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Women and architecture: Remaking shelter through woven tectonics

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Women and Architecture: Re-Making Shelter Through Woven Tectonics

by

Kirsten Lee Dahlquist

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Architecture School of Architecture and Community Design College of The Arts University of South Florida

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Dedication

This thesis is dedicated to female architects working to sustain life for our children and grandchildren. These women possess the capacity and the spirit for change.
Acknowledgements

I would like to thank the divine guidance of Anni Albers, the most influential and prolific weaver of the 20th century. We never knew each other, but at the loom, Anni is always with me.

I would also like to thank the supportive family and friends who used their hands to make this thesis dream a reality.
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Women and Architecture: Remaking Shelter through Woven Tectonics

Kirsten Lee Dahlquist

ABSTRACT

Weaving and architecture, conceived simultaneously with cave paintings, are two ancient forms of craft used to enclose space and provide shelter harmoniously with nature. In its basic composition, a useable textile is the interlacing of two members, warp and weft, at right angles to create structure and surface respectively. Textile artist Anni Albers of the Bauhaus attributes the organization of weaving to the skills of an ancient goddess. Her understanding of prehistoric cultures further links women closer to the overall creation of structure, though perceived as a masculine endeavor. Consequently, early advancements in architecture, the structural organization of shelter, are a result of feminine inventions. Moreover, it has been the female who has been entrusted with emotional and sensual elements of shelter since prehistory. Through the creation of a home, woman's mastery of the domestic realm strengthened and led to gender-defining ideologies. Suburban typologies of the post-war United States heightened the feminine domestic role through social and environmental isolation of the gender. The suburbs ironically conditioned an alternative sentiment of the built environment featuring ideals of tradition, sustenance, and continuity with nature.

In the modern era, weaving and architecture have devolved to be similarly designed and chosen for aesthetic qualities only. Textiles are produced for an indoor existence with weaving traditions unchanged and innovation seen in synthetic fibers. Modern shelter is chosen and constructed using inefficient practices popularized in the 1950s, with advancements only in materiality. Both disciplines overlook their feminine link and mutual advantages of protection, flexibility, user connection, tactile engagement, and environmental impact.

As a result of this disregard, the capacity of the planet suffers due to outdated and unsustainable residential building practices, while quality of life degrades due to the abilities of built spaces to nurture and engage inhabitants effectively. Based on eco-maternalist philosophies within architecture and the structur-
al, spatial, and tactile qualities of weaving, these crafts can again interlock into a modern, efficient construction of shelter. The time has come to rethink building design and the feminine integration of weaver and architect provides a foundation for the discovery of an appropriate assembly for the next generation.
this internal sense to the prehistoric era, when human kind began to insulate from nature, women created a meaningful, physical abstraction of what they intuitively understood. The invention of weaving became the means by which women could construct a permeable home for their families, enclosing yet still connected to nature. As society modernized, shelter retreated from weaving and nature and as a result, became generally disconnected with its inhabitants and failed to meet established prehistoric standards. Women transformed into dwelling decorators, not able to adequately care to families within homes which were premade and had no innate significance. With the invention of the suburbs in the 1950s, industry and mass production typified methods and means of construction of the single family home, placing quantity over quality. Modern shelter embodies an architecture of thoughtless form, promotes a lifestyle unconcerned with the future of mankind and nature, and is a physical representation of culture based around the artificial. As society has evolved far from prehistoric times, can the modern form of shelter truly be considered progress?

On observing the connections between constructing shelter and the nurturing, sustaining behavior of the female species, sculpture artist Erin Curry states “Our first architectural home is mother. A mobile shelter—structured by bone, held together by tendon and muscle, and insulated by flesh—carries us through an enormous world. Unseen and unseeing, we exist in a completely protected space.”¹ This initial relationship indicates that women possess this sense of care and compassion innately, as it is their internal structure which carries forth the next generation. Linking

１ Curry, Erin, “and then because I realized I have not written about dwelling,” Sculptress Studio, http://sculptress-studio.blogspot.com/2008/03/and-then-because-i-realized-i-have-not.html.
Connections of Weaving and Architecture

In initial regards to etymology, Mark Garcia author of Architextiles points to several unequivocal connections of the ancient crafts of weaving and architecture. “Textile, technology, text, texture, connection, and context are all derivative inflections of the same proto-Indo-European word, tek, which is the root of architecture. Additionally, technology and textile are also both derived from the Latin texere, meaning to weave, connect, and construct.”2 In the Four Elements of Architecture and Other Writings, Gottfried Semper further affirms the connections of architecture and weaving in that they occur concurrently in prehistory as the first form of shelter for humankind.3 The invention of aligning two members found in nature at right angles to each other initially led to the weaving of a basic enclosure system. Prior to the inventions of crafts such as pottery or metalwork, humankind developed the pen, a woven structure “bound together from sticks and branches...as the earliest vertical spatial enclosure.”4

Renowned modern weaver Anni Albers also points to the earliest creators of woven structure, the ancient Peruvians, as initially using textile techniques other than weaving, but ultimately a more formal weaving took over with the addition of organic fibers and later spinning of material from living creatures replacing branches.5 Semper elaborates the establishment of woven architecture for shelter precedes even that of the primitive stone wall, a basis of space making within architecture. The “enclosure and separation” of permanent architecture also occurs after the invention of woven architecture.6

Phillip Beesely and Sean Hanna state in Extreme Textiles that “the first building materials to emerge were not masonry, but woven.”7 The use of primitive woven architecture as a defense from external elements also precedes the creation of textiles as clothing. “The art of dressing the body’s nakedness is probably a later invention than the use of coverings for encampments and

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4 Betsky, Building Sex, 12.
6 Betsky, Building Sex, 13.
spatial enclosures. To protect and contain the human body animal skins, and later woven animal fibers, were stretched over a latticework of branches, to shed water, hold off the wind, and provide shade. This textile house provided the means of prehistoric protection for humans through its functioning as the first "secondary skin" system. Most notably, this rudimentary enclosure system traditionally created by women establishes initial ideals of "home," a separation of the "inner life separated from the outer life" and "the formal creation of the idea of space" for prehistoric cultures. In Extreme Textiles, Susan Brown notes that the most fundamental human endeavors have roots in ancient textile weaving. Realizing the pen and tent as the birth of weaving officially places it as the nurturer of humankind and a fundamental motivation for principles of modern shelter.

Although architecture and weaving are fundamentally connected through basic woven shelter, it is however important to note the level of shelter permanence presents a discrepancy. "If the nature of architecture is the grounded, the fixed, the permanent, then textiles are its very antithesis" states Anni Albers. As roots of humankind began with nomadic tribes, their textile houses, the tent, evolved to be easily transportable. Aaron Betsky, author of Building Sex defines the tent as "flexible object that you can build very easily and then change as you need; you can expand, contract, or change its direction without having to worry about foundations or even about openings." He elaborates that every part of the structure can be easily constructed by re-weaving as required as the tribe moves. Anni Albers remarks that it is not only the tent that requires ease of relocation, but that the methods by which the structure is carried are equally significant, requiring additional invention and construction. A woven net or bag, comprising a group of strings carries the disassembled tent while the textile material itself, "pliable and lightweight" adds to the ease of mobility. It is here that she notes the requirement of movement contributed to the development of a woven textile, rather than bulky hides, to decrease the weight of the transportable tent shelter. Acknowlege:

8 Betsky, Building Sex, 12.
9 Albers, Selected Writings, 45.
10 Betsky, Building Sex, 12.
11 Ibid,13.
12 McQuaid, Extreme Textiles, 38.
Weaving like architecture, despite differences in scale, is the regular interlock of two perpendicular members, leading to a product based on a logical structural order. According to The Manual: The Architecture of Kieran Timberlake, weaving and architecture are both created from basic structural elements organized using replication and alignment to form an overall pattern. In both disciplines, these fundamental constructions, when successful, also reveal the honesty in the process of making and creating form. Anni Albers states that “the more clearly the original formation is preserved or stressed in the design,” the more successful the weaving will be in both structure and appearance. With their alternative approach to Modern architecture through the assimilation of design and construction, the Jersey Devil Architects concur a true honesty within architecture occurs through expression, similar to Anni Albers approach to weaving. Seen within Modernism, “architecture bases its claim on to truthfulness on its expression.”


17 Ibid.

Honesty is subsumed by the manifest…” An integral component of both weaving and architecture, clear underlying structure ultimately conveys overall truthfulness to form.

Both subjects are structurally organized from numerous parts conforming to a solidified entity; however the precise composition of the structure of weaving differs from that of architecture. Modern buildings are assembled using a strict structural methodology based on compression and carried out in a precise sequence. “Primary elements support secondary, secondary supports tertiary, and so on.” Fundamentally, the size of each structural member is equivalent to the sequence of construction, creating a “hierarchy of support.” The weight of each member added must be supported by the member below it, contributing to greater bulk and permanence of the lowest level members. The organization of textiles is considerably different as each member shares an equal amount of importance within the whole. “Instead of fixed, rigid connections based on compression, textile structures use

![Weave Diagram](image)

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21 Ibid.

22 Ibid.
the construct, essentially creating a truly “balanced system.”

It is equally significant to note that the non-hierarchical systems of weaving parallel a similar system present within a natural ecosystem. Kim Tanzer and Rafael Longoria reveal in *The Green Braid* that an ecosystem is “comprised of elements of many diverse kinds of plant and animal life brought together by physical proximity. Such an ecosystem depends equally on contributions from all types of diversity.” Furthermore they highlight that hierarchy is a human-made concept created to rationalize “the goal of planetary dominance,” which is a fundamental opposite of an ecosystem.

William McDonough and Michael Braungart in *Cradle to Cradle* also tell of the equalities in the natural world:

> Each inhabitant of an ecosystem is therefore interdependent to some extent with the others. Every creature is involved in maintaining the entire system; all of them work in creative and ultimately effective ways for the success of the whole.

As an honest and primary abstraction of nature, weaving is the basis of architectural shelter, thus the incubator of humankind.

23 Ibid, 38 and 109.


25 Ibid.

Making Shelter and the Implications on Women

In *Building Sex*, Betsky asserts that even before the invention of a physical woven shelter, around 7000 BC, the primary location of human gathering for comfort, communication, cooking, child rearing, and making was the campground. It was a natural location round in shape, non hierarchical, neither horizontal nor vertical, inside nor outside, or void nor projection. Understandably as shelter evolved, the campground served as the logical site of a textile shelter. The woven tent, created by women, emerged comprising an abstraction of the campground into a flexible and transitory object. However, in volume the tent had characteristics of both void and projection, seen from its curving arc moving from the horizontal to vertical axis. The tent was generally rounded in form and free from internal edges to eliminate spatial interruptions. In doing so, occupants are afforded maximum connection, both at the physical and emotional levels. Anthropologists note that such intimate interaction between occupants in the shelter only occurs in modern day within a mother-to-infant relationship. It has even been suggested by Freudian theorists that the organic character of a tent shelter is a symbolic expression of the environment of the womb. However symbolic, they include sections outside where tool making and domestic work occurs and the activities of inhabitants can be expanded due to spaces seamlessly flowing from interior to exterior. Interior spaces are additionally filled with translucent light. The shelters allow for ease of adaptability in size and flexibility for inhabitants. Children are not required to sleep with their parents, they are encouraged to stay with extended family and befriend other children within the camp. Within the nomadic culture, no shelter is fixed and no land is privately owned. Shelter within these cultures does not enforce separation between families and relatives, but rather it embodies the ideal of a social cohesiveness, a community. Most importantly, while women held the ingenuity for tent design, both women and men constructed them communally. “The building activity may also be ritualized, as the “performer” sets into motion a body of traditional knowledge shared with other women...” It is the woven tent of women that makes everyone a home in the world.

