

2015

The Adobe Stigma

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NINO BOORNAZIAN

SENIOR INTEGRATIVE PROJECT:
INDEPENDENT STUDY

ARCHITECTURAL STUDIES
CONNECTICUT COLLEGE
2015



CONNECTICUT
COLLEGE

THE ADOBE STIGMA

**Nino Boornazian
Senior Integrative Project
2015**

Root Studio



Joao Boto Caeiro
Founder



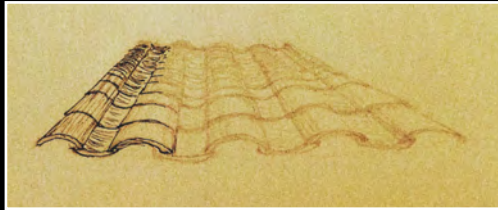
Fulvio Capurso
Co-Founder



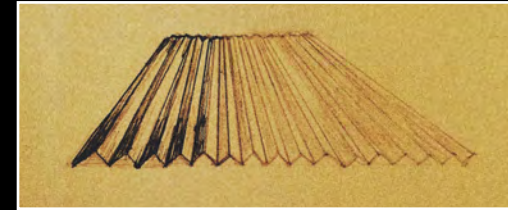
Tiago Siexas
Associate

Defining the Stigma

Vernacular



Industrial



Clay Tiles



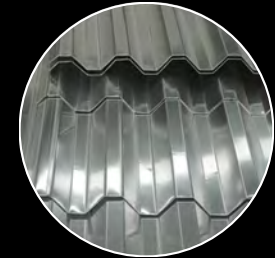
Stone



Concrete Blocks



Corrugated Sheet Metal



Adobe



Agave



Rural Romanticization of Industry



A photograph that I took in San Juan Mixtapepec



STRATEGIES

1.



Luxurious gym chain in the heart of Oaxaca
- Vernacular materials combined with contemporary

2.



Home construction in the indigenous town of San Juan Mixtapepec



Architects: Root Studio, J.J. Santibañez

Year: 2013

Location: San Felipe del Agua, Oaxaca de Juárez, México











On the Left:
Augustina's old home

On the Right:
Augustina's new home



Architects: Root Studio

Year: 2014

Location: Santa María Atzompa, Oaxaca, México







SCHEME 1:



SCHEME 2:

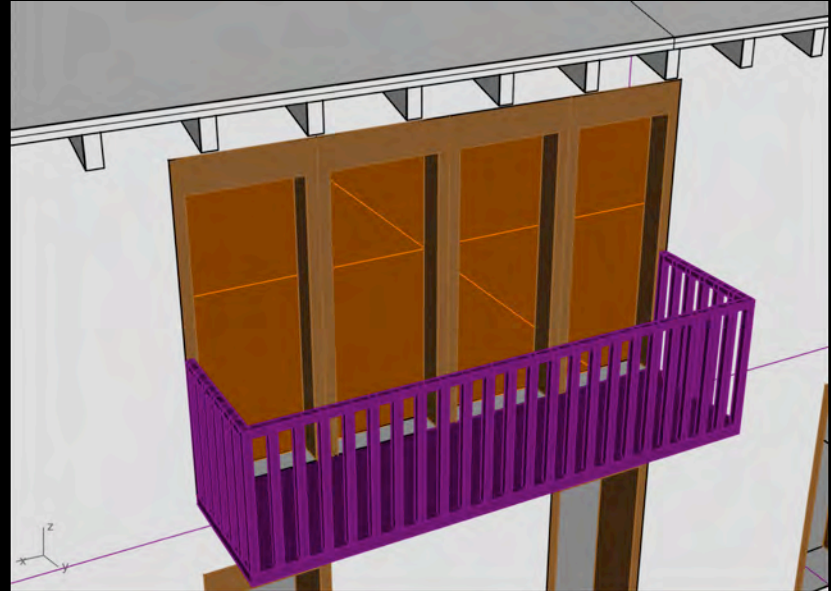


SCHEME 3:





RHINO VIEW:



MODEL VIEW:

