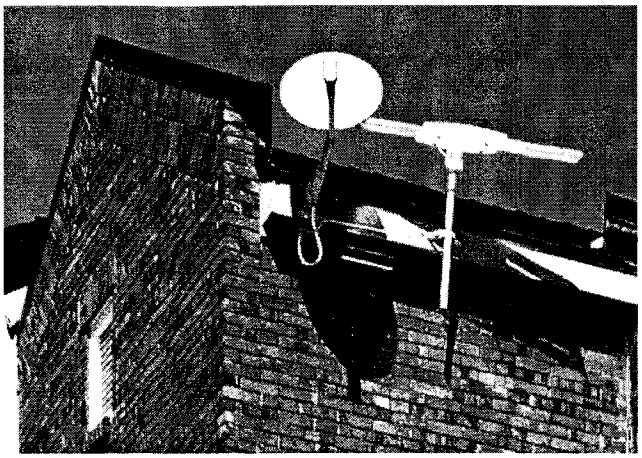

Fig. 9. Wired home.

Personal service workers, on the other hand, will not benefit from the revolution in information technology, because they will lack either the knowledge or the access necessary to participate in the virtual exchange of information. Possessing few marketable skills, they will hold low-paying jobs that haven't moved overseas or been replaced by computers.[20] They will find employment in general service areas not invaded by information technology (as custodians, cashiers, waiters and waitresses, fast-food workers or sales clerks), in low-tech production (in construction, agriculture, or sweatshops), or in shipping and receiving, an area that benefits directly from the tendencies towards dispersal and decentralization of both customers and providers (as truck drivers, delivery persons, or warehouse workers). We have already seen an increase in service sector employment as technology has altered the demands of work, a tendency that will most likely expand in the future. "Thus, a major part of the future of high technology is the creation of jobs that are of lower than average skills."[21]

It is the largest group, the technicians, that will bear the brunt of the changes wrought by information technology. This category will include everyone from inventory managers to paralegals to high-tech auto mechanics, in short, many disparate professions that all will require their personnel to be computer literate.[22] Much of the work will no longer be conducted in traditional settings as businesses attempt to reduce their office space and facility costs. Currently three strategies are emerging to achieve these goals: temporary employment, which divides the workforce into a permanent core and a pool of part-time workers hired as needed without benefits;[23] hoteling, "in which workers reserve a temporary workspace for any length of time from several hours to several days;"[24] or telecommuting, which encourages employees to work predominantly at home while remaining electronically connected to the main office.[25] Examples for this trend abound: Ernst & Young, a New York-based accounting firm has reduced its office space in Chicago from 377,000 to 300,000 square feet through hoteling while IBM expects to cut 15 to 20 percent of their office space by having 5,000 of its employees work at home, on the road, or in their clients' offices.[26] As a result, the workforce that in the past has enlivened central business districts all over the country will be scattered throughout the metropolitan regions.[27] This pattern will challenge municipalities to incorporate

information technologies into their existing infrastructure and will increase the need for services available close to home. Most importantly, however, the current proliferation of information technology will continue to re-introduce work into the home setting, thus obliterating the strict division between private and public realms that has been the norm for almost a century.

@HOME

> The domestic living room is emerging as a major site at which digitally displaced activities are recombining and regrounding themselves in the physical world. ... In many places now, news and entertainment, education, work, shopping and banking, and lots of general social interaction are starting to flow in and out. ... And, as networks and information appliances deliver expanding ranges of services, there will be fewer occasions to go out.
>
> — William J. Mitchell, *City of Bits*, pp. 98-100

Although theoretically it should be possible to provide information technology in any room in the house, Bill Mitchell assures us that the traditional living room will continue to be the principal area where interaction will occur. Various interior spaces will be enhanced through the installation of specialized information centers, but they will retain their original functions. The creators of *The Jetsons* also assumed that the dwellings of the future would, on a basic level, remain the same. Although the Jetsons' Skypad Apartment reflects the iconography of the space age, in reality it recalls the design concepts common to the 1960's. Shared spaces follow an open plan arrangement, while private spaces such as bedrooms and bathrooms are defined by walls that radiate out from the building's central support column.[28] Of course the apartment comes equipped with every electronic gadget imaginable: a robot who does the housework; a push-button machine that instantly delivers any food selected; a voice-operated washing machine that washes, dries, and folds clothes in thirty seconds; beds that eject their occupants like a toaster each morning; and tables that set themselves and clean up after each use. Despite an abundance of TV/media stations — one in each bedroom — the family continues to gather around the entertainment center in the living room and to congregate for shared meals in the dining room. Work has not invaded this home, nor has information technology altered the daily routine or rituals of the family.

