Transforming Architecture Through Symbiosis: Waste as a Resource

"Human progress has always depended on our technical ingenuity…but this is not enough." What we need is a new mindset, a new culture of design. Designers can benefit the global community by reconsidering the purpose, process, and products of design all at once. [1]

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INTRODUCTION

Community is an important element in the development of symbiosis in architecture, but it has been given little attention in relation to sustainability in architecture. Lance Hosey notes that the LEED (Leadership in Energy and Environmental Design) Manual, created and distributed by the United States Green Building Council, claims that a sustainably designed building helps to build a "sustainable community." However, LEED does not actually note what sustainable design is, or even what a "sustainable community" is. This is an important point, because as Hosey also notes the relationships between "ecological, economic, and social conditions" has been seen as important since 1994. [2] Yet, this idea of community relating to economy and ecology has not become as mainstream as we would think. Certainly the creation of the EPA (Environmental Protection Agency) P3 Awards: A National Student Design Competition for Sustainability Focusing on People, Prosperity and the Planet has helped to spread this idea nationally, but it has not actually fully penetrated into the architecture community. [3] This paper posits that through the connection with community a more sustainable architecture can be achieved using symbiosis to foster that connection. The discussion will center on an architectural design studio that explored these ideas as a basis to connect with both the community of our small university town and the university using sustainable design and community engagement.

So how do we, as architects and architecture educators, begin to instill this important lesson of community in relation to sustainable design? James Fennell, architect and planner, and Lola Scobey, Sustainability Director, of the Fennell Group have written about this concern, specifically in their book Build Ivywild: How Awakening an Old School Is Sustaining Our World. They feel that the national sense of "…common good and our sense of community are waning…" right when we need to depend on each other the most. The example of how community can be brought back into architecture design and development

is symbiosis. Fennell and Scobey expand on the traditional definition of symbiosis to include a cooperative environment forming a continuous loop based on respectful relationships and encouraging individuality. [4] There are three vital interactions for this type of symbiosis to work. The first is environmental symbiosis, which entails a relationship to the earth. This is something that architects have embraced with the adoption of LEED and the Architecture 2030 Challenge created by Edward Mazria. [5] The second essential relationship is functional symbiosis, or the relationship of economic prosperity. Architects are consistently dealing with the economics of architectural design and construction, except this is not just the relationship of budget of a project, but the long-term costs of the byproducts of human activity created by the programmatic spaces within the architecture. Therefore, the economic prosperity of the tenants of the architecture rests on the last relationship: cultural symbiosis. Cultural symbiosis is the relationship of the community both within the architecture, and the community outside of the architecture. This allows the functional symbiosis to work. Community members work together to share the byproducts of human activity, which, in turn, works towards a part of the environmental symbiosis of keeping this waste out of landfills. [6]

THE STUDIO

Build Ivywild is not just the title of a book, but also the idea of designing a symbiotic district to encourage the sharing of the byproducts of human activity. It focuses on the neighborhood level to address the economic, cultural, and environmental issues with transportation of waste. This has never been seen before in neighborhood planning until Build Ivywild, and tends to only be seen in more industrial and agricultural settings. [7] This studio was tasked to "Build Ivywild" in the small town where the university resides, and engages the community that includes the town and the university. This encompasses the same ideas and values as in the original Ivywild project in Colorado Springs, CO. That project was the renovation of an existing high school to house a main tenant of a microbrewer, with additional complementary programmatic tenants such as a bakery, community garden, coffee house, and architecture firm. The scale of the original Ivywild project is larger than that of this studio project but similar programmatic elements were maintained.

The studio was tasked with the reuse and renovation of two historic buildings in downtown Starkville, MS as one of the many sustainable elements of the design. The two main tenants were two new local businesses of a microbrewery and bakery. These two programmatic elements were to work in conjunction with a community garden and community space. The first three programmatic elements were meant to emulate the original Ivywild project, but the community space was added to enhance the connection with the community by providing a space for all members of the community in which the project was located. This was a way to foster the beginning of a symbiotic district by incorporating the community along with the businesses of the project. Students were also allowed to include other programmatic elements to the building that they felt would best support the symbiotic ideas that they had developed. This was to encourage the students to more fully develop the symbiotic district and not limit their ideas to the basic program provided.