28 Ibid.
29 Ibid.
30 Ibid.
31 Ibid.
32 Ibid.
The campfire, and later the woven tent became a place where women frequented more regularly than men. As such, the campfire has been determined to be the location of two pivotal acts: the origins of architecture and also matriarchy:

The women were the ones who bore children, and they were the ones who could weave nature together into clothes, baskets, and tools. Women were the guardians of the future of the group, those in control of technology the turned raw materials into food and protection, and those who probably managed to fix unspoken rules into commonly held beliefs.  

As these findings dictate woman’s connection to shelter in prehistoric life, the question still remains as to how women first came to be been entrusted with such undertakings? The solution resides in the fact that biologically the raising of children was not the predominant duty of men, as breast feeding took up to three years. If a community required women to provide any type of work, their participation depended solely on the compatibility of this work with the requirements of child care. “Thus, if the productive labor of women is not to be lost to the society during the childbearing years, the jobs regularly assigned to women must be carefully chosen to be compatible with simultaneous child watching.” As young children resided mostly inside shelter, women needed to be nearby and their domestic work required certain flexible characteristics: a reduced amount of concentration, repetition, interruptible, easy resumability, and not dangerous. The idea of hunting live animals with a child on one’s back is not conducive to the safety of the child or the effectiveness of the hunt. Weaving, spinning, sewing, basket making, and preparing daily food all adequately fit the specific work requirements for women out of necessity, in addition to successfully nurturing the next generation.

Although women’s duties were of utmost importance to the survival of the prehistoric people, present cultures disregard the biological necessity, and the seed of a social construction of gender is planted.

In regards to the modern era, dwellings, until the 19th century, were not for a single family but rather consisted of a large permanent building containing residences and workshops with spaces to house the immediate family as well as the extended family, protégés and household servants. Communal living and working was still predominant and shelter was not separated into spaces to house the immediate family as well as the extended family, protégés and household servants. Communal living and working was still predominant and shelter was not separated into

33 Ibid, 10.
private/public realms, as seen in the more modern times. As industrial invention began to dominate the natural world, the idea of domesticity within shelter was defined, delineating a separation between work and home and of the masculine and feminine worlds. The nature of the two genders considered men capable for work in the public realm and relegated women to turning the private sphere into places of respite and rest for husbands and fathers. Industry also moved basic textile production and other traditional work for women and the home into factories and everything now was becoming readymade. In Negotiating Domesticity, Joan Williams states when men began working outside the home “a whole ideology thus came into being which justified the gender division between breadwinners on one hand and caretakers on the other hand.” This is important as it highlights the decrease in significance of women’s work and as a result the dawning of modern social constructions of gender.

Because of this nineteenth century division, the successful ability to shape the home for husbands, fathers and children and the overall quality of the domestic environment has come to represent and dominate the woman. Fashionable domesticity guides and home economic science campaigns of this time targeted women and identified their performance of modern matronly duties as necessary to enrich the comforts of shelter and provide escape from the world outside. Clarence Cook notes the woman was both a manager of tasks and controller of aesthetic harmony within the home as dictated by Ladies Home Journal and House Beautiful. Women spent long hours executing these learned, domestic tasks on a daily basis as prescribed in these journals to make a home, eventually ascribing their self worth to their homemaking abilities. Coupled quite directly with the representation of the home and the quality of family life was now the representation of femininity.

Keeping in mind the role of shelter in “social constructions of gender,” Making Space suggests masculinity and femininity soon became identified characters as opposed to the scientific, biological roles of man and woman of prehistory. These characters soon transferred into shaping the built world of the 20th century.

37 Baydar, Negotiating Domesticity, 7.
39 Baydar, Negotiating Domesticity, 200.
40 Matrix, Making Space, 7.
tury and developing patterns for what it should look like.41 Most notably, the new housing typology of the suburbs, a response to the post-war housing crisis and an alternative to the blight and pollution of the working-city environment accurately embodies these gender constructions. New suburban housing developments not only offered material gains from previous models by emphasizing the importance of a clean, quiet, and orderly home environment, but they also further highlighted the social constructions of gender.42 Created with the planners’ intentions of 100% car ownership, based on a grid, and zoned into locations for specific activities, Making Space uses the new “ideal town” example of Milton Keynes, built in 1967, in South East England as an example.43 Home and leisure activities are split with access to these areas being quite difficult without the availability of an automobile. Typically, at this time most men utilized the family vehicle to travel to their place of employment during weekdays and even in households with two vehicles, many women did not know how to drive. Public transportation was available, yet highly inefficient and foot and bicycle paths existed, but comprised a winding and non-direct, lengthy route. Women were therefore relegated to a limited local realm, now not just because of their previously outlined domestic duties, but more significantly because of a genderized disparity in access to mobile resources.44

The suburbs, based on an escapist notion and the desires of personal independence, segregated the domestic space and sanctioned the woman’s duty of cultivation of a retreat free from outside influence for husbands and fathers. In Building the Dream, Gervase Wheeler states a common agreement at this

41 Ibid, 38.
42 Ibid, 44.
43 Ibid, 39.
44 Ibid, 40.
time was that “Americans tended to enjoy associations with others in their politics but not in their homes.” 45

The dwelling for each family in the suburbs now became an individualized unit, a welcomed improvement upon 19th century multi-family housing that was attributed to slum conditions. Coincidentally, the assumption that a separation from outside elements and families would enhance the family nucleus actually contributed intensely to the isolation of women in the suburbs. Additionally, the suburbs were constructed to differ significantly from the modern city, with the implementation of a clean, village-like utopia in a natural setting, far beyond urban extents. 47 The development home and close community as notions of progress in reality contributed to social gender constructions shaping the built environment and ultimately dictating the roles of women within modern shelter.


46 Matrix, Making Space, 55.

47 Betsky, Building Sex, 145.
Chapter Two:

Case Studies

The Bedouin Tent

The Bedouin are a predominately desert-dwelling Arab ethnic group, ranging from semi-nomadic to nomadic within the Persian Gulf States, mainly the countries of Jordan, Saudi Arabia, Israel, and Syria. Central to the Bedouin tribe is their form of shelter, the goat hair tent, or bayt which is also the same word in Arabic for the familial unit. Dating back to the time of King Solomon and still used today, the goat hair tent is well adapted to the climactic challenges of desert life and can be dismantled in a short period of time for transport to the next site. Traditionally Women have been the weavers of goat hair into yarn for modular tent panels and also the erectors of the actual tent structure.

The Bedouin people successfully utilize a material which is manufactured and extracted locally, as well as renewable as their primary source for tent creation. This is an ideal scenario as goats of their own herd are sheared in the spring and new yarn is spun and woven on a yearly basis. Tents typically take up to a year to create and last from 5 to 20 years depending on the concentrations of actual goat hair, as other substances may be added to decrease cost. Utilization of local and renewable materials is an integral part of the search for a new construction method or assembly as negative environmental consequences due rising fuel and transportation costs, pollution as a result of transportation, and depletion of long-cycle resources become apparent. Conventional building materials also require natural resources in production, greater growing periods, and are often take business away from local economies if made in other areas.

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49 Ibid.


The method of weaving employed by the Bedouin women not only makes the family tent, but also rugs, saddlebags, cushions, and all other necessities for the home. All items start as narrow strips which are further lengthened or cut depending on their ultimate use. Individual panels of the tent can also be replaced as required, without destroying the entire construct. As an important shelter piece, such as a roof panel, becomes worn it is relocated to a less demanding area of the tent, such as the sides. When the side sections become worn, they can be converted into a saddlebag, rug, or tent patch. When a piece is no longer useable, it is left in the desert to decompose back into the earth as it is made of organic material. As modern recycling is seen in today’s society as a “cure-all” for the ills of waste production, it is rather downcycling or a reduction in the quality of the waste material and transference to another form. Unlike the Bedouin tent, modern materials are not specifically designed to become something else of substantial quality after their initial use or for safe indefinite disposal. However by implementing their smart materials and production methods into the making of a modern weaving construct, there can be multiple intended uses after the initial expires and the product can coexist within nature during its life and afterlife.

52 The World of Bedouin Weaving, “Weavings.”

Figure 7. Bedouin tent descriptive graphic.

Typical erection of the tent occurs by unrolling the goat hair panels, stitching them together into a rectangular shape, and raising the fabric on poles. Guy ropes tied to the panel edges stretch out several feet and are tightened and tied while pegs are pounded into the earth to stabilize the structure. The fabric skin
of design and construction for a desert dwelling people, however this is an inappropriate type for non-nomadic people seeking shelter within a locale containing ample resources. The Bedouin example is useful in providing supplementary ideas to enhance new directions, but the specificity and need for movement is no longer applicable for modern day.

Although some Bedouin have reverted to a static, urban lifestyle, most of them are still nomads like their ancient ancestors. Continuously traveling in a region where resources were always meager provided a natural cycle of replenishment for fallowed lands. The Bedouin form of shelter has been tailored specifically to this necessity of movement for resources. The tent climactically responds to different locations and seasons by opening and closing different side flaps. Additionally, it can be erected in sections, depending on the level of permanency desired by increasing tent width and rows of poles. Complete deconstruction can occur in less than an hour.54 This is an extremely effective method


The Spanish Pavilion

The Spanish Pavilion for the Shanghai Expo 2010 by architectural firm EMBT of Barcelona is designed and conceptualized using traditional Chinese and Spanish basket weaving techniques. The Shanghai Expo aims to be the most sustainable and technological of all its predecessors, providing the Spanish “Habitable Construction” a sound platform for experimentation within both fields.55 Developing the handcraft technique into a method of construction also enabled designers to build a bridge between East and West, namely the increased business relations of Spain and China.56 The 75,000 square foot pavilion has an east wing divided into three floors where visitors are able to access several public services such as a tapas bar that can hold up to 300 people and where cuisine based on Spanish products will be offered. A retail store, a 200 person capacity auditorium, and a business center which takes incorporates the Expo’s functioning as a meeting place to increase and boost the Spanish business presence in China.57 An underlying concept of the pavilion is taking tradition and turning it upside down while joining two modern cultures with their shared handcraft history.58

“You have to work with traditions and transform them into new life,” says Benedetta Tagliabue of EMBT, in regards to joining ancient weaving with the sensual curves of a showcased modern pavilion.59 Although confident in a weave structure for the pavilion, the architects initially had not fully explored the final material. After a global research tour, the natural material of native willow stems was selected due to its ease of artisanal hand weaving into a wicker mesh.60 Serving as a climactic membrane, the mesh will filter and flicker sunlight to the interior and will repel water thanks to a protective waterproof coating.61 Seeking inspiration from local and handcrafted methods and materials enables architects to question and invent based upon the already proven

57 Shanghai Expo, China Briefing.
59 Ibid.
60 Ibid.
and successful, while also strengthening cultural and social traditions. Furthermore, a sense of pride is derived in the making of the wicker panels by the Spanish weavers knowing this is for their own country. This project also demonstrates that the need for new ways of enclosing space is possible and realistic using uncommon approaches. It is additionally interesting to note that when embarking on the project, EMBT was not aware they were not alone in undertaking a woven structure. Typically for small utilitarian objects, wicker and other woven materials are gaining acceptance as industrialized products through companies such as GKD Metal Fabrics in Germany.\textsuperscript{62}

EMBT acknowledges that using a natural element was a large step and it took some client convincing, but the impermanence of the work empowers an innovative and experimental spirit in design and construction. The uninhibited plan houses an relatively unbounded program, enabling spaces to be free flowing and ideal for the sweeping willow mesh enclosure system. The non-traditional material also comes with limitations and luckily the six month duration of the Expo allowed EMBT to skirt such issues as long-term maintenance and vast climactic and seasonal changes.\textsuperscript{63} However, Benedetta Tagliabue felt that with proper maintenance and timely substitution of worn wicker panels, a more permanent building could be created, perhaps even for housing.\textsuperscript{64} Panels are now being tested under normal outdoor conditions un-

\textsuperscript{62} \textit{RIBBA Jounral.com}.  

\textsuperscript{63} Ibid.  