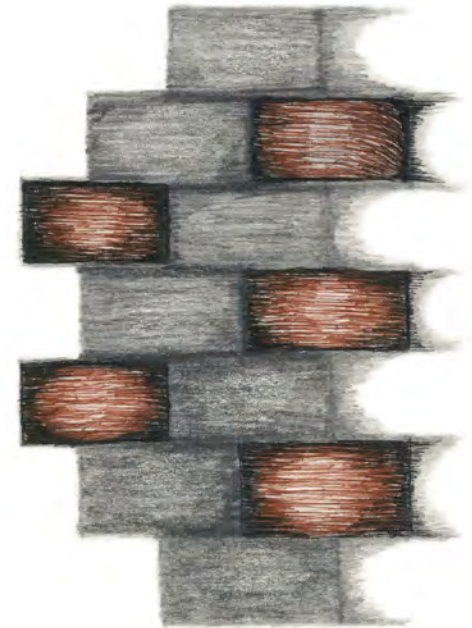
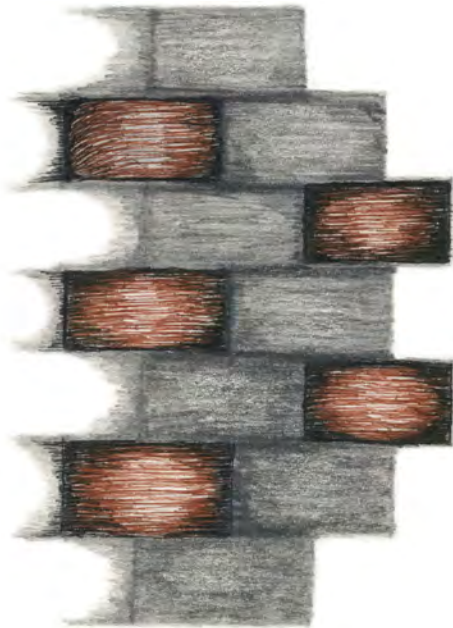




Physical Model of OIDHO Center

THE ADOBE STIGMA

**Nino Boornazian
Senior Integrative Project
2015**



THE ADOBE STIGMA

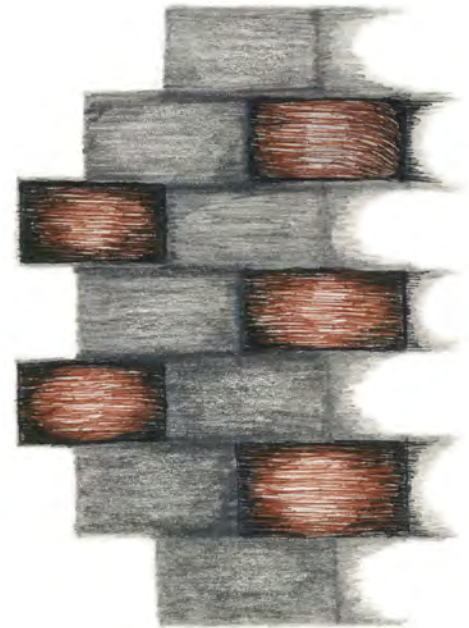
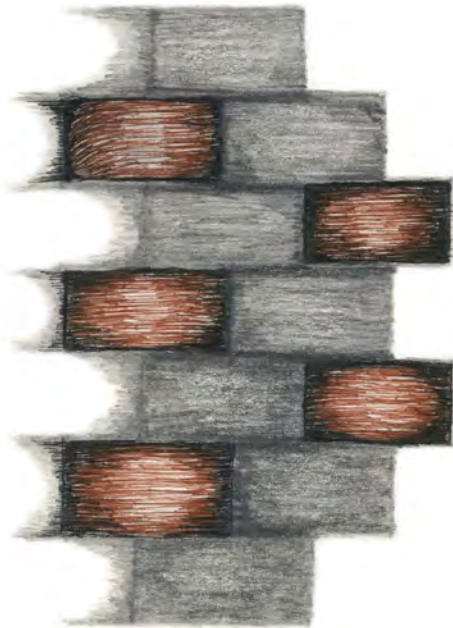
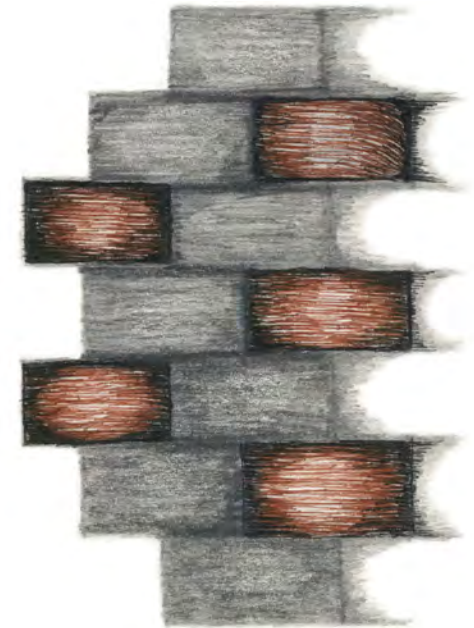
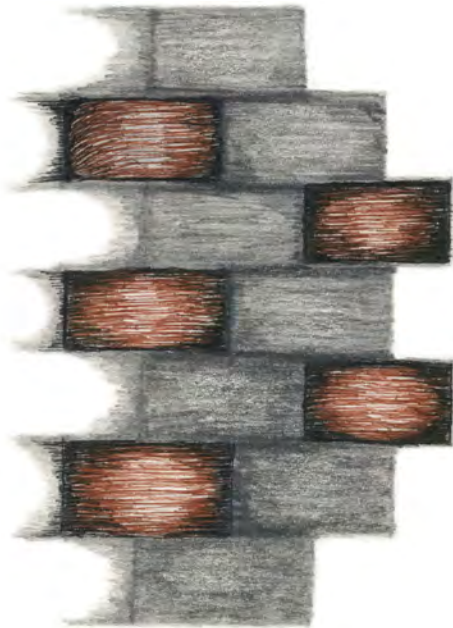