The symbiotic district is also meant to include the university, being a land grant university, which can accept and provide the byproducts of human activity, such as spent grains and compost, that can be used in the project. The idea being

that the district acts as a closed-loop system based on the three interactions. Functional symbiosis is achieved through the shared byproducts from the various businesses in the district, and more specifically in the architecture. [8] The spent grain from the brewery can be used by both the baker to make bread, and by the community garden to make compost. The produce grown from the community garden can be used in the beer and the bread in addition to being shared with the community. This is an important aspect of the symbiosis because sharing waste allows reduced building operating costs while eliminating this waste from our landfills. Additional benefits include a self-reliant community and the inclusion of the community that promotes education and adoption of the symbiotic idea. [9]

FUNCTIONAL (ECONOMIC) SYMBIOSIS

Functional Symbiosis is the efficient reuse and repurposing of the byproducts of human waste to create economic prosperity for all involved. [10] This reuse of the byproducts of human activity has recently become a new market in the United States economy. Katy Steinmetz, a writer for Time Magazine, discusses some of the various businesses that have sprung up due to this important and rising need. Reused clothing retailer, Twice, helps to divert approximately 400 pounds of used clothing from landfills each year. Noah Ready-Campbell is one of the founders of the company and notes that he and his partner were inspired to both "…reuse clothing and avoid manufacturing more." This is an important issue as the United States trashes nearly 12 million tons of textiles yearly. [11] This does not include the large quantity of used clothing also donated to third world countries instead of empowering them to create their own textile industries and be less dependent on Western countries. It also shows that reuse of consumer waste can be a profitable and valuable part of our culture. Additionally, other ubiquitous items in American culture are not recycled. Plastic containers typically end up in landfills, or as litter, with only one-quarter being recycled. This leaves nearly 40 million pieces of plastic that could be reused and reduce economic and environmental burdens. [12] Cell phones are even worse with 90% being trashed despite the valuable metals and other toxic items as part of their construction. Even food is being wasted at a rate of 40% when we have so many Americans living in poverty and unable to gain access to proper nutrition. Symbiosis can also help remedy the issue of food insecurity as well by providing opportunities for the community to grow its own local fruits and vegetables using recycled byproducts of human activity as compost instead of having food thrown into landfills.

Economic prosperity alone is not the main driving force behind these new enterprises. Arun Sundararajan, business faculty at New York University, believes that the "human connection" is what makes these businesses successful. "There is a non-economic value that comes from giving your stuff to other people." Besides the functional and cultural factors that Sundararajan notes, he also remarks on the additional economic factor of reduced waste. [13] Using functional symbiosis in an architectural design can enhance the community connection by showing community members how sharing and reusing byproducts of human activity connects them in the architecture and throughout the community. Both the economic and community aspects of functional symbiosis can be supported by an architecture that considers the adjacencies and intricacies of sharing the byproducts of human activity for the benefit of businesses and the community.

ENVIRONMENTAL (EARTH) SYMBIOSIS

Environmental Symbiosis is the acknowledgement of the impact of the built

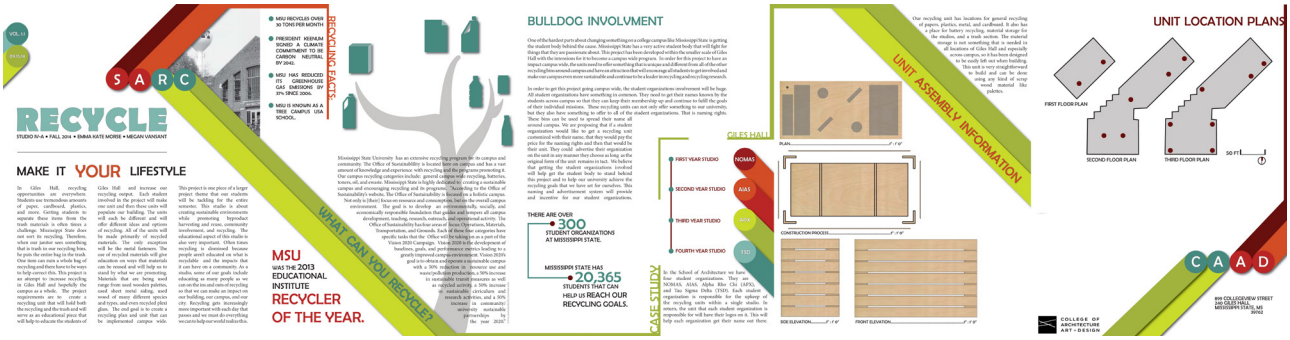

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Figure 1: *Recycling Plan* by Megan Vansant and Emma Morse