Altogether, the dwelling is experiencing a renewed emphasis that recalls its role in America during pre-industrial times. Back then, dwellings not only provided shelter for family members and livestock, but also served as the family's center of production (the making of candles, soap and dyes as well as the extradition of sugar from corn and yeast from milk) and as a place for formal gatherings (weddings, funerals, burials and business deals).[29] These days, however, unlike on *The Jetsons*, more and more people are working at home. In 1990, according to a study by the U.S. Department of Commerce, owner-occupied households were the largest they have ever been.[30] In upscale dwellings several rooms with highly specialized functions have been added to the traditional assemblage of bedrooms, bathrooms, kitchen, dining room, living room and family room. These homes, in the one million dollar category, feature exercise rooms, indoor pools, home offices, game rooms and theaters. Although similar in size to the manor or estate houses inhabited by large households during past centuries, these sprawling dwellings house only a rather small family and their occasional guests. They do, however, cater to every possible need. Sophisticated home electronics combined with large, flat screens or projection devices bring the best art, the best libraries, and the best entertainment into the home theater, thus eliminating the necessity of going out. Of course, as was the case in the past, homes or estates of such grandeur are only available to a selected few, either those who make more than $ 200,000 a year or have inherited wealth of similar magnitude.[31]

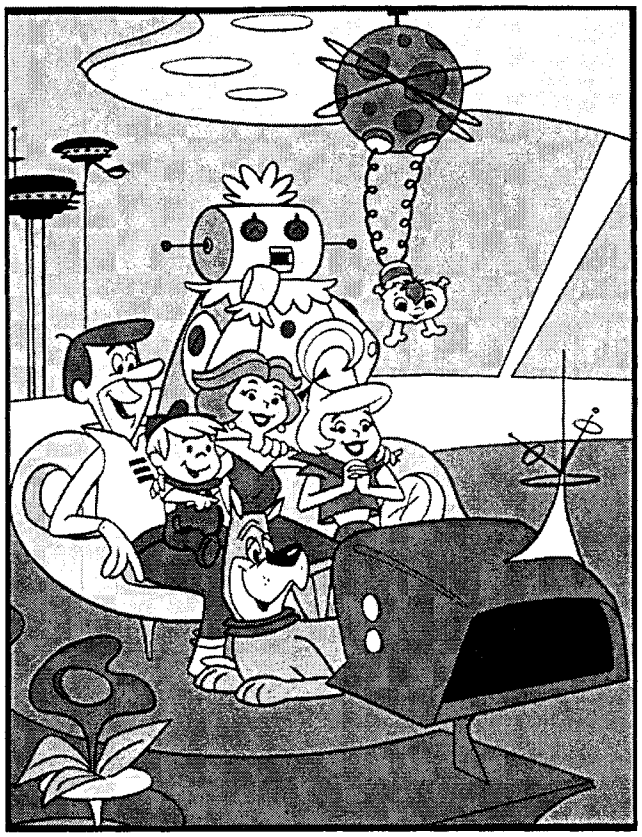

Fig. 10. Home Entertainment.

Another type of dwelling has emerged in recent years that differs substantially from the more traditional concept predicted by the creators of The Jetsons. The most elaborate example of this type of intelligent home is owned by the computer magnate, Bill Gates. On his estate residents and guests wear a little electronic pin — similar to those used in various Startrek movies — that activates information devices and environmental controls based on the individual's location. Music, digital images, movies, phone calls and a moving zone of light accompany the individual from room to room. Rather than containing many rooms with specific functions, the building has numerous microcomputers embedded in its walls that adapt spaces to the profile of each user.[32]

Although the full integration of such technology into the home is beyond the means of most mortals, smaller, more affordable technology exists that can create a more modest version of the intelligent home. Laptop computers and cellular phones, when paired together, form a small, mobile command center that allows us to exchange information wherever we are. We can use it for video conferences, phone and fax messages and data retrieval from the internet. The machines function as desk tops, storage units, play stations, and televisions. Because the command center can be moved throughout the house, traditional spaces can become hybrids that cater to more than one function. The kitchen, for example, can become a temporary home office, while the bedroom can turn into a small home theater. Hybridization thus allows us to use space more efficiently by making it possible for us to use each room for a variety of activities. Interestingly enough the same technology that allows for a more flexible work environment and has created new building types, is also transforming the way we inhabit our homes.