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Introduction

Architect Joao Boto Caeiro of Root Studio, in Oaxaca, Mexico, has recognized the looming cultural, economic, and environmental repercussions of a growing dependence on industrial materials, and has dedicated his career to the reversal of a stigma attached to vernacular materials such as adobe. I interned with Root Studio during the summer of 2014 and had the opportunity to participate in the firm's efforts first hand. In the past decade, Root Studio has implemented two particularly effective strategies to combat the negative social perception of adobe in both rural and urban settings.

1) The design and construction of emblematic buildings in cities.

Root Studio produces elegant buildings with a contemporary aesthetic, yet each project displays a similar loyalty to vernacular materials and traditional building techniques. A “modern” building made from predominantly vernacular materials has a profound effect, working to reverse the perpetuating notion that the vernacular has no place in contemporary society. In addition, through the involvement of surrounding communities and volunteers in the construction of their projects, Root Studio revives traditional building techniques and advertises the practicality of the vernacular. Their projects link the vernacular to the contemporary and stand as symbols for the contemporary relevance of tradition. [1]

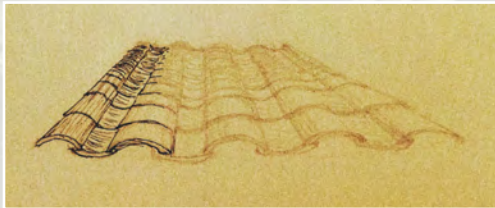
2) The revival of traditional building techniques in rural communities provides the knowledge to inexpensively build homes with vernacular materials, eliminating the dependence on industry.

Root Studio tackles the source of the problem through its participation in Adobe for Women, a nonprofit organization dedicated to the revival of traditional building techniques in rural communities. In these communities, Adobe for Women provides both an educational experience in traditional building and tangible homes for impoverished people. The vernacular homes stand as symbols within their communities demonstrating that those with limited resources can still have beautiful, comfortable, and sustainable homes if they embrace their culture and work to preserve the knowledge of traditional building techniques. [2]

Material Glossary

Throughout this paper I often compare industrial and vernacular materials without necessarily going into the specifics of what that entails. These are broad terms that vary considerably based on a variety of different contextual factors. For instance, the traditional building techniques native to one region of Mexico are not necessarily applicable to those of another, as the materials are used in response to different environments. Industrial materials vary little in response to climate as they are mass-produced and often used in both urban and rural settings throughout the state of Mexico despite its diverse ecosystem. This material glossary provides visual insight as to what exactly I intend to reference through the mention of industrial vs. vernacular materials in this paper.