environment on nature by creating a mutually beneficial relationship with the earth. [15] This comes from questioning our relationship with the earth and the effect of our waste on the earth. While some waste can be used and reused in the architectural setting, such as the wastewater from the microbrewery tenant being used to water the community garden, others must be dealt with by society. Walter Benjamin questions the relationship between our trash and history as a way to interrogate the modern everyday. He examines the "spent and discarded materials that crowd the everyday." But to what purpose? He sees trash as the "detritus of modernity" which focuses on the past, rejecting the new, but since this is trash it is not glamorous and does not allow "sentimentalizing." Benjamin then uses this to propose a "trash aesthetics" which Ben Highmore posits in his article Benjamin's Trash Aesthetics, is a radical and critical attention to the everyday that could possibly even be called recycling, or "an ecology of everyday experience." [16] The studio project discussed here uses Benjamin's idea of "trash aesthetics" as a way to educate students and the public on the everyday and the use and reuse of consumer waste and its impact on the environmental symbiosis of this project. This was done with the preliminary conceptual development projects given to students, which required them to use "trash," or repurposed materials, that would have been thrown out.

The students began their education and inclusion of the community through three conceptual design projects based on the "trash aesthetic". First, students created a recycling plan and designed recycling containers for the university. (Figure 1) This was seen as a first step in outreach through the students and university community. It was important to approach the university students as the future consumers and community members who would ideally support this project and maintain its impact. Also important was the outreach to the other departments throughout the university to explore the idea of symbiosis by working with faculty and staff at the university, especially the College of Agriculture. The students met with the Sustainability Coordinator of the university, as well as the janitor of the School of Architecture, to discuss the feasibility of their ideas and how it would actually educate the target audience. The second conceptual project was the design and construction of an educational art sculpture. The sculpture, as well as the recycling container, was required to be built primarily of repurposed and recycled materials. Again, the idea was not just to educate the students through their research and investigation into the conceptual idea behind the project, but also the public. The sculptures were placed in various locations around the School of Architecture building, and students were tasked with also making the sculptures as tamper resistant as possible. The final project was also to use as much repurposed and recycled materials as possible in the creation of a dress and sets for the annual NOMAS (National Organization of Minority Architecture Students) "Trashion Show." (Figure 2) The "Trashion Show"

is a highly popular event that is attended by the university community, as well as the townspeople. It is hosted in the School of Architecture and was an excellent opportunity to showcase the things that students have learned in the studio so far.

Another way to look at the environmental impacts of this type of symbiotic project is through the qualities of a specific recycled material. Roland Barthes explores plastic, one of the most common of recyclable materials, and its everyday qualities. Those qualities include "…infinite transformation…" and "…ubiquity made visible…," and also apply to this project. [17] The use of existing buildings is paramount to this project, not just for the sustainability of using an existing building, but to show the flexibility, the plasticity, of architecture over time. James Fennell uses the old Ivywild School in the seminal project discussed in his book because it is reused to create the symbiosis necessary to generate the change that is needed in architecture and the community. This is due to the reuse of an existing building, instead of demolishing the building for new construction. It was also due to the location of the old school in a residential neighborhood, which would then support the newly programmed school building and encourage walkability to business, retail, and dining.

The studio project emulates this by incorporating two existing historic buildings in downtown Starkville, MS and tasking the students with incorporating the new program into these spaces, as well as the development of the connective outdoor spaces between each building. The outdoor spaces were looked at as public parks and event spaces that could be used by all. Additionally, the project site is within easy walking distance of several neighborhoods within the town. The students also researched LEED and the sustainable aspects of breweries, bakeries, and community gardens to begin a conversation on the environmental symbiosis for the architecture. Some of the additional environmental design aspects incorporated by the students included the use of bioswales, natural lighting, natural ventilation, natural shading, energy efficient lighting, and rainwater collection.