CONCLUSION

> The next major battle in America will be between urban and rural cultures. Today, people live rural, work suburban, and

Fig. 11. Contemporary home cinema.

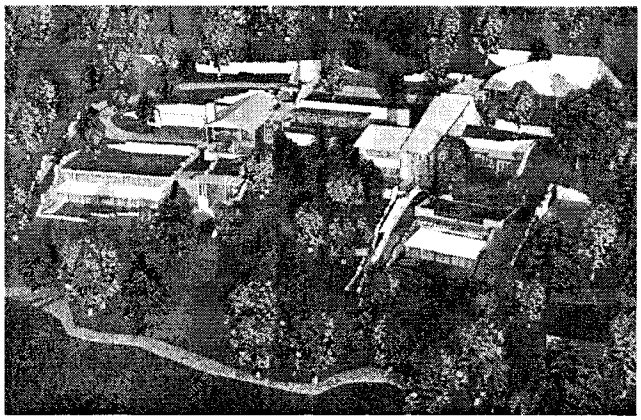

Fig. 12. Bill Gates' house.

> have an urban mind-set. In the new economy, it becomes far less important where you live.
>
> — Watts Wacker, resident futurist, SRI International[33]

If we were to produce *The Jetsons* today, we would have to revise much of the imagery and content of the original series. After all, only a few of their predictions have come true. Since we tend to speculate about the future with the present in mind, the current use of information technology and its impact on our society would most likely influence our visions for the future. Whatever direction these might take, the majority of us will still inhabit planet earth, commute by car rather than flying saucer, and use a vehicular form of public transportation instead of people movers. An increasing number of service workers — not robots — will cater to our needs, while we most likely balance more than one job at a time. Rather than working exclusively for one company, many of us will have to possess numerous marketable skills and provide services to several organizations, individuals or companies all at once. We will work at home, in an office, or out of a car or cafe, keep flexible hours, and be constantly available via fax, beeper, or internet. Astonishingly enough, our professional lives will actually resemble those of homesteaders in our pre industrial past, a time when multiple occupations such as "farmer, carpenter, mason, engineer, and blacksmith," as well as "veterinarian, hunter and trapper, experimental agriculturist, and merchant"[34] were the norm.

In the next century, we will live in metropolitan regions that will lack the classical distinction between Center City and the edge. In addition, traditional building types serving a single function will give way to new hybrids that will cater to many different functions such as work, education and entertainment. The new hybrids will have to be designed with flexibility in mind, which, in turn, will make their appearance less distinctive. The same philosophy will also influence the design of our homes, where peripherals such as telecommunicators, television screens or network connectors will be able to alter the character and function of every room to serve momentary needs. Our dwellings will thus come to resemble a 19th century homestead that "had to take the place of the church and meetinghouse and school — and sometimes the tavern."[35]

As we begin to spend more and more time at home, whether working, playing or resting, what our neighborhood or community offers to us will become increasingly important. It's appearance will have to welcome prospective clients. At the same time, it will need to provide us with specialized services for our work, and cater to social functions that can neither be fulfilled within the dwelling nor through information technology. Such neighborhoods or communities will differ drastically from the urban sprawl and isolation experienced today. Rather, just as our future homes will resemble earlier homesteads, they will recall a 19th century village. It seems as if when we look into the future, we will see the past. On the surface, of course, things are quite different, but underneath, they are much the same.

NOTES

[1] M. L. Smith, "Recourse of Empire: Landscapes of progress in Technological America," published in *Does Technology Drive History?*, Merritt Roe Smith and Leo Marx, editors, (Cambridge: MIT Press, 1994), p. 40.

[2] Given the fact that Modernism saw its introduction to American households through movies rather than exhibitions or professional journals — in a typical week in 1939, attendance at the movies was eighty-five million — one can only speculate on the impact of science fiction movies and animations on the millions of teenagers that watched them. (see Donald Abrecht, *Designing Dreams*, Harper and Row, 1986).

[3] Phyllis L. Stewart and Muriel G. Cantor, editors, *Varieties of Work* (Beverly Hills: Sage Publications, 1982) and David B. Bills, editor, *The Modern Times* (New York: State University Press, 1995).

[4] William Mitchell, *City of Bits* (Cambridge: MIT Press, 1995), p. 10.