Vernacular



Clay Tiles



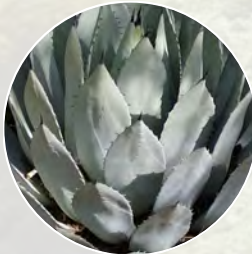
Stone



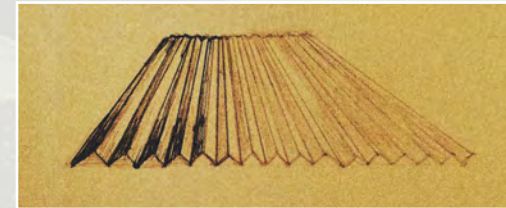
Adobe



Agave



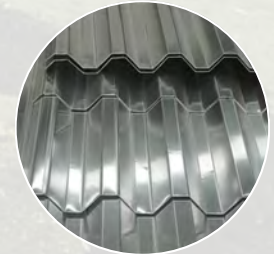
Industrial



Concrete Blocks



Corrugated Sheet Metal



Building Techniques

Root Studio has designed emblematic buildings in the city of Oaxaca that stand as strong visual metaphors for the coexistence of vernacular materials and contemporary design. However it is one thing to promote traditional revival through a purely aesthetic approach, and quite another to do so in practice. Even if the emblematic buildings have the intended motivational effect, many lack knowledge of the necessary precautions to take when building with adobe, for example. This is a distinct problem because failing to meet the criteria in which adobe can be utilized will result in its failure, perpetuating its false reputation as an inferior material. It is for this reason that Root Studio goes to great lengths to include the surrounding communities and regional volunteers in the construction of their projects. They

teach the process of making adobes, and other free or inexpensive measures that can optimize the performance of the material.

Making Adobe

Depending on the kind of earth used, there are several different approaches to the construction of adobe bricks. While supplementary ingredients can vary significantly depending on the method of construction, earth, water and straw are inherent to all kinds of adobe. For the adobes in the Adobe for Women projects, Root Studio used a mixture of earth, water, straw, and donkey manure. The earth is extracted on site from approximately half a meter below the surface in order to ensure that it does not contain any organic material. If organic material were to make it into the adobe mixture, it



Figure 1



Figure 2



Figure 3

could potentially grow and compromise the structural reliability of the blocks. After extracting the earth, it is often sifted as an extra precaution against organic materials. Once the earth is ready, it is mixed in with water, donkey manure, and straw (Figure 1). The donkey manure and straw provide an adhesive quality while the water allows the mixture to be shaped into a desired form. After all the ingredients are combined they are then mixed together with bare feet (Figure 2). The mixture is then covered with plastic to maintain moisture as it is placed into wooden frames built to the desired dimensions of the bricks. The bricks sit within the frames overnight to take shape and are then removed and allowed to dry for two to three weeks before used in construction (Figure 3).

Foundations as Boots

Adobe is extremely susceptible to water and will erode rapidly if it comes into consistent contact with it (Figure 5). To withstand the elements, Root Studio emphasizes that “big boots and hats” are integral to the survival of adobe structures. In other words, adobe cannot be maintained without properly constructed foundations and roofs. It is of an economic and structural interest to implement a foundation of appropriate height. If it is built too low the adobes can be damaged, and if it is built too high, the result is an unnecessary waste of time, resources, and energy. Root Studio suggests that the foundation should rise approximately 30 centimeters above grade. Using this modest height in their domestic projects, Root

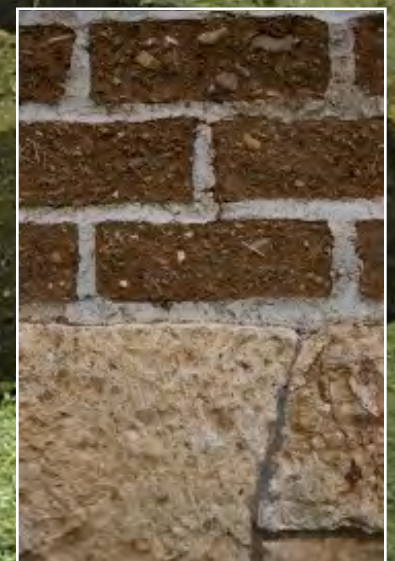


Figure 5



Figure 4

Figure 6



Studio has had success in the preservation of the adobes without sinking unnecessary time and effort into over-sized foundations. Concrete mortar is often used to bind stone foundations however it is not always a necessity. In rural communities, foundations can be constructed free of cost by gathering local stone and using earth slip to bind them (Figure 48).

Roofs as Hats

Roofs are sloped to allow for water run off, and elongated to protect the adobes from rain (Figure 7). Root Studio has found that a 30 percent slope achieves maximum affectivity. The incline is steep enough to enable run off, yet shallow enough for the clay roof tiles to sit on the surface without needing to be fixed with cement. Efforts like the application of tarpaper beneath the tiles and sealing the wood with motor oil are inexpensive and significantly

increase water resistance.