CULTURAL (COMMUNITY) SYMBIOSIS

Cultural Symbiosis is about people, both as a community and an individual. The conjointly favorable relationships that are created in this type of project are based on people's individual skills and experiences as well as their associations. [18] The ability to work together with a wide variety of individuals for the common good requires a flexibility and plasticity that can benefit everyone. Plasticity can also be seen as a part of the cultural symbiosis that allows society to be educated through this project and, as a result, evolve to fit the growing need for a more environmental and economical model of design. The public can be taught about the symbiosis inherent in the project through the design of the building, as noted by Victoria Meyers, David Niland Chair at the University of Cincinnati School of Architecture, in her manuscript Green Politics. However, one must be careful not to fall into the 'green-washing' trap of using only sustainable materials, but must make a larger statement with the design of the building. Projects such as the Swiss Re Headquarters and the City Hall in London, both by Foster and Partners, showcase a public image of green architecture that is out for all to see and learn from. These types of projects do not limit themselves to being a "public image," they also bring up concerns of how architecture can "…integrate itself with nature rather than disrupt the ecological field." [19] This is the very point of the symbiotic idea, to work along with nature instead of against it. The studio project does this by building on the educational conceptual projects and creating

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Figure 2: *Trashion Show Outfits* by Lorianna Baker and *Educational Sculptures* by Ryan Bridges and Lorianna Baker