\textsuperscript{64} Ibid.
der the Barcelona sun.\textsuperscript{66} Having the freedom to experiment, without many consequences is an ideal scenario for the creation of a new woven construct. The venue and use of the building enables different user experiences and perceptions of the space, prior to the introduction of more formalized conditions. The international presence of this alternative building practice also exposes to the layperson outside of architecture or construction that a new set of ambitions are replacing traditional thinking. In the search for new methods, this might not be the ultimate approach but it at least it transforms thoughts into concrete form.

Developing the handicraft technique of wicker weaving into a practice of construction was the goal of the architects of EMBT. Simply connected yet separate was the approach to the skin/structure relationship employed in the pavilion design. The structural system essentially consists of woven panels hung from a skeleton of undulating steel beams and pillars which is easily dismantled.\textsuperscript{66} The contrasting nature of the free flowing wicker to the firm and regimented structure permits the innovative geometry to be realized. Wicker panels are fabricated by a variety of different artisans, thus necessitating a wide margin of error and a straightforward junction system in their assembly.\textsuperscript{67} Wicker panels were designed using in three weaves, three different colors, and in three different shapes, all adding to the variety and complexity of the skin.\textsuperscript{68} This innovative and integrated relationship of the skin and structure is a positive step from the separateness of the Bedouin tent components. Despite this structure also being temporary, it begins to further explore ultimate permanency and adaptability of a habitable woven structure. Accepting that the wicker is of flexible and woven nature and, in this case, not one of rigidity provides a sound rationale for an accompanying structure. The structural skeleton essentially forms its own fabric to support the skin, thus creating a double layered hybrid. This is a viable solution however, with the explorations of metal fabric and mesh, the fabric could eventually support itself, fabric skin as structure. As the willow stems of the wicker panels are a natural material, their life span as useful cladding comes into question. Their ability to filter and flash sunlight into the interior is a positive attribute, along with their local harvesting and manufacturing.

65  Ibid.
66  Ibid.
67  Ibid.
68  Ibid.
The Textile Works of Anni Albers

The creation of useable textiles, such as tunics, carpets, and blankets linked the artisan with the manufacturer and the beautiful with the useful. Historical accounts recollect it was a divine female being who presented the act of weaving to mankind establishing ancient connections of women to textiles. Drawing from this historic link and ironically from gender prejudices of the time, the all female Weaving Workshop of the German Bauhaus was established in 1919. Although the Bauhaus was created as a response to reforms of art education searching for the anti-pictorial and avant-garde, weaving was still primarily taught as and considered an aesthetic craft. Early teaching styles emphasized only decorative, post-war European designs that produced lace, embroidered pillows, and narrative tapestries, without establishing any true woven meaning or structure. Anni Albers applied for admission to the Bauhaus in 1923 after rebelling from the conventional lifestyle of her wealthy Jewish Berlin family. One year later as part of the Weaving Workshop, she created her first fiber work, a wall hanging of plain weave construction made of cotton and silk. Through her work she searched for a conceptual and graphic language to join hand weaving with the mechanized loom, the importance of the link between material characteristics and the ultimate composition of threads, and the development of weaving to satisfy the useful and the beautiful.

Upon entering the Bauhaus Weaving Workshop, Anni Albers concluded that decorative, pictorial weavings previously completed were not consistent with the institution’s ideals, therefore unfamiliar and untried methods proved to be the only steady course for weaving advancement. Already having an applied arts education and enrolled in European textile design and construction at the Bauhaus, Albers chose to forfeit all traditional instruction in the creation of this spontaneous, experimental, and playful


71 Ibid, 80.


73 Troy, Anni Albers, 85.

74 Albers, On Designing, 38.
threads under and over. It is interesting to note Albers approach to the new era and working with the material, she admits, was incompetent.\textsuperscript{77} Her openness to continued experimentation in technique slowly allowed concepts to emerge providing a basis for her later complex efforts. Removal of prescribed program, rationale, or decorative ideal during experimentation is an extremely valuable design tool when looking to break new ground.\textsuperscript{78} In the case with a new woven construct, one of the few constraints will be not using previously employed techniques, such as traditional wood frame construction or design as merely embellishment.

Initially excluded due to narrowing the Workshop’s individual search for a vision, design and production of industrial textiles later appeared along with the promotion of interdisciplinary influences, thus a laboratory for textile exploration was born. Keeping in mind the notions that fundamental textile organization should be echoed in both its form and function, Albers addressed the mechanized loom by first creating samples and prototypes by hand. This still allowed her the experimental play, despite a usable outcome.\textsuperscript{79}

75 Ibid.

76 Troy, Anni Albers, 106.

77 Albers, On Designing, 39.

78 Ibid.

79 Ibid, 16.
Klee, also made significant contributions to new weaving foundations, despite having no training in fibers. In his Workshop lessons, he symbolically equated the “under and over” structure of weaving to the use of the checkerboard and grid pattern in his work. Klee also taught the Workshop that pure composition emerges with repetitious pattern and complexity occurs with the abstraction of these forms.\(^{80}\) The open laboratory indeed allowed Albers to develop and a new weaving arrangement, but it more importantly let her isolate one element or idea at a time of this immense task and continually refine the process. Similar to the development of a structure based on the fundamentals of weaving, the process is nearly as important as the product. Eventually all elements unite to a coherent voice, but without initially handling, carefully shaping, and learning from each piece, the goal is lost.

From Albers’ 1944 essay “Work with Material” she writes the modern man is alienated from materials as they exist naturally and only knows them in the form of a finished product. She suggests keys for reestablishing contact with unknown objects of our modern culture and truly getting in touch with the origins of the earth is to indulge our tactile sense in pure materials.\(^{81}\) Ancient Peruvian weavers preserved the links between process and product through direct material contact, something not seen in European cultures. Although she admits the modern craftsman is relatively obsolete today, the artist’s direct contact with a demanding material, like the Peruvian, inspires inherent meaning in the product. Without truly handling the material, the modern painter, for example, is unable to learn limitations from unresponsive mediums.\(^{82}\) It is exactly this dilemma that is occurring in today’s building practices: we are disparate from and under-stimulated by the spaces we inhabit because of our lack of connection to them and their lack of instilled meaning. We generally know nothing about their origins or how they were constructed and they provide us nothing but protection. This is not advocating that laypeople design and construct their own shelter but if architect and builders utilize challenging materials, listen to them, and instill more compassion and thought in their making, a greater pride and inspiration could be derived by the inhabitant from within the space.

Taking the role of the craftsman of old under interpretation, Albers analyzes his dialog with material in that his matter was not immediately ready for molding, it required his touch. His skills were not refined in such a way that a prescribed method was

\(^{80}\) Troy, Anni Albers, 126.

\(^{81}\) Albers, On Designing, 50.

\(^{82}\) Ibid, 27.
followed. Invention was a necessity, making him an artist as well. Following only what the material told him, the craftsman organized all embodied energies, provided meaning to a material beyond itself, and therefore created art. Creative energies of products either made from technology or art cannot satisfy all that we call for: “the need for the functioning of a thing and the need for an appearance that responds to our sense of form.” Representing our modern culture, we have separated works of pure form on one side and equipment on the other. However, the usefulness of a product should not hinder its ability to become beautiful. Any material, any working procedure, and any method of production, manual or industrial, can serve an end that may be art. Taking this research into the development of a useful and beautiful woven construct: Is it too much to ask that it be a direct result of the designer as the producer? Could the inherent characteristics of its material have been fully explored in creation of its final form? Additionally, could the product be both useful and beautiful, a result of embracing both art and technology? The answer to all of these should be no, it is not too much to ask because it is something we

83 Ibid, 3.

84 Ibid, 2

85 Ibid, 15.
The Cellophane House

“Cellophane House makes no claim to permanence” states the architecture firm, Kieran Timberlake.\(^86\) The design concept stresses that this structure functions primarily as a vehicle for securing materials in such a manner that they form a habitable shelter. They crux of the concept lies in the fact that the materials are merely in a structural holding pattern rather than in a fixed, permanent state.\(^87\) The design allows for materials in the structure to retain their identities as individual entities and for the possibility for them to be released from the structure at any time.\(^88\) It is Kieran Timberlake’s reasoning that in building construction “when materials are fixed to one another, they become part of a composite structure, from which they can be freed only through the expenditure of great amounts of energy.”\(^89\) Most importantly, the materials themselves are actually of little importance and the method in which they are assembled comprises the quintessence of the structure.\(^90\) Although not directly stated, it appears that the Cellophane House draws upon the Bedouin Tent and other nomadic structures, with the understanding of impermanence and evolution in regards to structures. In the modern world, where cheap and quick comprise the basis of a large amount of archi-

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87 Ibid.

88 Ibid.

89 Ibid.

90 Ibid.
tectural endeavors, it is paramount to integrate the notion that the structures built today cannot be fixed and the concept of designing permanence must be reversed. If design was organized like a weaving where everything that can be woven can be unwoven, this understanding would come at the beginning of the design process. Coincidentally, this is the most notable element demonstrated in the Cellophane House design.

In its most basic understanding, a building is basically an assembly of materials intelligently organized to form an enclosed shelter. According to Kieran Timberlake, “we recognize that these materials came from somewhere, are held together for a time by the techniques of construction, and will at some future time transition into another state.”

Common conventions teach that buildings are permanent, but in essence they temporarily coordinate materials into a balance. However, it is important to note that this balance will inevitably be disturbed by the natural, chaotic forces of the universe. Despite architectural efforts, it is impossible to permanently fix materials. This variable method of assembly also identifies with the structural organization of weaving. Each member retains its individual identity within the overall pattern and relies on each other for support, but is not permanently fixed to each other as each desires to return to its previous state. As we are not presently erecting structures like the Coliseum or the Pantheon, technology, weather, general wear, and fashion ultimately deem structures as inhabitable or outdated, relegating them to non-use and a final state of waste. However, the process of weaving proposes that permanence is not even a desire of construction.

91 Ibid.
The Textile Works of Julia Sherman

Fine artist and filmographer, Julia Sherman evokes ideas of folk rituals and feminist theory throughout her formal works and enacted images. In Sherman’s artists statement she states “her formal compositions and finely cannot conceal her attraction to the homemade, the experiment and the discovery.”92 Additionally, she notes that her work must be understood as a performance and is then translated into a highly detailed installation.

Sherman’s most recent project, Room-A-Loom, is a site-specific weaving project. “With consideration for the architecture of the gallery, the loom uses the building’s walls to turn a room into a simple machine. With the loom spanning the width and breadth of the space, there is no place to enter without becoming part of the planar field of yarn and donated materials.”93 Spanning the width of the room enables the weaving, generally a two-dimensional object, to begin to take on three-dimensional characteristics. As it is constructed, it creates its own set of architectural characteristics, creating spatial interest and a dynamic with the weavers. The gallery space where it is being woven recedes to the back, while the large weaving comes to the foreground, directing the experience of the place.

An untitled work created using a traditional loom intertwines both personal and collective female history of the artist:

In two isolated incidents, the women of my family have given me their lingerie and silk


stockings. I never had the impulse to try them on, but instead I decided to cut the gowns into long spools of silk thread and to weave them along with my grandmother’s stockings and garter into a wall hanging.94

By embedding these unusable, yet highly meaningful items, within her weaving, Sherman gives a meaning to the textile product beyond itself. She also suspends the moments and memories of her relatives to be enjoyed by future generations. Additionally, during the Room-A-Loom project, participants were asked to bring in materials of significance for weaving. Materials include: dog fur, a blanket from distant travels, an ex-girlfriend’s pajamas, flowers grown in a personal garden, and many more significant items. Not of high value or antique worth, items still poses an importance to the invited weavers and coupled with their own actions of hand weaving inscribe within the work meaningful messages.