Surface Coating

While it is perfectly viable to build with exposed adobe brick provided adequate protection from moisture, surface coating is another option. Root Studio usually applies white finishes in their work but many natural pigments can be used to yield virtually any color (Figure 8). They use a plaster made from a mixture of lime, water, salt, and cactus extract. Moisture levels in the adobe fluctuate naturally according to the climate and it must be allowed to “breathe” in order to preserve structural integrity. The lime plaster prevents water from entering and causing damage but it allows humidity and air to circulate enough to keep the adobe healthy. Concrete based plaster is too impervious to fluctuating



Figure 7



Figure 8



Figure 9

air moisture levels to foster ideal conditions for adobe, yet is often used as a surface coating and the consequences are significant. Concrete prevents the adobes from exuding natural levels of moisture. Pressure builds as the moisture tries to leave and results in the deterioration of affected portions of the coating (Figure 9). Sometimes the concrete manages to contain the moisture which eventually soaks down to the foundational blocks and can result in the collapse of the entire structure. When stacking adobes, lime mortar should be used instead of cement mortar for the same reason. In rural communities with limited resources, earth slip is available alternative to lime mortar.

The Stigma

The 1980s brought about an industrial boom resulting in the drastic expansion of Mexican cities and an eco-

nomic shift rendering agriculture as a practically unviable source of income in many rural areas. [3] Farmers were forced to seek other employment opportunities, and flocked to cities to find work in urban construction. Concrete quickly became the symbolic material of modernization in Mexican cities and it was not long before this influence spread to the rural areas that currently account for nearly half of Mexico's estimated population (Figures 10 & 11). [4] In the past 20 years, many impoverished communities in Oaxaca, Mexico, have turned their backs on traditional building techniques and vernacular materials such as adobe when faced with the opportunity to purchase materials romanticized as modern. In many of these impoverished towns, the incorporation of industrial materials has become a



Figure 10



Figure 11

way for residents to display their status within the community (Figures 12, 13, 15, 18, & 19). Many who visit these communities find it difficult to rationalize why it would be desirable to incorporate such contrasting imagery, yet the residents take pride in what they consider to be a link to modern society.

Although a jarring visual juxtaposition to the vernacular aesthetic of rural settings, contrasting imagery is by no means the most threatening side effect of manufactured building materials. In comparison to vernacular materials, tin, glass, and concrete are more expensive, less sustainable, and far less suited for the climate of southern Mexico. Furthermore when rural communities invest in materials manufactured in cities, they perpetuate the economic trend benefiting urban life and impoverishing their towns. [5]

Adobe is a vernacular material well suited for the climate of southern Mexico that has fallen victim to negative connotations in light of manufactured materials that have become available in recent years. The making of adobe bricks is a complex process that has been passed down from generation to generation and it is at risk of extinction. As families become dependent on industrial materials through a desire to be modern, the process of constructing adobe structures becomes obscured over time. In addition to the social perception of adobe as a “poor man’s” material, it is starting to earn a reputation for being unreliable when really the poor performance is a consequence of the fact that the nuanced construction process is fading over time. However, this trend is not unique to adobe. The glorification



Figure 12



Figure 13

of industry has tabooed the use of vernacular materials, and traditional building techniques throughout Mexico and could eventually lead to their extinction.

In 1964, Bernard Rudofsky organized an exhibition at the MOMA titled *Architecture without Architects*. The aim of the exhibition was to emphasize the beauty of traditional building styles in indigenous cultures achieved through careful selection of vernacular materials best suited for their respective climates. [6] Several traditional Mexican building techniques were featured in the exhibition. The climate of Mexico varies significantly depending on the region. Naturally, the traditional building styles of each region vary in response to respective climates. [7] For instance, in the hot and arid region of González y González, homes with thatched roofs are common to maintain a

hospitable temperature using locally harvested agave spikes as the predominant material. [8] These homes have a life span of up to twenty years and can be easily disassembled or repaired. [9] Agave provides an inexpensive, and comfortable solution to the climate of González y González yet in recent years it has been all but abandoned. [10] Mariana Yampolsky references the example of María Cruz Angela Ramírez, an elderly resident of González y González:

“In this region, which is hot and dry, we used to build our homes from maguey [agave] spikes. They would last twenty years or more, and the interiors were always cool (Figure 14, 16, & 17). But few people today want to live in such houses. Mine is the only one left in this place. Over there, as you can see, my



Figure 14



Figure 15

son has built a modern house. He went to work in the USA, and when he came back he made his house with walls of breezeblock and a roof of lámina [corrugated sheet metal]. I live there with him, but when the sun beats down on the roof we feel hot and uncomfortable. That is why I keep my old house. I use it to cook in, and it is always cool. Yet no one likes these houses any more. Everyone here remembers how to build them, but I do not think that any more will be built.” [11]