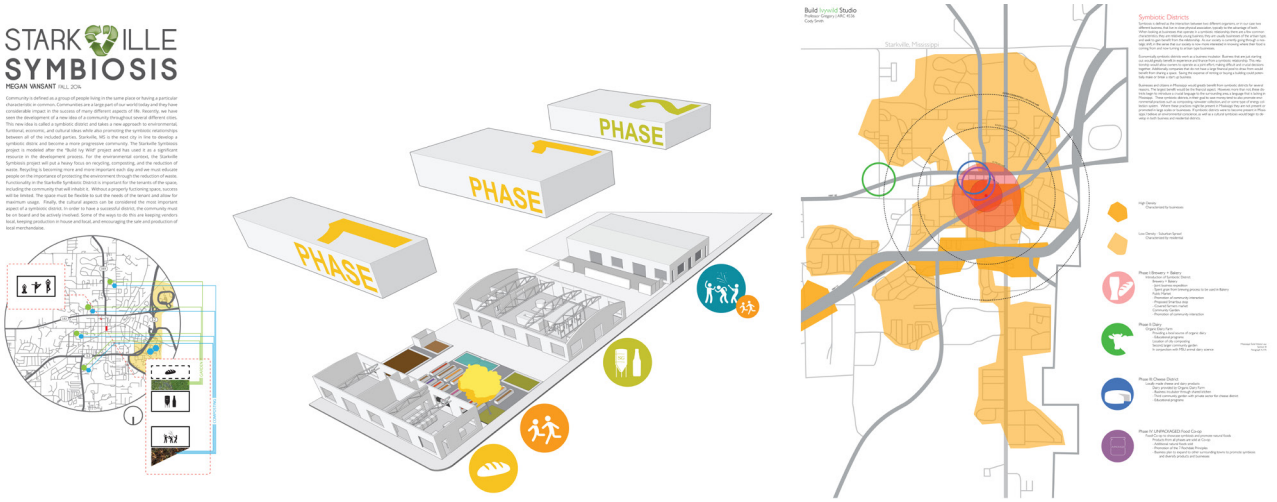

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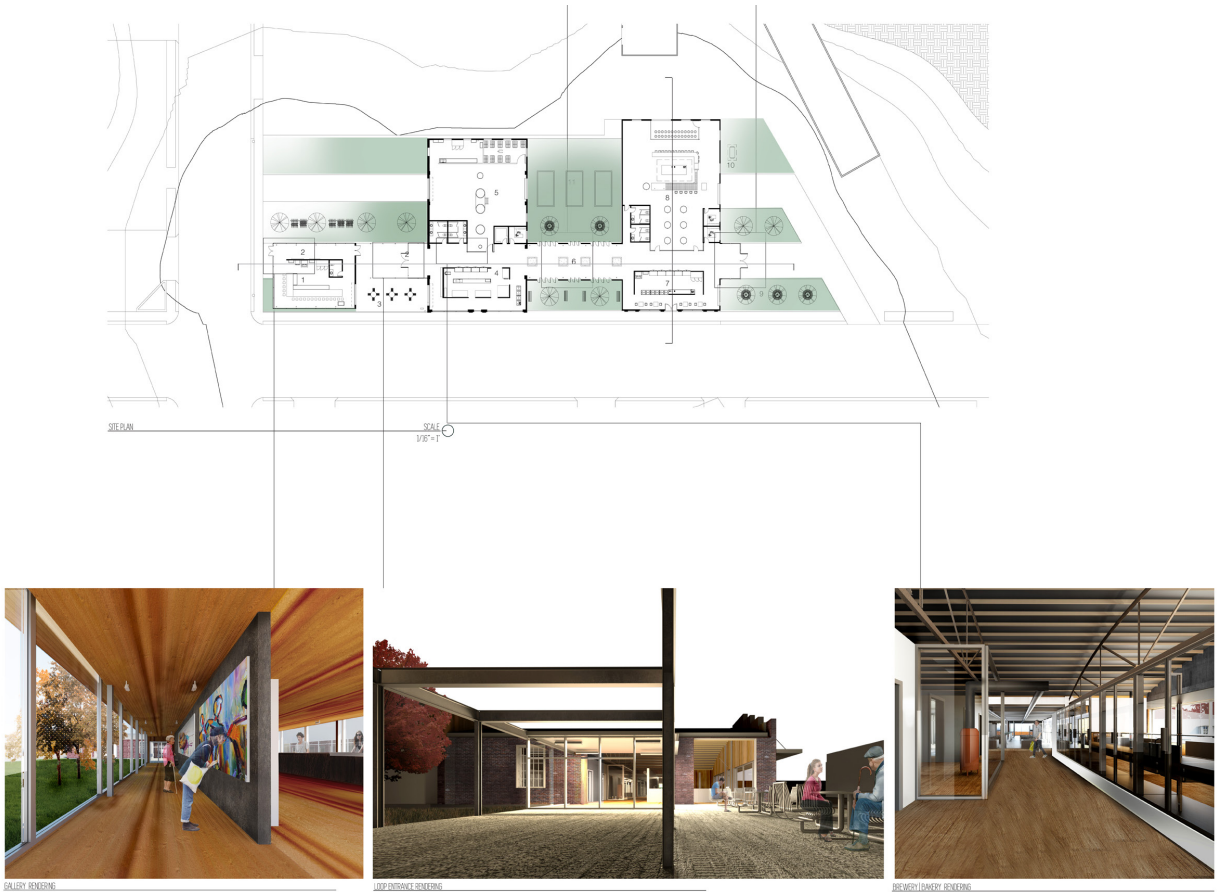
Figure 3:*Cultural Symbiosis Diagrams* by Megan Vansant and Cody Smith

a building design based on the culture and community influences inherent to this particular project site. Incorporating walkability, public venues, a brewery, and community garden tie into the existing influences of the small southern university town in which this project resides. Harnessing these elements ties the project to the community in a way that will lead to the success of the architectural design and the symbiotic district.

Leon Trotsky discusses the "…domain of custom and habit…" and how it "…occupies but a negligible place in the history of man," which is important to the development of the cultural symbiosis of this project. [20] Even with a great public image, the community must see the project as being integral to the habit and custom of their community. The project is located in a small, southern town where, despite the existence of a major research university, the local population is resistant to change. Trotsky states that "…new morals cannot be produced out of nothing; they must be arrived at with the aid of elements already existing, but capable of development." [21] The recognition of this barrier is important in the development of symbiosis so that the community feels that the project is culturally part of their surroundings, and not opposed to it. Paraphrasing Ghosn and Jaziary in their article Geographies of Trash, how can we fashion a process that uses consumer waste in a way that engages the economy to "mobilize social capital and social space"? [22] Symbiosis can establish that process, which creates a district limiting the transportation of the byproducts of human activity while supporting the environment and community through the use of culturally significant ideas based on place. This studio project does this through the development of the community spaces and transparency, as well as the integration of the functional symbiosis ideas and spaces into the community.