A performance weaving, entitled Cone of Power, is enacted using several portable, backstrap looms. The looms are all connected to a fixed structure, a large rock in this case, and the weight of the weaver’s own body is employed in such a way to provide tension forces for each individual warp. This is a prehistoric type of loom and is also extremely portable. “For this piece, I made 6 backstrap looms and taught friends to weave. The construction of the piece happened over the span of 8 hours.”95 To construct the cone in the time duration, each loom is connected to a central line hanging from the ceiling with the counter-balance of opposing weavers uniting the construct into a whole. The weaving occurs in a two-fold process as the weavers pass their yarn around in a circle, weaving upwards, and also connecting their looms to each another concurrently. The resulting shelter remains in the space as an installation. This installation exhibits the pivotal notion that the acts of weaving, creating, and connecting are more important than the resulting shelter product. The intricately devised weaving scheme and physical connection of the weavers, translates individual contributions into a symbolic and holistic ritual.

Both in the Room-A Loom and Cone of Power Sherman invited novice participants to be introduced to and involved with her weaving performances. In regards to the Room-A Loom performance she states:


The loom itself is really simple and anyone can be taught to use it in about 5-minutes. People are invited to gather together the material of their choice and to contribute to the weaving of this collaborative textile. Participants often form new friendships while sharing stories about the materials they bring in. 96

Having the opportunity to partake in a simple abstraction of a very complex craft provides excitement through learning basic weaving skills while interacting with the artist and other participating weavers. Most importantly, they are creating form from meaningful hand work and collective experience, ultimately changing the image of woven shelter.

Chapter Three:

Expanded Project Narrative

Maternal Design

As women’s bodies are the first environments for the next generation they have instinctual feminine characteristics which provide tools for place making ideals for the home and its connections to the outside realm. According to a neuroscience and architecture study conducted by John P. Eberhard, men and women’s brains appear very similar, however they are used in completely different manners. Men are generally left-brained and matter-of-fact and women generally right-brained and caring essentially highlighting women as the more tender, gentle, and nature-connected gender. It is of no surprise that from this mental functioning, women of all backgrounds have been entrusted as the “caregivers” of society since pre history. This responsibility not only affects women’s heightened concerns for familial health and well being, but also the duty to provide an environment embodying the figurative ideals of “home.” “Women feel in some way responsible for creating quality of life.” Emphasis on providing a nurturing, sensitive, and balanced environment comprises a portion of women’s poetic, place-making intentions within the domestic realm. However, results of these ideals echo beyond the walls of a home and have come to impact the welfare of the planet and all species. “There is something about being brought up as nurturers, as sustainers of life that carries through everything” states Janine Beynus in Women in Green. Woman’s poetic, domestic care giving effectively seeks to better the world by making it more “homelike” on all fronts. Caring for the immediate domestic en-


98 Ibid.

99 Ibid.

100 Ibid, 78.

101 Ibid.

102 Ibid, 5.
Referring to John P. Eberhard, right-brain dominated individuals have an increased awareness towards the impacts of the built world on the natural world, effectively attributing sustainability practices to the holistic, place making views of women and the home. Likewise, this maternal derived method existed long before the modern sustainability movement became popular.103 This is not to say men do not share in the concern for the natural world, they do, but their goals generally center along a “technological sustainability,” which seeks to solve environmental issues independently and on a case-by-case basis. Alternatively, women perceive an “ecological sustainability,” which recognizes environmental issues as interconnected and in order to develop appropriate solutions, a fundamentally new method of comprehension and perception must be adopted.104 Similarly, as the growing popularity of the modern sustainability movement has shown, current building design and construction methods need to be reevaluated and redefined to sustain the capacity of the planet. The intrinsic, “homelike” ideals of women already provide basis for new methods to sustain our families and the earth. Dana Jackson, co-founder of the Land Institute elaborates that:

The coming together of the ecological and feminist movements gives us a greater opportunity to change patterns that not only lead to the extinction of countless other species but also destroy what supports humans…Certain attributes of women’s culture must be employed to help us adapt to sustainable, ecological living patterns. What we might call the feminization of the culture will come about in response to the environmental crisis in the most decentralist social organizations of all, our families and partnerships.105

Specifically in the creation of modern shelter, the suburbs have been labeled one of the most unsustainable types of development106 for both the environment and for the well being of the family unit. This failure is due in part to the typical suburban form and organization representing the opposite of maternal thinking.107 The connections of the quality of the built realm to human health are increasingly more apparent and continuing to ignore the ineptitudes of the suburban home in America jeopardizes the lifespan of the earth. Embracing a “feminization of culture” will

103 Ibid, 2.
104 Ibid, 9.
105 Ibid, 5.
106 Ibid, 80.
107 Ibid, 10
ensure the future of our species has a clean and livable planet as well as an understanding of the appropriate methods to sustain it. “Life has been around for nearly four billion years. She’s figured a few things out.”

Kira Gould in *Women in Green* highlights the most important question about the connections of the built world to the natural world for future generations: “How do we enumerate principles that encompass everything from the number of BTUs our houses will burn this year to the spiritual well-being of our great, great granddaughters?” Modern sustainability guidelines do not address a non-tangible, spiritual well-being and similarly, place making ideals do not encompass a need for technological innovation and improved measurement systems. “Qualitative and quantitative goals need to be addressed at the same time.” Highlighting the individual importance with the symbiotic relationship of these two areas enables practical considerations and improved quality of life to equally contribute to a new maternally derived shelter construct.

However, without the maternal approach, this dwelling model is incomplete for the emotional well being of the family. Equal attention focuses on women’s instinctual principles to nurture the family spirit, provide balance, versatility, longevity, innovation, collaboration, and a respect of the natural world. These elements, although less concrete, ensure more meaningful, ecological sustainabilities create a domestic environment that is socially and culturally rich, provides a stimulating and sensual experience, and intelligently and courteously utilizes nature’s offerings, such as sunlight, plants, views, colors, textures, and climate. The value of the home is now not only measured in BTUs and dollars, but is translated to share an equal role to enhance family togetherness, community involvement, and environmental stewardship. This unification of women’s pragmatic, domestic ideals and instinctual, ecological philosophies with technological innovations reveals a true system appropriately addressing a sustained type of shelter and, more importantly, a new approach to living.

William McDonough, author of *Cradle to Cradle*, states that “at some point a manufacturer or designer decides, ‘We can’t keep doing this. We can’t keep supporting and maintaining this system.’ At some point they will decide they would prefer to leave

108 Ibid, 159.
109 Ibid, 111.
behind a positive design legacy. But when is that point? We say that point is today, and negligence starts tomorrow.” 111 A mid century and genderized mindset, ancient and toxic building techniques, and the disconnection of the family unit are results of modern negligence exhibited and fostered in the suburban housing typology. “We need to find, know, and nurture our house—the place we live.”112 Women understand it is not really about creating a new home, it is about rediscovering and respecting the one we already live on, guaranteeing our legacy for daughters and grand-daughters.

111 McDonough, William, Cradle to Cradle, 43-44.

112 Gould, Women in Green, 168.
Expression of Culture Through Our Objects

According to Aaron Betsky in *Building Sex*, “culture is the product of making place...We define the space in which we appear and that act of appearance then defines our role in society.” 113

Furthermore, we come to understand the world we live in through outlining it with our bodies and understanding it through explorations in material form. 114 Making things help us understand who we are and where we are in the world. Before the invention of formal language, threads along with cave paintings were the original communicators of meaning for prehistoric cultures. According to Anni Albers, the ancient Peruvian culture, having no written language, created some of the most intricate and evolved textile works that have ever existed. The entire history of the Peruvian culture, “the full life of their world” has been interpreted into woven form. 115 Andean cultures developed a semantic language of hieroglyphs imbedded within their woven works, enabling their textiles to exist for more than utilitarian function. “Their personages, animals, plants, step forms, zigzags, whatever it is they show, are all conceived within the weaver’s idiom.” 116

Through this original language methodology, Betsky states a “porous” barrier was created between the actual and the interpretation of our world, however it still allowed a complete understanding through contact with earth’s material. 117 The nomadic, prehistoric world entwined art, language, and common

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113 Betsky, *Building Sex*, xvii.
114 Ibid, 17.
116 Ibid.
agreement.\textsuperscript{118} He elaborates that the tent symbolized culture for the nomad and although it is woven shelter and a material interpretation of its surroundings, its invention marked the evolution of a further separation of interpretation:

The tent was a built spiral that contained and preceded the rigid constructs of grammar and the layers of value that were the result of the creation of territory. Before there was land that was owned, and before there was an abstract language that was written down, there was the reality of the tent that made us at home in the world. It was a real place, made by men and women together. It was the scene of our humanity, one in which we made a world for ourselves. Yet the tent is also the site of the nomadic people who are removing themselves from nature.\textsuperscript{119}

This “act of appearance” set into motion the tension of prehistoric society: a desire to communally live and also a fear of the unknown natural world. The desire to categorize and replace rather than remake naturally through art as experience, initiated the dawn of modern language. Actual written words began to replace thread as text and carrier of meaning. Writing separated of words from their “ephemeral connection with the act of speak-

\textsuperscript{ing} and connection with community.\textsuperscript{120} According to Jacques Derrida in Betsky’s \textit{Building Sex}, “language is an artificial construct that is necessary for the creation of rational human society but that it itself a form of covering up or forgetting of a world we know only through senses.”\textsuperscript{121} Language is also thought to be a masculine invention applying rules, grammar, and value, to conceal the natural woven interpretations of our surroundings. Meaning of the world was taken from communal knowledge and placed within confines, only accessible to the few.\textsuperscript{122} Substituting our experiences of the world with words, rather than weaving also significantly relegated our understanding of the world through women. This is the way in which humankind

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\textsuperscript{118} Betsky, \textit{Building Sex}, xvii.

\textsuperscript{119} Ibid, 18.

\textsuperscript{120} Ibid, 16.

\textsuperscript{121} Ibid.

\textsuperscript{122} Ibid, 17.
began to first remove itself from truly experiencing the world and perceive it from a masculine or feminine perspective, thus affecting a future separation from nature.

In regards to modern cultures, Anni Albers states “concerned with form and with the shape of objects surrounding us—that is, with design—we will have to look at the things we have made.” She continues that “it is good for all of us to pause sometimes, to think, wonder, and maybe worry; to ask ‘where are we now?’” Essentially, the understanding of a culture has come to be represented in the language all of its designed products, including both architecture and textiles. Consequently, what are the messages our products are sending about created places of this era? As demonstrated by the prehistoric woven tent, a space becomes a place through architecture and with modern architecture, constructed buildings have come to represent culture and give definition to this time. They are manifested as a visual language of the built environment. The messages of architecture articulate that structures of nature have been dominated by the structures of man, they are a symbolic construct of sexuality in the real world, and they are not a natural interpretation of our surroundings, thus the barrier of experiences is not porous.124

Through their use of language, the modern form of building does not let us connect with or be at home in the natural world, which can first be seen in the creation of ancient cities. Settlements were initially based around the model of the tent, however aforementioned prehistoric tensions prevailed and a replacing, instead of remaking of the world ensued. The Neolithic period highlights humankind’s change from a society based on cooperation, communication, and understanding to one of control, expansion, and exploitation. “This happened at the same time as or because, we moved from a matriarchal to a patriarchal society.”125 Betsky notes that cities in Mesopotamia, Egypt, Greece, and Rome were based around the patriarchal model and in the modern day, the creation of suburban residential developments, the modern approach to shelter, also reveals evidence of this type of design as well.126

Built using the innovation of industry and mass produced housing, the suburbs are an artificial world with the latest tech-

123 Albers, Selected Writings, 34.

124 Betsky, Building Sex, xiv and xvii.

125 Ibid, 19

126 Ibid, 21.
nology and absolutely no sense of connection to community or nature. “The suburbs are one of the least sustainable types of development” states Lauren Anderson of the New Orleans’ Neighborhood Housing Services in *Women in Green*.127 Designed to allow air, light, and promote health, suburban communities contribute significantly to the isolation of women due to inadequate mobile resources, degradation of the family-community unit and to the destruction of the natural ecology and limited resources. As most suburban communities are based around the introverted, single-family dwelling, connections between families, involvement in community activities, and a connection with nature are downplayed. A lack of interactions outside the home further contributes to the tendency of the human existence to evolve into an indoor species, most notably negatively affecting health and causing a continual increase in size of the spaces we inhabit.128 Because suburban dwellings are generally not built by inhabitants, decorating is accepted as the method to personalize space with impermanent additions, “privatizing little pieces of an alien environment” as Betsky states.129 Through the visual language of the suburbs, construction methods and lifestyle approaches encouraged lie at the heart of proven adverse affects already incurred on the planet. According to *Woman in Green* the typical suburb is the opposite of women’s way of thinking about the world and with half the population of this country living in the suburbs, suburban dwellers live an overwhelmingly misinterpreted lifestyle.