Why are these traditional building techniques rejected despite their practicality? Agave is the superior financial option as it can be locally gathered and assembled for free. Ramírez says herself that the agave homes are far better suited for the climate of González y González, yet the town has divorced itself from the vernacular out of a desire for industrial materials such

as breezeblocks and corrugated sheet metal. This sudden rejection of the vernacular is ultimately the byproduct of a recent economic devaluation of agriculture and can be observed in the story of Ramírez’s son. Due to the rapid decline of agriculture as a source of income, and subsequent immigration to cities on a large scale, indigenous communities are turning their backs on the inexpensive and biodegradable vernacular materials suited for their climates. People from rural settings leave their communities for work and return under the impression that the only way to be considered part of the modern world is through use of the industrial materials seen in cities. Clearly this longing for modernization has had a powerful effect on rural settings, as families are willing to sacrifice their comfort, and funds to link their



Figure 16



Figure 17

homes to what is perceived as a contemporary aesthetic within their communities.

A similar stigma to the use of agave in González y González has formed against adobe in both urban and rural contexts. In Oaxaca, where high altitudes create a climate that is hot during the day and cold at night, adobe is best suited for the climate because of its thermal behavior. It absorbs heat during the day ensuring a cool interior atmosphere and at night the heat is released which keeps the interior warm. The thermal quality of adobe is so well suited for the climate of Oaxaca that it eliminates the need for fans or air conditioning. In response to the Oaxacan climate, Root Studio uses adobe in combination with clever detailing to tie the vernacular to the contemporary demonstrating that it is not necessary to sacrifice comfort, sustainabil-

ity, or cultural identity for contemporary relevance.



Figure 18



Figure 19

Sport City, 2013, San Felipe del Agua, Oaxaca de Juárez, México

Root Studio's projects are predominantly residential, however their most renowned project is Sport City Oaxaca. For the design of Sport City, Root Studio collaborated with architect Juan José Santibañez, who is also involved in the efforts of Adobe for Women and passionate about the virtues of vernacular materials. Sport City is a Mexican gym chain that has many different branches throughout the country. For most of its locations, the designs are restricted to modern materials using primarily concrete (Figure 20), however the one in Oaxaca is unique, and symbolic of Root Studio's philosophy (Figure 21). A predominant use of adobe in combination with industrial materials suggests a mar-

riage between the vernacular and the contemporary. As an emblematic public building located within the city of Oaxaca, Sport City helps negate the unfortunate social convention that the vernacular has no place in modern expression.

From the exterior, a passionate emphasis on the contemporary relevance of vernacular materials is made immediately apparent. The use of adobe, stone, and clay tiles pays respect to the traditional building techniques of southern Mexico. The adobe walls rest on a stone foundation and a strip of flattened clay tiles wraps around the building decorating the façade. The building is capped with a series of slanted triangles set within a steel framework and lined with corrugated sheet metal. While the roof is made entirely from industrial materials,



Figure 20



Figure 21



Figure 22

it is visually well integrated within the predominantly vernacular aesthetic. A decorative pattern is painted on to the sheet metal unifying the vernacular and industrial materials used in Sport City (Figure 23). The background is painted brown harmonizing with the color of the adobe and clay tiles. A modern aesthetic is achieved through the colorful geometric pattern that is painted on top of the brown background. Through the incorporation of vernacular and industrial materials and the thoughtful unified design of the exterior, Sport City presents a metaphor for the contemporary virtues of tradition.

The main entrance is shaded by a wide steel framework, lined with strands of bamboo clearly visible upon entering the building (Figures 22 & 24). The bamboo used throughout the design of Sports City is a Colombian strain and it serves both dec-

orative and structural purposes. While the bamboo is not native of Oaxaca, it acts as a visual alternative to industrial materials for modern expression. Once inside, it is impossible to ignore the use of vernacular materials. The adobe walls surround the vast interior space filled with exercise machines and the massive stone foundation reaches about 4 meters in height for the northern parts of the structure where the grade slopes dramatically (Figures 25 & 26). A crucial part of building a successful adobe structure is ensuring that the bricks do not come into contact with water. As covered in the building techniques section, it is absolutely necessary for the foundation to be raised above the topography of the site. The scale of Sport City places an emphasis on this fundamental property and can be interpreted as



Figure 23



Figure 24

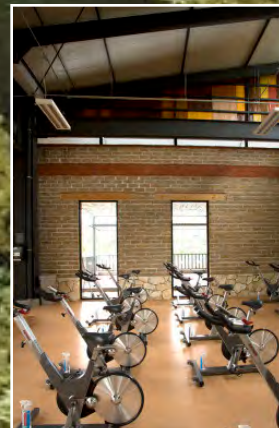


Figure 25 & 26

a reminder of an integral part of the process, which many have forgotten. For any kind of building technique there are precautions that must be acknowledged and adobe is no different. With the right approach, adobe is a perfectly viable option. Sport City advertises the social significance as well as the functionality of traditional building.