THE FINAL PROJECTS

The students took the information they learned and incorporated an educational aspect into their architectural designs while also integrating community through the procession of spaces, the use of entry, and hierarchy. While focusing primarily on the building design the students were also tasked with incorporating the community as learned about from reading Build Ivywild: How Awakening an Old School Is Sustaining Our World. This included the creation of a community engagement diagram on how they would interact with the community through the project. (Figure 3) It also included a proposal for a "Phase II" of the



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Build Ivywild project where an expansion of their symbiotic ideas would occur in the town in relation to the original project site. This “Phase II” could include an expansion of the brewery or bakery, or could instead add a different program that would enhance the functional symbiosis. A cheese maker, which could contribute excess water from the cheese making process, is an example of one type of Phase II project types chosen.

Solutions to the development of a symbiotic architecture that includes community ranged from projects that took connection literally and figuratively. The project that used connection literally created a spine that connected not only the spaces between the two existing buildings, but also the process of brewing. (Figure 4) The spine spaces educated the public by showing the pipes the moved the beer throughout the building during the brewing process. It also showed how the byproducts of the businesses in the architecture were shared between the spaces. The connective spine also allowed for the division of public and private space but still gave views into the baking and brewing processes. Community engagement was achieved through the development of the spine and connective outdoor spaces that draw people in to use those spaces and visit the businesses. Two added programmatic elements of a restaurant and ice cream shop were added to encourage a wider range of community members to visit the project and learn more about symbiosis while enjoying the public spaces and the products of the businesses.

The project that was more figurative in the use of connection to develop the project used building form and path to connect the existing buildings and required programmatic spaces. (Figure 5) A path was carved out of the two buildings and

Figure 4: *Starkville Symbiosis* by Kevin Flores

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Figure 5: *Starkville Symbiosis* by Aryn Phillips

at that path the buildings were pushed and pulled to show a solid/void connection between the outdoor spaces and the indoor businesses. A public pavilion was added to the corner of the lot to both hold the corner and as a public beacon for the project. The transparency of the pavilion enhances community through open sightlines into the existing buildings and the path that leads you through them. This transparency also educates visitors to the project by being open with a lot of glass to show the processes of the brewery and bakery, as well as how they share their waste with the rest of the building and community.

The ideas produced by the students will be used by the local clients and Build Ivywild to encourage the development of an actual project in town. The use of the Ivywild School case study project in the book by Fennell and Scobey shows the large amount of work, both cultural and political, to get this project off the ground. Yet, through the social contracts that are being built from the work of the students this is the beginning of the symbiotic idea and district to come. [23]

CONCLUSION

The students came up with many great ideas on how to create symbiosis on the three scales of the building, the community, and the town. However, issues arose in the development of how to appropriately engage the community and use the project site. The project site, just like the surrounding sites in this empty downtown, did not hold the corner and therefore created a problem of how to create an "urban" condition in this small, rural downtown. Varied responses from

students included the creation of a public park in the open space, adding public venues like an amphitheater, and the addition of new buildings. The addition of a new building to hold the corner seemed to be the most successful, but the downtown area also needs green space badly as it has none currently. The balance of public/private space in a symbiotic project was not adequately addressed and should be explored more in the future if this is to be a model for cultural symbiosis.

The space needed by the two main tenants of the brewer and baker was also different and therefore most students divided them up into the two existing buildings. This created opportunities of community connection in the open space between the two buildings. However, it also created problems in the sharing of the waste created by the businesses, somewhat hindering the functional symbiosis. Students varied in their development of the three open spaces as well. Some embraced the open spaces and fully integrated them into their building design. While others saw them as an afterthought, something for a landscape architect to deal with. These open spaces had the most potential to engage the community as they were meant to be spaces for everyone, but the students struggled on how to incorporate them into their "built" spaces as a way to foster community.

Lastly, the students did not adequately engage the environmental symbiosis of the project. Perhaps it was because this was the most familiar due to the ubiquity of sustainability in studio projects and lecture courses. The students tended to focus on the cultural symbiosis of engaging the community and the functional symbiosis of how the businesses shared waste instead of seeing all three as one organism that needed to be addressed. Despite these issues the students were able to involve the community as part of the symbiotic process through the creation of knowledge about symbiosis in architecture and the creation of public spaces to make a more sustainable architecture. Symbiosis can only be shaped through the development and sharing of this knowledge, and a transformation of architecture that uses waste as a resource to educate and bring together the community for economic, environmental, and cultural benefits. Community is the biggest resource and should not be wasted. Architects and architecture educators can help the community stake out new territories through the integration of symbiosis in architectural design.

ENDNOTES

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7. Ibid, 5 and 46.
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