Similarly, as written language has replaced our understanding of the world through textiles and permanent buildings have replaced our need for textiles as shelter, textiles have been downgraded to a minor art, decorative supporting parts, and indoor existences. “But with their relaxed duties, that is, no longer having to guard our life, [textiles] have accumulated more and more functions that belong to another realm—aesthetic functions.”130 Textile chemistry and industrial production have advanced while the basic techniques of weavings have remained constant or have been forgotten. Advancements also have predominately affected quantities of fabric, leaving the quality of modern fabrics unmoved. Such a vital communication medium, with origins from women and the earth, has been lost to modern culture and used instead as embellishment.


story of an ancient Peruvian worker observing the textile work of today. She elaborates that as the weaver was part of the greatest textile culture in history, "he can be considered as fair judge of our achievements." The weaver would wonder at the synthetic yarns, fabric treatments for water-repellency, flame retardant, and etc., and the vast assortment of colors now available. With the use of mechanical textile production the weaver would also naturally be in awe at the speed of production, intricacies of the weaving, and the consistency of the threads. Albers elaborates that initially the weaver would feel quite taken back at advancements which have occurred since his time, perhaps feeling underachieved about personal textile creations. Regaining his pride, the weaver would soon realize these modern contributions to textiles only occur in two specific areas: one pertaining to the new characteristics of the traditional material and then in the innovative methods of construction. Additionally, the weaver would cleverly conclude that neither of these two advancements adequately satisfies his field of expertise: "the intricate interlocking of two sets of threads at right angles." The weaver would immediately recognize the simple weave, and even the complex weaves of this era, as he observed the large quantities of mass produced fabric. Few elements of technique would intrigue him at this stage of fabrication and as a result, he would have several critiques and comments.

What the Peruvian would call "bareness" in weaving can predominately be related to the increased use of the machine and the reduced use of the hand and spontaneous shaping. Consequently, divorcing the planning from the making of modern textiles disrupts the creation of thoughtful form, evaluated based upon the great works of the Peruvians. The natural and sometimes surprising characteristics of material are replaced by rigid design, durability, and quantity. Textile forms addressing both beauty and use have vanished, highlighting a deep emotional and practical division. Albers believes that it is therefore valid that new developments should be designed for the task of usefulness, while corresponding to the imaginations of art.

As weaving and architecture have evolved to be industry dominated and devoid of human expression, to realign them means a truer built expression of the world. Contemporary build-

131 Albers, Selected Writings, 28.
132 Ibid.
133 Ibid, 30.
135 Ibid, 14.
ings should interpret in their form an understanding of and cooper-
eration with the natural world, rather than a dominance and sepa-
ration, through woven techniques. In essence, in developing a
refined expression of culture through objects for the future, we
must regress to progress.
Working with the Hands and the Handmade

In *Selected Writings on Design*, a collection of essays written between 1947 and 1965, Anni Albers uniformly supports that modern machines and technology have reduced the prominence of handmade work and the vital role of the craftsman in shaping the objects of everyday use. “No need to get our hands in the dough. No need—alas, also little chance—to handle materials, to test their consistency, their density, their lightness, their smoothness.”\(^{136}\) Technology now breaks up these separate stages of investigation and design, placing these roles into separate and unconnected hands, thus affecting effectiveness of the sum of the parts into a whole entity.\(^{137}\) A single craftsman is no longer at work. Candidly Albers remarks that technological advancement removes the unrewarding chores of ceaseless effort and struggle only demonstrated by hand work. Because hand contact today generally occurs only with the form of the finished product, Albers stabs at whether this industrial progress is actually a balanced progress. Is it still something beautiful and useful that satisfies a need for connection to the material and experimentation in the medium of making? As a result of dominating industrial production, the perception of touch, of forming is increasingly removed from the modern lifestyle. Additionally, as we touch things to make sense of the world our need for tactile stimulation is left inactive.\(^{138}\) Things are created quickly and exist purely for our consumption, producing a society dominated by collecting rather than constructing. With specific regard to weaving, the mechanized loom clearly permits less flexibility, experimentation, or connection with the material of the work than the hand powered loom. “Each step towards the mechanical perfection of the loom, in common with all machines, in its degree, lessens the freedom of the weaver,”\(^{139}\) Albers does make note that technology and the foot powered loom are both beneficial for the boredom of repetition and mass-quantity, however the quality of the work produced therein reflects these goals rather than invention imagination.

Despite the push for technological progress, humans have always had an innate sense and desire to create by hand, thus further disenchanting machine made objects from our primal existence. “There is, of course, a most legitimate urge in everyone to use his hands, and this takes us back again to the earliest periods. For when man learned to go upright, his hands

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\(^{136}\) Albers, *Selected Writings*, 69.

\(^{137}\) Ibid, 19.

\(^{138}\) Ibid, 69.

\(^{139}\) Ibid, 40.
were freed for the making of things, his most human trait, and his mind developed with it."  

140 Without the outlet to create, modern society bases the creation of form on little more than a thought of outer appearance.  

141 Furthermore, design has been reduced to indirect forming, through vicarious mediums of graphics, words, and unresponsive mediums. Albers points to the example of the painter and his ability to "just squeeze, a tube and his obedient medium permits him to use it anyway he likes."  

142 However hand weaving, considered a complex craft, arouses the "hubris of creative ecstasy" and is an exception to the deficiency of intelligent forming (OD.).  

143 With regards to all crafts, Albers considers "the more possibilities for attack the material offers in its appearance and in its structural elements, the more it can call forth imagination and productiveness."  

144 As few of these opportunities exist, the mental and physical struggle to shape the shapeless and to physically manifest a vision is removed from modern culture.

Consequently, by reinserting the work of the craftsman, society can begin again to make and form by hand, recharging meaning to material far beyond itself.  

145 It is understood that the original craftsman has been overrun by industry, but the modern artist seeks to continue the familiar link with pure material and slow process of form. Albers considers the modern artist as capable of embodying the spirit of the craftsman of yesterday. "It is here, I believe, that the true craftsman is found—inventive as ever, ingenious, intuitive, skillful, worthy of linking us with the past. His work is concerned with meaningful form, and finding significant terms for newly unfolding areas of awareness."  

146 By taking material back into the hand and directly experiencing material, society can regain a sense of balance.

Although Anni Albers essays were written over 50 years ago, they elude a familiar perspective in regards to a continued and increasing societal reliance on mass-production and disconnect with the hand made. Her views of the re-embodied craftsman are still extremely prominent especially as a growing number of modern artists are creating work by hand and employing techniques and materials associated with craft. Demonstrated in By Hand:

145 Ibid, 25.

146 Ibid.
A significant aspect of these craftsman-artists is the fact that many of them have fine art or liberal arts educations and backgrounds prior to embracing handmade work. By bringing paint and charcoal into this constructive realm, "their ideas are thus strengthened by unique materials and contexts" and their desire to explore a more intuitive approach to popular to design is


148 Ibid, 11.

149 Ibid.

150 Ibid, 11.

151 Ibid, 12.

152 Ibid, 7.
further supported.\textsuperscript{153} Coincidently, in her essay \textit{One Aspect of Art Work}, Albers also remarks on the necessary colliding of academ- ics and the realm of “making something become real,” for a true understanding of form and the freedom of constructing.

But how do we know how to build? Education meant to prepare us. But how much of education is concerned with doing and how much with recording? How much of it with productive speculation and how much with repeating? … Too much of our education provides instead of prepares and thus loses its serving role and tends to become an end in itself … Education in general means to use academic education, which becomes synonymous with an unproductive one. If we want to learn to do, to form, we have to turn to art work, and more specifically, to craft work as part of it.\textsuperscript{154}

Albers does not speak of this approach to education in the speculative sense; rather she speaks from real life experience. She entered the Bauhaus in 1923 after having experienced the “sterility” of a traditional applied arts education.\textsuperscript{155} With the spirit of the Bauhaus and the experimental nature of the arts after World War I, she along with her colleagues chose to reject their previous training and the existing weaving curriculum, one based on pictorial notions of decorating and embellishment. Instead they embraced an ideal to work directly with the material to return to a sound basis of personal creativity and tactile exploration, leading to some of the most successful textile works in modern times. Her struggle with a rugged material while at the Bauhaus and for the remainder of her career validates the timelessness of the craftsman’s methods and that “the physical body is the primary means with which to experience the world and the most obvious tool for the production of creative work.”\textsuperscript{156} With the resurgence of the handmade, craft regains its powerful definition “to care,” and informs a new generation of artists that manual work is a genuine artistic experience.

\begin{flushright}
\textsuperscript{153} Ibid, 8.
\textsuperscript{154} Albers, \textit{On Designing}, 30.
\textsuperscript{155} Ibid, 38.
\textsuperscript{156} Hung, Shu, \textit{By Hand}, 12.
\end{flushright}
Chapter Four:

Initial Woven Experiments

Preparation for Work One

Figure 14. Selected fibers.

Figure 15. Measuring warp.

Figure 16. Making the cross.

Figure 17. Tying onto front beam and placing fiber in dents.

Figure 18. Fibers then inserted into heddles.
Tying onto back rod with first knots. Figure 19.

All bunches tied to back rod. Figure 20.

All fibers tied to front rod. Figure 21.

Winding bobbin to make first wefts. Figure 22.
Work One: Untitled

Figure 23. Plain weave with green fiber and brass section weft.

Figure 24. Twill weave.

Figure 25. Plain weave with blue weft.
Figure 26. Plain weave with yellow weft.

Figure 27. Selvedge or "end" condition of weave.

Figure 28. Plain weave with alternating yellow and blue weft. Fabric still on loom.
Figure 29. Twill weave with chunky weft.

Figure 30. Alternating, long-run twill weave.

Figure 31. Alternating, short-run twill weave.
Selected Preparation for Work Two

Figure 32. Selection of fibers.

Figure 33. Placing the fibers through beater dents.

Figure 34. Pulling fibers taught from rear.

Figure 35. Alternating colors through beater.

Figure 36. Tangle created from pulling fibers from rear.
Work Two: Untitled

Figure 37. Plain weave with cellophane and jute fibers as weft.

Figure 38. Cellophane weft in plan weave.

Figure 39. “Hooking” different wefts and changing direction.
Figure 40. Detail of “hooking”.

Figure 41. Allowing jute weft to raise from two-dimensional plane.
Increased amount of jute weft to raised from two-dimensional plane.

Figure 42. Increased amount of jute weft to raised from two-dimensional plane.

Figure 43. Detail of raised jute.

One directional twill weave detail.

Figure 44. One directional twill weave detail.
Figure 45. Detail of jute.

Figure 46. Loose twill weave with metal mesh inserted.

Figure 47. Warping metal mesh after fabric is removed from loom.
Chapter Five:

Project Initiatives

Problem Statement

After careful consideration of initial research and analysis of woven experiments, the following are outlined as important questions in the development of a woven shelter artifact:

- How can shelter design be united again with the act of making, replacing what has already been made for us?
- How can an architecture of weaving reveal the processes of making and experimenting?
- How can we connect with and embed meaning into the spaces we inhabit?
- In making space a place, what elements can modern shelter re-learn from prehistoric shelter?
- How can the structures of nature again be equal with the structures of humankind?
- How can woven architecture capture a memory to inform the future?
- How can the act of nurturing extend into the physical environment of shelter?
- With regards to beauty and functionality, how can the objects we make better represent who we are as a culture?
Goals and Objectives

After a thorough deliberation of issues and priorities of a woven shelter artifact, the following are outlined as goals and objectives to be achieved for an informed process and relevant outcome:

Design a shelter installation centered on the act of weaving.