In addition to instilling cultural pride through persistent application of vernacular materials at Sport City, Root Studio's integration of industrial materials continues in the interior further emphasizing the coexistence of tradition and modernity. This message is expressed most clearly in the design of the open patio (Figure 27). The patio functions as a place for customers to enjoy refreshments from the café after working out at the gym. There are several tables and chairs placed around

the perimeter of the space. In the patio itself, there is a centralized tree that elegantly extends up and out of the space. The customers benefit from both shelter and natural light made possible by the lack of a ceiling. With a stone floor and clay tiles resting above the roof surrounding the square, the space makes clear reference to the traditional building materials of Oaxaca. The supporting structure is steel, but perhaps more captivating is the clever drainage system built into the vertical steel supports that functions as a water feature as it drains into a moat around the courtyard. Water runs off of the tiles and into the support system, where it flows through a diagonal pattern of channels, creating a soothing effect (Figure 28). Root Studio has resourcefully created a fountain that serves a practical function as well.



Figure 27



Figure 28

While Sport City achieves aesthetic harmony between industrial and vernacular materials, the exploration of such creativity in architecture using a costly industrial material like steel is a luxury that impoverished communities cannot afford. However, by setting these details within a project so clearly dedicated to preaching the merits of the vernacular, Sport City establishes an aesthetic link between traditional and industrial materials that poses a refreshing contrast to commercial architecture, which generally excludes the vernacular. As immigration to cities continues, buildings like Sport City Oaxaca play a pivotal role in the reversal of negative social connotations towards the vernacular.

OIDHO Center for Women, 2014, Santa María Atzompa, Oaxaca, México

This summer I worked with Root Studio on the construction of a Center for Women for an organization called OIDHO (Organizaciones Indias por los Derechos Humanos en Oaxaca) located within the town of Santa María Atzompa just three miles outside of the city of Oaxaca. OIDHO is an organization that advocates for the human rights of people from indigenous towns. The organization has established several communities throughout the state of Oaxaca. The one that I worked at is located within the town of Atzompa and functions somewhat like a commune. People from indigenous communities looking for work in the city of Oaxaca are welcome to stay and eat at OIDHO for free so long as they offer some kind of service in re



Figure 29



Figure 30



Figure 31

turn. The services required are by no means extensive but all of the guests are encouraged to contribute to the betterment of the community each day. During my time there, the services offered included assistance with construction, art lessons, and preparing meals for the community. Root Studio was hired by OIDHO to design and build a Center for Women within the community including sleeping space, a studio, a lounge, and a kitchen.

For my internship I participated first hand in Root Studio's efforts to revive and revitalize traditional building techniques. I was most exposed to their approach through my involvement in the design and construction process of the Center for Women. Throughout my time at Atzompa, members of the community were involved in the construction process and learned about proper precautions to take while build-

ing with adobe (Figures 30 & 31). In addition, Root Studio recruited large numbers of volunteers through social media to assist in construction each weekend, extending the educational experience even further.

When construction began in early June 2014, there was nothing but a pre-dug trench for the foundation. Both the members of the community who partook in the construction and I had the opportunity to learn the nuanced process of building an adobe structure and the necessary precautions to take in order to insure quality performance. The work was done predominantly by hand, which was grueling to say the least but it resulted in a valuable learning experience. By teaching with an inclusive and hands-on approach, Root Studio provides indigenous people staying at the OID-



Figure 32



Figure 33



Figure 34

HO, with the knowledge and practical means to properly build with vernacular materials native to their surroundings and rural backgrounds.

Construction began with the foundation (Figures 32 & 33). Truckloads of stone were dropped off at the site and we broke them down into manageable sizes using sledgehammers. Concrete was mixed by hand and used to bind the broken stone within the foundation. As covered in the building techniques section, the first step in building any adobe structure is securing a stone foundation above grade to prevent the adobe from coming into contact with water. It took us about three weeks to complete the foundation and once we were finished, it was time to begin laying the adobe bricks (Figures 34 - 37).