[5] For a detailed description see: Raymond Arsenault, "Still the south: Air Conditioning," *Southern Exposure*, Vol 23, Issue 2, 1995.

[6] *The Technological Reshaping of Metropolitan America.* Washington, D.C.: U.S. Congress, September 1995.

[7] The *New York Times* of July 14, 1996, reports that because of the revolution in communications and data processing, accompanied by company downsizing, as many as 40 million people work at least part time at home, with about 8,000 home-based businesses starting daily.

[8] Phoenix, Arizona's population has grown from 107,000 residents inhabiting 17.1 square miles in 1950 to 1,052,000 residents inhabiting 339.8 square miles in 1994. Settlement density has decreased from 6,257 residents per square mile to 2,338 residents per square mile.

[9] Sherry Ahrentzen, "A Place of Peace, Prospect, and ... a P.C.," *Journal of Architectural and Planning Research* 6:4 (Winter, 1989).

[10] Ibid., p. 284.

[11] Mike Burton, executive director of Portland, Oregon's metropolitan government, as quoted in *newsweek*, May 15, 1995, p.43.

[12] Ibid., May 15, 1995, p.43.

[13] Mitchell, p. 48.

[14] Information technology's sphere of influence is several times larger than that of the car, which determined building locations at a more local level. The new technology, on the other hand,

allows businesses to easily expand their operations all over the world.

[15] Already in March 1963 a group of distinguished scientists, economists, and academics predicted that, "in time, the new computer revolution would take over more and more of the productive tasks in the economy, leaving millions of workers jobless." Jeremy Riffkin, *The End of Work* (New York: Putnam, 1995), p. 82.

[16] "Workers of the World, Get Online," by Daniel McGinn and Joan Raymond, *newsweek* special issue (winter 97/98), p. 32.

[17] Ibid., p. 32.

[18] Watts Wacker, a futurist from SRI International, as quoted in "Workers of the World, Get Online," p. 33.

[19] Michael Brill, as quoted in *P/A* March 1994, p. 50.

[20] "Workers of the World, Get Online," p. 32.

[21] Rumberger and Levin as quoted in Kenneth I. Spenner, "Technological Change, Skill Requirements, and Education," published in *The New Modern Times*, David B. Bills, editor, (New York: SUNY Press, 1995), p. 114.

[22] "Workers of the World, Get Online," by Daniel McGinn and Joan Raymond, *newsweek* special issue (winter 97/98), p. 32.

[23] According to Jeremy Riffkin, p. 190, the Bank of America Corporation estimates that in the near future less than 19 percent of its employees will be full-time workers.

[24] Ziva Freiman, "Hype vs. Reality: The Changing Workplace," *Progressive Architecture* (March 1994), pp. 51-2.

[25] Ibid., p. 52.

[26] Riffkin, p. 150.

[27] According to Link Resources, in 1993 7.6 million Americans worked part- or full-time at home, a number that is likely to rise. Ziva Freiman, "Hype vs. Reality: The Changing Workplace," *Progressive Architecture* (March 1994), p. 52.

[28] Blueprints of the "Home of the Jetsons" as shown in: Mark Bennett, *TV Sets: Fantasy Blueprints of Classic TV Homes* (New York: TV Books, Inc., 1996), pp. 88-90.

[29] For a description of spatial practices during the nineteenth century see: J. B. Jackson: "The Westward-moving House," reprinted in *Re-Reading Cultural Geography*, p. 70-72.

[30] *We the Americans ... : Our Homes, U.S.* (Washington: Department of Commerce, 1993) and Population, Housing Units, Area Measurements, and Density: 1790 to 1990 (http://www.census.gov:80/population/censusdata/table-2.pdf). In owner-occupied households the median number of rooms has steadily grown from 5.3 rooms in 1950 to six rooms in 1990. The increase in size was accompanied by a decline of people per unit (1950; 3,28 / 1990; 2.43) as well as of people per room (1950; 0.71 / 1990; 0.47).

[31] According to a U.S. Census Bureau estimate the mean income received by the top 5 percent of the American households was $ 201,220 in 1996, barely enough to afford such a home.

[32] For a description of Bill Gates' home see: "Bill Gates, Inside 'The House'," *newsweek* (Nov. 27, 1995), pp. 62-63.

[33] as quoted in "How will we live? The Home of the Future," *Builder* (March, 1997), p. 98 ff.

[34] J.B. Jackson, p. 70.

[35] Ibid., p. 72.