- Underline the preparation and making in the construction of the device
- Connect with the raw materials of construction through making
- Utilize the properties of materials to create new combinations
- Embrace the versatility of a non-hierarchical structure
- React to suburban shelter which is made for us

Instill meaning in the shelter materials.

- Design the shelter with an importance greater than outer appearance
- Embrace working by hand, woven language, and captured memory
- Replace objects which we actually construct rather than just collect
- Becomes a representation of a culture rooted in making

Design using notions of prehistoric woven shelter

- Exist within rather than on the natural world
- Implement a porous barrier of the natural world into the human-made world
- Translate the prehistoric traditions of the campfire and tent
- Symbolize both void and projection
- Carve an amorphous and intimate in enclosure for human interaction
Embody the ideas of structure as inherent to femininity

- Develop a structure reminiscent of human nurturing
- Incorporate levels of flexibility and direction
- Create both a cave and a skeletal frame
Chapter Six:

Program

Design Criteria

The design of the woven shelter construct will consist of an ephemeral, three-dimensional environment based on the literal and conceptual construct of weaving. In addition to its exhibition of creating meaningful form by hand, the construct will serve as an outdoor architectural installation for gathering, connection, and education. This is not a housing prototype, but a shelter with roots in prehistoric notions of maternal thinking and nomadic shelter. The construct becomes a conceptual catalyst for future innovative shelter constructs. Through a process of making, seeing, and doing the conventions of modern structures already built for us are replaced with human connection with material and construction. Product is not a building, but architecture based on the synthesis of community, culture, and education. The performance of making will celebrate interactions with it through sensation, demonstration, and physical connection with materials, nature, and community.

The process begins with a basic and repetitive shelter framework, the *warp frame*. This comprises the structural, fixed organization of the construct, related to the warp in handcrafted loom weaving and ideas of enclosure and structure based around maternal nurturing. Connections from interior to exterior, transparency, circulation flow and other experiential design considerations are dictated by the warp frame shape. A specified amount of *interfab*, infill material similar to the weft in a handcrafted loom weaving, is then woven within the warp frame creating surface, enclosure, volume, and space. Interfab is meaningful fill material programmed within the consistent warp frame to embed emotional significance. This woven architecture captures a meaning in its form and suspends it for the future. In this sense meaningful, rather than premade or mass produced items, makes the form both useful and important. All work is done by hand, providing an additional level of embedded significance and attention to craft through the connection with raw materials.

When the warp frame is combined with the interfab using...
a woven tectonic language, the resultant is called an artifact. The embodied artifact is the physical representation of the conceptual space between humankind and nature. As the first separation from nature was a porous woven enclosure, the artifact expresses elements future shelter should aspire to achieve. Spatial qualities of the artifact are intimate and nurturing, providing maximum human to human connection through an enclosing, yet permeable environment. Fluidity of space is enhanced through its amorphous shape based on the prehistoric tent: a non-genderized space, the artifact displays moments of containment and projection. The artifact remains intact for a temporary period of time and is then deconstructed, as everything than can be woven can be unwoven. No joint or connection in the artifact is fixed, alluding to impermanence of life cycles and growing stages of nature and humankind. The significance of the artifact lies in its preparation, creation, and meaning, defining a culture more responsive to building amongst nature rather than on it.
Locational Implications

As the woven shelter artifact makes no claim to permanence, it also makes no claim to being part of a specific location. However, its installation in Tampa, Florida does invoke some timely, locational relevance. The city of Tampa, like many US cities, is beginning to understand the importance of sustainable-based growth through informed design, education, and community participation. This commitment was recently solidified by the city’s participation in the American Institute of Architect’s Sustainable Design Assessment Team’s 2008 study. "The Sustainable Design Assessment Team (SDAT) program brings together multidisciplinary teams of professionals from across the country to provide a road map for communities seeking to improve their sustainability—as defined by a community’s ability to meet the needs of today without reducing the ability of future generations to meet their needs."157 The SDAT program is based on the American Institute of Architect’s goal of assisting communities developing a sustainable and lasting relationship between humans, nature, and creating place. Furthermore, by attaining a balance among cultural, environmental, and economic systems, communities can respectably sustain the planet as a site for human settlement.158

With specific regards to the arts as an essential factor of successful and sustainable urbanism, the SDAT committee outlined several areas of which need improvement in regards to creating a more sustainable realm through art initiatives. Tampa is already authorizing public art as part of new public and private construction projects, giving the city an artistic face. However, the city could be more engaged in public art-making, giving meaning to the city and its inhabitants, and celebrating the historic and cultural arts of Tampa.159 Additionally, Tampa should continue to implement art events that inform how the population views downtown, urban neighborhoods, and parks. Existing public art events like, Lights on Tampa are beneficial, but continued efforts such as an installation based around new interpretations of shelter and the woven arts will further assist the city in its commitment towards a sustainable future, an opportunity for audiences discover the city, its, and a means to put a small piece of themselves in city


It was further concluded that outdoor performance art and culture in the downtown should play a leading role in the effort to transform the meaning and image of downtown towards the public. Artists and performers have the ability to provide unique perspectives, experiences, and opportunities with regards to all development efforts. Currently residents identify with the city, yet it is difficult for many to express an image for its future. Through the incorporation of arts, individuals within a community can be given the opportunity to express themselves about significant personal and/or community subjects. The opportunity to learn about prehistoric shelter, the need for increased connection with modern shelter, and the development of new methods and materials could contribute to a more holistic vision for the city’s residential initiatives.

The SDAT committee also outlined professional artists as key players in the sustainable development process. “Artists are the people who can design the activities and lead a community group from beginning to end as an art piece or performance takes shape.” Through public work, artists learn to give back to the community via their art and the meaning it provides the city, while also taking on a new kind of artistic challenge. The making process enriches them both professionally and personally as they venture into new territory to work with a new community. Fiber installation artist and Tampa native, Janet Echleman, has public art placed all over the world and no longer resides in the city. However, during Lights on Tampa in 2006 she returned home to construct a temporary installation for the Poe Parking Garage in downtown. Understanding the lack of significance of the parking garage in the public image, Echleman’s design drew people inside the space, many experiencing it for the first time, transforming the unknown space into a place.

I was drawn to this site precisely because there was nothing to draw me to it. Its concrete construction method typifies the kind of flavorless, colorless structure we see everywhere in America that ultimately disappears from public memory. Last year, I began my research by asking people in Tampa what they thought of the garage. The vast majority of people couldn’t recall what it looked like, and weren’t exactly sure where it was, despite the fact it takes up an entire city block of waterfront in the heart of downtown Tampa. The site called for an infusion of warmth and color sufficient to draw people inside and

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160 Ibid.
161 Ibid.
162 Ibid.
163 Ibid.
through the space. 164

The fiber installation provided Tampa with a unifying artistic vision, however it is important to note Echlemen’s realization that the installation could have happened in any parking garage in the country. The installation was about the overall artistic awakening of a garage, but coincidentally it was incorporated into an artistic and cultural event. Similarly with the performance of woven shelter artifact, it corresponds to a particular message of connections between shelter and nature, connection and construction. This is particular focus of the city of Tampa for its sustainable future, but a non-locational base enables the message of the artifact to more importantly, be relevant on a global scale.

Chapter Seven: Preliminary Design Concepts

Weaving Meaning into Design

Figure 48. Space memory details.

Figure 49. Emotional memory details.

Figure 50. Physical memory details.

Figure 51. Material memory details.
Preparation for Work Three

Figure 52. Setting up large weaving; tying onto front beam.

Figure 53. Detail of fibers and fishing line tied to front beam.

Figure 54. Making knots after feeding fibers through heddles.
Figure 55. Detail of fibers in heddles.

Figure 56. Winding the warp onto the back roller.

Figure 57. Warp ready for weft.
Work Three: Embedded Meaning

Figure 58. Natural and fishing line warp with metal rods as weft.

Figure 59. Detail of natural and fishing line warp with metal rods as weft.
Figure 60. Fishing line and meaningful relative’s tie as weft.

Figure 61. Detail of fishing line and meaningful relative’s tie as weft.
Figure 62. Untitled weave pattern with chunky and fuzzy weft.

Figure 63. Detail of untitled weave pattern with chunky and fuzzy weft.

Figure 64. Detail of fishing line, copper tubing, and plastic rod as weft.

Figure 65. Detail of fishing line, copper tubing, and plastic rod as weft.
Figure 66. Detail of copper tubing as weft.

Figure 67. Twill weave with plastic bag weft.
Figure 68. Expanded view of twill weave with plastic bag weft.

Figure 69. Selvedge condition of twill weave with plastic bag weft.

Figure 70. Rolled hardware cloth weft capturing spatial memory.
Rolled hardware cloth and large wooded dowel as weft capturing spatial memory.

Figure 71.

Detail inside weft capturing spatial memory.

Figure 72.

Selvedge condition of 16mm film weft.

Figure 73.

Detail of scenes on 16mm film weft.

Figure 74.
Figure 75. Detail of scenes on 16mm film weft.

Figure 76. Detail of scenes on 16mm film weft.
Figure 77. Detail of scenes on 16mm film weft.

Figure 78. Detail of scenes on 16mm film weft.
Maternal Structure Guidelines

Figure 79. Graphic of maternal structural constants.

Figure 80. Diagram of design criteria for maternal structure.
Woven Shelter Concepts

Figure 81. Diagram of design criteria for maternal structure.

Figure 82. Diagram of design criteria for maternal structure.

Figure 83. Diagram of design criteria for maternal structure.
Figure 84. Diagram of design criteria for maternal structure.

Figure 85. Diagram of design criteria for maternal structure.

Figure 86. Diagram of design criteria for maternal structure.
Diagram of design criteria for maternal structure.

Figure 87.
Chapter Eight:

Project Execution

Final Design Exploration

The final design concept of weaving space led to weaving objects off of the traditional loom and exploring weaving in three dimensions while still keeping the ideals of material memory and maternal structure. Additional research on the history of weaving in primitive cultures led to the discovery of the backstrap loom and its portable and modular characteristics relevant to this study. According to a textile exhibit entitled The Fabric of Mayan Life, the backstrap loom is “a fairly simple and mobile type of loom, as it largely consists of sticks and a strap worn around the weaver’s waist to apply tension to the threads as the fabric is woven.”

The loom is then attached to a stationary object, primarily a tree, to maintain and adjust tension. The basic design of this type of loom, as compared to the traditional heddle loom, allows complete flexibility in weaving, as it can be used anywhere. Additionally anyone can quickly be taught to use it and it also can be adjusted to any size body or weaving expertise.

The very elegant and simple fabric produced from the backstrap loom and its extreme versatility is an inspirational module in the interpretation of weaving space to provide shelter. With a jump into the human scale and an extension into the vertical plane to wrap three-dimensionally, the woven section lends itself to creating a habitable space. The three realms of basic architectural shelter—roof, floor, and wall—are achieved through small planar adjustments to match these elements. Furthermore, with a repetition of the woven modules radially around a stationary object a complete enclosure is constructed.

...
As the backstrap loom typically attaches to a tree to create tension, the idea of the tree began to have specific design and aesthetic implications as a center of the woven enclosure. The course of this study thus far has comprised a return to nature as the center of modern life coupled with a respect to how the built world interacts with it. Using the convenience of the tree as an existing part of the backstrap loom, nature provided specific inspiration for the overall design of the woven enclosure. The language of the prehistoric campfire, the Fibonacci series, the nautilus shell, the maypole, and the primitive hut all contribute to a final woven shelter design conceptually and physically connected to nature.

Being a very prehistoric tool, the elements comprising the backstrap loom can be readily found within nature. However, as efficiency and innovation both play a vital role within this study, retrofitting loom elements to embody current technology became a major project intent. Textile artist Travis Meinolf provided a vast array of information in regards to updating both the production of loom elements, streamlining the process, further enforcement of the process over the product in the act of weaving, and the communication of weaving to a mass audience.168 “The setup of the loom is where most the design decisions are made. Once you actually start producing cloth, you’re in production mode and not thinking about the design.” Meinolf’s design reinterpreted several of the pieces of a traditional loom, such as making the heddles and the beater into one piece and replacing the soft heddle loops of the backstrap loom with a rigid board with slots securing the fibers. Most importantly, Meinolf used digital fabrication, namely laser cutting, to create his reinterpretation allowing many loom sets to be created efficiently, quickly, and without little waste.

As Meinolf’s loom sets were used to create blankets, a loom set used to make shelter took into consideration many other elements. The resulting weight of a shelter fabric contributed to an increase in width and length of the loom set and an increase in thickness of plywood for construction. Due to an increase in tension of the shelter fabric, personal comfort of the weaver and strengthening the connection points to the body and tree were also closely addressed in the new loom. With the use of computer aided drafting and subsequent digital fabrication practices, making changes to the loom set was simple and straightforward. Subsequently, several prototypical sets for weaving space were constructed to adapt to the jump in scale, use as shelter creation, and preservation of portability.


169 Ibid.
The prototypical shelter section proved to be extremely effective in erection and temporary use. Most importantly, the process took less than two hours and required little expertise to construct. The functioning of the loom was much more simplified than a traditional loom, therefore easily translated to other people. As a result, these findings led to a transformation of a primitive machine into the design of an efficient kit of parts relating weaving to a broader, novice audience. Anyone, regardless of their weaving experience could now make fabric for their own shelter. Along the same vein, the kit of parts could be brought to any location and, with the use of a stationary object, construct a temporary shelter in any chosen location. Different design configurations respond to location and need, therefore creating a site specific woven shelter.

The overall aim of the shelter is that weavers have input in the design, construction, and use of the shelter, beyond that which is available in traditional, modern shelter. Based on need, the intricacies of the process are understood and the parameters of the weave are developed to reach a final construct. Hand work places a significant part of the weaver into the process and gives the piece meaning beyond itself. The weaver also has complete control over what materials to use because the weft yarns are free for exploration. As the process and structure of weaving captures meaning, a weaver may choose to select a material for reasons studied earlier in Material Meaning. By making the process of selecting materials personal, an even greater connection is made to the place of inhabitation.
The Making Day

Based on the success of the first prototypical woven section and related analysis, the succeeding step revealed to be a temporary construct highlighting the process of weaving and the personal, emotional connection to shelter-making. A grove of trees south of the University of South Florida, School of Architecture and Community Design, was selected as the site-specific shelter locale. The largest tree within the grove, having a trunk circumference of over 100 inches and branching off into three immense limbs at a height of 6 feet, served as the stationary object and a conceptual basis. In this particular instance, there is already shelter from the overhead tree limbs. However, relating to insect cocoons hanging in trees, secondary shelter is provided by the tree, but primary protection and privatization of space is achieved through the insect-created shelters. A series of three grounded, woven cocoons were envisioned to carve out place and to allow perception of the space underneath the tree with new eyes and consciousness. Each cocoon would be made of seven woven sections, with the width and height of each cocoon being determined by the branch it was connected to. This shift in scale and reaction to place further demonstrated the adaptability of the weaving system.

Conceived as weaving performance, goals of the event emphasized handwork, use of meaningful material, and the resultant "social fabric" of construction. Most importantly, the performance sought to allow handmade, woven shelter to rise to significance greater than traditional shelter. Participants from the local community were invited to interact with fellow novice-weavers and contribute a one-hour weaving shift using the efficient backstrap loom kit.

Invitees were also requested to donate a weft material of their choice that could be transformed on-site for weaving the shelter. This material could consist of but not be limited to plastic grocery bags, old clothing, plants or vines, fabric, ribbons, pantyhose, shoelaces, blankets, electric or computer cords, belts, video and cassette tape, or film. This request addressed parameters within the formal guidelines of this study, while also allowing a personal creativity, authorship, and connection which could not be pre-designed in the shelter.

Over the course of two weeks, twenty-one backstrap loom sets were designed, laser cut, assembled, and attached to the base of the selected tree in preparation of the event. The nearly 12,000 feet of warp rope included in the looms was ready for programming with meaningful weft.
The event “Remaking Shelter: An Adventure in Collaborative Weaving” occurred on March 6, 2010 from 10 am until 6pm. Over the course of nine hours, over 30 different individuals of different backgrounds and ages were taught to weave, contributing to fourteen complete shelter sections. One complete cocoon was erected using the methods of the initial prototypical woven section during the weaving event. The following day a second cocoon was erected using retrofitted methods based on observations from the weaving day. Weavers donated nearly 5000 feet of their own unique weft material, ranging from relics, recycled elements, or pure experiments, to construct the shelter and embed a piece of themselves into the construct.
Post-Making Day Analysis

After chronicling the events of the weaving performance, several notable areas of activity were analyzed in relation to initial project intentions. The transformation of invitees into an actual weaving community was immediately perceivable with the start of the event. Novice weavers from different backgrounds and locations joined together for communal making and to achieve a common goal. Backstrap loom sets originally designed as individual tools, evolved throughout the day into a process of teamwork due to the long length of the warp fibers. In these cases, a single participant would throw the shuttle while the other participant, having the loom around their waist, would adjust the heddle board as required to efficiently advance the work.

Most notably with regards to community-making was the arrangement of weavers and looms around the tree. Initially, seven weavers were spread radially ten to fifteen feet away from the tree in relation to the cocoon design. However, as weaving advanced woven fabric was rolled at the participant’s waists, moving them closer to the base of the tree. Correspondingly, those fabricating weft material for the weavers also moved. Weaving techniques and tips were also shared verbally as weaving advanced. Social connectivity increased through decreasing the physical proximity of making, strengthening communal relationships.

The resultant creativity and thoughtfulness in which weavers collected and donated a personal weft material was extremely successful. Nearly every participant donated a unique material for themselves and in some cases had remainder to share with other weavers, adding to the overall richness and connections embedded within the shelter. The supplied rope, which coincidentally was the easiest material to work with, was immediately perceived as a *boring* weft and exists very little in the construct. Material ranged from Christmas lights, a child’s raincoat, a Starbucks apron and hat, plastic grocery bags, men’s ties, t-shirts, electrical cords, newspaper, Spanish moss, and other unique items. Donated material transformation into a useable form for weaving on site was also an important job and also contributed to personal connection to shelter.

The majority of participants, having no experience with weaving or familiarity of construction methods to erect shelter sections, exhibited an impressive array of construction ingenuity throughout the weaving performance event. On several occasions participants were observed innovating construction methods and tools on site for alternative uses in weaving and shelter erection. If the loom set did not accurately fit to a participant’s body style,
adjacent tools were used to perfect a better fit. On another occasion, slight modifications were made to the loom set if a particular material required different handling tactics in order to be woven.

Several pieces of the loom set failed throughout the day and were replaced with new pieces. After each breakage, however an informal, verbal analysis was conducted to determine cause of failure. Participants were eager to continue, but more importantly wanted to ensure a proper usage of the tools and methods. This desire enabled them to stay alert to their weaving movements and also maintain a high level of craft for the woven section. A quick reiteration of proper methods, typically solved the weaving breakdown, however in some instances the problems could not be resolved.

As craft and accuracy were obvious goals of the event and final construct, maintaining these two elements became a challenge of communal construction. In regards to design and image of the woven sections, some participants easily understood the process and were able to construct highly crafted pieces. Other participants struggled and were not as successful in the weaving task, thus resulting aesthetically in a piece of low craft. However, regardless of final outcome every woven section was included in the final construct as skill level was not a requirement of a performance based on the process and not the product.

Similarly in the erection of the first cocoon design guidelines were initially set and dictated, but when working in a communal setting with novice participants, challenges do arise. Despite much assistance and help from the weaving community, the connection details of the first cocoon to the tress did not result in an outcome that was consistent with the design parameters. Consequently, the construction of the second cocoon the following day allowed for further analysis and a change in the construction method to allow for an elegant and less haphazard detail. With regards to construction methods and ingenuity within a communal setting, the overall goal and true success is to clearly outline parameters but be willing to remove personal connections to actual authorship.
The obvious lack of continuity and sensitivity to nature within current construction led to the incorporation of innate maternal nurturing and a return to the prehistoric woven shelters of women. In further strengthening a connection to the natural world, the internal shelter of the female body symbolically became a design impetus for the permeable enclosure of both cave and skeleton, exhibited in the construct design.

Being communally created, the work embodied many voices as well as being a vehicle of communication in regards to current, clearly outdated building standards. The benefits of communal making go far beyond those of just the project site, but begin to educate a greater audience and spur movements for change. All the voices realize there is a different way of making and the need is now.

It’s not a landmark building, a set of rules, or a single event that is going to make a difference in shelter construction, but rather looking differently at the things we already possess in order to move forward sensitively, intelligently, and sustainably. Carol Franklin in *Women in Green* states that “the earth is one large household we have a responsibility for.”

Conclusions

As mentioned *By Hand: The Use of Craft in Contemporary Art*, “the physical body is the primary means with which to experience the world and the most obvious tool for the production of creative work.” The design output of this particular study became precisely that: an exercise in hand-making, as well as experimenting, gathering, and truly seeing again. Superficial, convenient, or finite end products were not revealed nor the aim. Rather, powerful queries about the fundamentals of society, culture, and the built world instead probed the heart of the matter: making space, personal place.

A temporary, spatial construct acted as a creative tool to alter the perception of building and social connection with place. Weaving, literally and conceptually, linked prehistoric shelter with modern building and questioned whether current construction methods are true progress and positive representations of culture. Design and construction of the construct was rethought in terms of weaving, highlighting hand making, material connection, versatile structure, and most significantly the concept of process over product.

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centuries humanity has been above nature. An architecture incorporating the natural constructions of weaving is an intuitive process that holds true potential in bringing humanity back down to its root. With the innate guidance of women, nurturers of the earth, the pursuits of change become even more palpable. This study scratches the surface of the task given to this generation of architects. Most importantly, it leaves room for continued exploration with the only result being the question “What’s next?”
Chapter Nine:

Project Graphics

Prototype Design and Erection

Figure 88. Overhead diagram of human body connected to backstrap loom.

Figure 89. Making images from actual use of backstrap loom.

Figure 90. Elevational diagram of human body using backstrap loom.
Figure 91. Concept collage of nature as inspiration for design.

Figure 92. Inspirational imagery for design.

Figure 93. Sketches of shelter design.
Figure 94. Laser cut sheet for personal loom set.

Figure 95. Laser cut sheet for personal loom set.
Figure 96. Laser cut sheet for personal loom set.

Figure 97. Shop drawing diagram of shelter fabric.
Figure 98. Shop drawing detail of shelter fabric.

Figure 99. Shop drawing detail of shelter fabric.
Figure 100. Shop drawing detail of shelter fabric.

Figure 101. Tree selected for weaving prototype.
Figure 102. Images of loom prototype pieces.

Figure 103. Images of loom prototype pieces.

Figure 104. Images of loom prototype pieces.

Figure 105. Images of loom prototype pieces.
Figure 106. Images depicting the setup of the prototype.

Figure 107. Detail images of prototype setup.
Figure 108. Detail images of prototype setup.

Figure 109. Detail images of prototype setup.
Figure 110. Completed prototype woven section.
Figure 111. Completed prototype woven section.
Alternative shelter construction design.

Figure 112. Alternative shelter construction design.

Figure 113. Alternative shelter construction design.

Figure 114. Alternative shelter construction design.
Figure 119. Cocoon shelter plan.

Figure 120. Invitational poster for weaving day events.

Figure 121. Images of loom set up for weaving day events.
Images of the Weaving Performance Day

Figure 122. Looms set up radially around tree on weaving performance day.

Figure 123. Looms set up radially around tree on weaving performance day.

Figure 124. Detail of loom set connected to tree.
Figure 125. Cutting donated materials for weft usage.

Figure 126. Detail of Starbucks apron for use as weft.

Figure 127. Novice weaver beginning to weave.

Figure 128. Weaving and rolling up fabric at waist.
Figure 129. Winding the shuttle.

Figure 130. Participant cuts up an old raincoat for use at weft.

Figure 131. Beginning to weave the raincoat.
Figure 132. Broken heddle board during weaving.

Figure 133. Winding the shuttle with plastic bag weft.

Figure 134. Winding the shuttle with Starbucks apron.
Figure 135. First complete woven section.

Figure 136. Working in teams to use the backstrap loom.

Figure 137. Working intently to make the weave tight.
Creating weft material from donated men's ties.

Figure 138. Creating weft material from donated men's ties.

Resultant weave of men's ties.

Figure 139. Resultant weave of men's ties.
Figure 140. Novice weaver working with supplied rope.

Figure 141. Several loom sets tied to tree.

Figure 142. The communal weaving group.
Figure 143. Working to construct the first cocoon shelter.

Figure 144. Working to construct the first cocoon shelter.
Figure 145. Weaver volunteers assisting in construction of the first cocoon shelter.

Figure 146. Working together to solve connection problems.
Figure 147. Altering the height of the woven sections in the tree.

Figure 148. Ensuring the shelter support piece is under proper tension.
Images of the Final Construct

Figure 149. Overhead connection of the second cocoon to the tree.

Figure 150. Detail of shelter support connection.

Figure 151. Wall floor transition of shelter.
Figure 152. Detail of floor condition with stake tie downs.

Figure 153. Newspaper weft detail.

Figure 154. Belt weft detail.

Figure 155. Christmas light weft detail.
Figure 156. Tie weft detail.

Figure 157. Colored T-shirt detail.

Figure 158. Tie weft detail.

Figure 159. Floor to wall section of woven shelter.
Figure 160. Wall to roof connection with shelter support piece.

Figure 161. Detail of plastic bag and newspaper at shelter support piece.

Figure 162. Starbucks apron and hat weft.

Figure 163. Detail at shelter stake tie downs in ground.
Two woven shelter cocoons at tree site.

Figure 164.
Figure 165. Two woven shelter cocoons at tree site.

Figure 166. First smaller woven cocoon on performance day.
Figure 167. Second larger woven cocoon.
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Appendix
Appendix A: Communication of Ideas

Selection of Online Blog Posts

Warp = Weft = Weave

Last Thursday I became a weaver in the actual sense. Setting up for three days culminated into a truly crazy creation of experimentation. I started out doing a simple basket weave and then moved to a twill using the same yarn I had used for the warp. This yarn proved to not be a good selection as it was difficult pulling the baster after each throw of the shuttle. I also had a lot of trouble keeping the selvages (the edges of the piece) even and not pulling in too much. Contrasting this is something I’m sure is acquired with more exposure. Sadly, I also snapped three blue lines due to a snap behind the reed. So, you live and learn. It was a really fun experience however because I soon moved on to investigating different patterns, yarn, and beating strengths. See my latest creation below. I feel pretty successful right now and look forward to more. I’m really looking forward to possibly designing and/or conceiving my next piece on paper beforehand, as Anni Albers did. From this first study, I am also interested in further using other items besides yarn as the weft and just seeing what happens. Channeling happy accidents is what I am going for.

Figure A-1 Personal blog page—continued both columns.
Appendix A: (Continued)

A TACTILE SUSTAINABILITY
ARCHITECTURE, WEAVING, AND WOMAN

MIDNIGHT, SEPTEMBER 14, 2009
Starting off right
After coming off of no-weaving week, I have started my second piece and have successfully measured the yarn, sized the reed and threaded the heddles and its only halfway through Monday! (ugh! of relief) I realize that despite other commitments and work this is the most important part of my study and I need to make it a priority... daily. In planning the new piece, I wanted to stay main with the methods explored in the first piece to one, not get too far over my head initially and two because its the most basic and most ancient form. I kept two alternating colors, however, based off of some accidental snapped yarn creating interesting voids in the first piece, I decided to buy one, two, or no threads in the reed dents to hopefully create a randomized shed, repeated as the color changes. I still thread the heddles using a straight draw, 1, then 2, 3, and 4, then repeat, so I am unsure of the outcome. I am also going to use a plastic bag that I shredded into a "yarn" and perhaps some rough twine that I purchased at a hardware store as an interesting weft. Interestingly the new piece is a blue and yellow warp again. I was drawn to this fluorescent yellow yarn and the blue randomly followed.

I did however have some breakthroughs last week: I met with local weaver and USF Collaborator Judi Nelson. Let's just say she is exactly what I need as a beginning weaver to have on my side. During our talks she brought up several good points on weaving design and production, first being how natural the act of weaving comes to her. The precise and intricate movements of the set-up along with the rhythmic dance and synchronicity of throwing the shuttle and depressing the bobbins. I completely agree with her description and satisfaction derived from weaving. It felt completely natural for me as well, like something inherent.

Although being new, the language of weaving somehow feels familiar and not foreign.

ABOUT ME
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A Master of Architecture Thesis explores the relationships between architecture, weaving and woman. Maternally-based design strategies and qualities of protection and encroaching space harmoniously with nature through textiles attempts to re-envision the modern construction of shelter. By existing not as a space or a place, translating surface to structure, and revealing its making in the outcome, an ephemeral construct demonstrating an architecture of experimentation emerges.

VIEWS MY COMPLETE PROFILE

BLOG ARCHIVE
▼ November (2)
▼ October (3)
▼ September (12)
the goods
Quick post
New Experiment(s)
An Architecture of WhAt?

She also commented how weaving is a solitary act, unlike other fiber arts like quilting, knitting, or spinning. This isn’t necessarily a negative and creates a different experience than your typical Monday night knitting group. Weaving isn’t done to pass the time, it’s a conscious and deliberate act. I have found that it allows you be alone with your hands, the material, and your thoughts. You are completely present with your movements and what happens is under your direct control. Under a strict set of repetitious process and guidelines, infinite possibilities reveal themselves.

Judi and I were also discussing the first piece I created and the unified strength of the under- and over members. She suggested I write this comment I made down, so here it is: The piece was so flexible and so rigid at the same time. I can’t just stop, but I can manipulate it in so many ways. Although this is significant observation, its relevance is yet unknown... not for too much longer though.

Finally, Judi and I discussed that weaving is much more about process than product. At this point, I have spent much more time setting up rather than actually weaving, but I feel nothing has lost as I have learned so much over the past few weeks. I have a sense of pride in hanging up my recent project for all to see, it’s a beautiful experiment, but is it a true representative of the time, energy, and thought embodied to make it? Are our efforts ever completely understood in our creations? Is it supposed to only be a personal triumph? Is the product really important or is it the learning and growing that makes the process worthwhile? This is something to be explored as weaving is approximately 70% process and 30% product. Does creating beautiful architecture follow the same course? I would say yes.

POSTED BY KRISTEN DANQUIST AT 1:48 PM
REATIONS:
funny (0)
interesting (0)
cool (0)

0 COMMENTS:
POST A COMMENT

Figure A-2  Personal blog page--continued both columns.
Appendix A: (Continued)

An Architecture of WHAT?!  
As this is an architectural thesis, sadly I cannot just keep playing
and experimenting forever on the loom…there has got to be a
method to this madness, even if it does change on a weekly basis.
As a result of oodles of research this past week, I have been able
to draw some initial qualitative design assumptions. I am newly
intrigued with the popularity and effectiveness of architectural
installations seen at such venues as P.S. 1 MOMA and the Storefront
for Art and Architecture. As these constructions are temporary
and small in scale, they provide a high level of sensorial
experience of the space/place without all of the practicalities of
an actual building, kind of like a solution for the senses. Priority is
placed however on their actual method of construction, due to
time restraints, space, and the direct and immediate connection
of the designer to the materials and production—which I find to be
the most challenging and intriguing element of all. To restore the
designer the experience of direct experience of a medium is the
lack of today, the words of Armi Albers. The process of forming
has been disturbed by divorcing the planning from the making,
since a product today is in the hands of many, no longer in the
hands of one. Most importantly Albers states that the craftsman
gives meaning to material beyond itself. This is quite an
empowering statement.

Below are my qualitative thoughts on program.

Figure A-3  Personal blog page—continued both columns.
Appendix A: (Continued)

A TACTILE SUSTAINABILITY
ARCHITECTURE, WEAVING, AND WOMAN

TUESDAY, SEPTEMBER 22, 2009

New Experiment(s)
I am pleased to see making progress on the next piece, which includes industrial twine and a large heavy-gauge plastic bag I sliced up into one continuous strand and loaded onto my shuttle, as my well materials. I also used a technique of the two well materials joining at randomly located across the warp, something I have never seen before. This is intriguing, but I wish it was more apparent. As a plastic is transparent, it is most like a regular well strand, but when it approaches the joint with the twine, it loses something. Any thoughts? However, positives exist: not having working with either of the two well materials, I wasn’t sure how they were going to lay within the warp. I didn’t think this got on paper beforehand, but as I am sticking with my laboratory of experimentation. Interesting enough, the plastic happily folded in half without much work on my part and made an even spacing for the twine to follow, both without much beating. It is better we let the material speak than we speak ourselves.

Additionally, in Manual: The Architecture of Kieran Timberlake, they talk of the craft of weaving itself and the presence of weaving in architecture:

The building block, or cell, of a woven surface is the joint between overlapping materials. Weaving in essence is a continuous joint. In closely spaced weaving, the pattern of intersections becomes both visually and practically subservient to the plane or volume. Although the joint is normally an event of each physical consequence that it dominates our perception, in a densely woven form, the joint is transformed into a recessive contributor to the overall appearance of surface and shape.

In addition to the entire work being a continuous joint, I feel the internal joint which I created with the two well materials begins to add another dimension, still identifying with their description, but perhaps not in such a recessive way. This joint, an additional form of structural organization, is one of my doing which I imposed on the material and process, not mechanically imposed by my tools. Should it be a recessive or begin to organize the entire piece? As I am thinking about moving into three-dimensions by next adding some thin gauge wire to the next experiment on this warp, perhaps that could express the internal joint spatially, in addition to its visual distinction.

Figure A-4  Personal blog page—continued both columns.
Appendix A: (Continued)

A TACTILE SUSTAINABILITY
ARCHITECTURE, WEAVING, AND WOMAN

WEDNESDAY, NOVEMBER 4, 2009

and so she shall weave...

After quite a battle with the fishing line, I finally got the warp in place, all 12 feet of it!!! The fishing line put up quite a fight when I was trying onto the front and back apron rods. I think staying put is the best thing that it does. Also it obviously doesn’t stretch similarly to the wool yarn, so that is making a difference in the tension I am trying to maintain. Despite these difficulties I think it was a really great choice to use something with such a similar form but from a completely different origin as the wool. The purpose of this weaving is to express embedded meaning, communication, and memories. As the current state and appearance of the wool yarn still give reference to the sheep that it came from. I didn’t shear the sheep, but most people are familiar with the shearing process and then the process in which raw wool is spun into yarn. Physical properties of wool traditionally denote warmth, comfort, protection, and softness. All of these qualities in some form are all present in the yarn and are more apparent as I weave them into cloth. The fishing line is a completely different ball of wax. Other than being made from petroleum, I know next to nothing about what chemical processes and procedures are required to create the product. Furthermore, it is traditionally used as part of a recreational activity, is transparent, and spends a lot of time being wet...a long way from the loom. Essentially its in foreign territory, so lets put it to the test!!! What can and can’t it do? So far, all it wants to do is roll back up on the spool it came on...argh. But, also, we must listen to the materials! Oh and i’ve got some old 16mm movie film on the way...Mwah!!!