The adobes were pre-made and delivered to the site by a company based in the

city of Oaxaca. This luxury was made possible by the funds that ODHIO had available, and because of its close proximity to the city of Oaxaca. For most rural communities, this is an impractical means of acquiring adobe, as they are geographically isolated from the companies who produce them, and lack the funds to make such purchases. It is for this reason that adobes are usually made by hand in rural contexts. Although the process of making adobes by hand was waived in the Center for Women, the community still learned proper building precautions despite the client's means of acquiring them. We stacked the adobes in a running bond pattern to provide maximum support and used mortar with lime as the primary ingredient to fix them into place. A common mistake that people make while building with adobe is us



Figure 35



Figure 36



Figure 37

ing cement-based mortar instead of lime. Concrete and cement-based mortar have a poor adhesive quality when it comes to earth.

After stacking adobes for approximately a month, we had reached the second story of the structure and it was time to begin installing the doorframes on the ground floor and the floor beams of the second story. Carpenters who were staying at OIDHO made the doorframes on site in a woodshop that was part of the organization and we assembled the pieces (Figure 39). Once completed, we pounded the doorframes into their designated spaces using mallets and planks of wood to protect the surface (Figure 38). Another two layers of adobe were stacked on top of the frames before we began to place the supporting horizontal beams for the second story. This was the state that I left the project in before my return to

the United States in early August 2014. Construction of the Center for Women was not fully completed by the time I left Oaxaca, but based on renderings and a model that I made of Root Studio's projected design, I can affirm that the Center for Women will present an aesthetic that ties the vernacular to the contemporary (Figures 42 - 44).

The roof is to be inclined at a thirty percent slope, providing an angle that requires no cement to fix the tiles and allows effective water run off. In addition, the roof generously extends beyond the surfaces of the adobe walls to shield them from rain when water runs off the tiles. These are precautions that optimize the performance of adobe and the community will continue to learn as construction progresses. The inclusive efforts of Root Studio at Atzom-



Figure 38



Figure 39

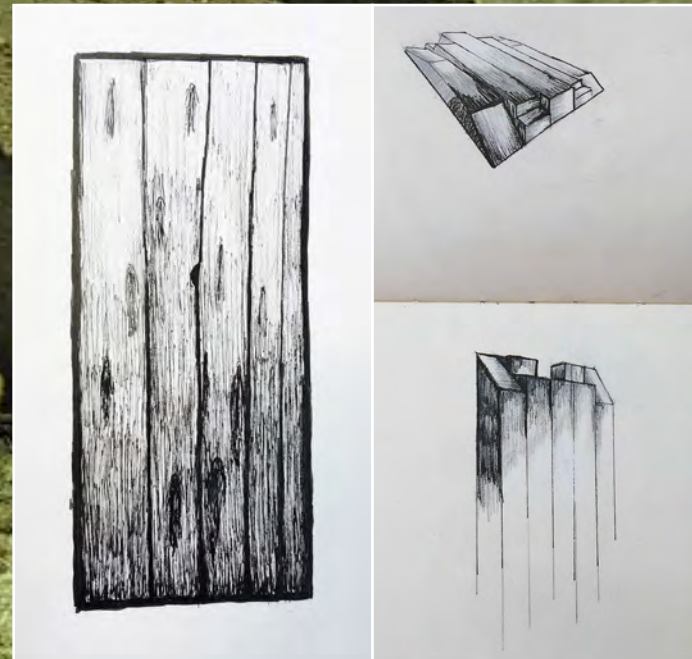


Figure 40 & 41

pa exposes crucial building techniques to a large variety of participants and in so doing, works to revive traditional building techniques and faith in the performance of vernacular materials.

The finished project has two stories, and consists of two separate structures connected by a patio. The patio is enclosed by a wooden structure providing shelter from the rain while spacing between the planks in the façade allows light to flow in and illuminate the space. Three balconies project from the western façade with iron railings and wooden spokes which mirror the materials and spatial patterns seen in the patio structure. The doors of the building are planks of pine set within iron frames (Figures 40 & 44). The iron on pine aesthetic expressed in the doors, balconies, and patio structure is in keeping with Root Studio's intention to visually unite the

organic and the industrial. These details have not yet been incorporated but they may be observed in my renderings, drawings, and physical model. It is by no means typical of traditional adobe construction to incorporate such details and it is unlikely that they would be accessible to people living in impoverished towns. However, similarly to Sport City, the Atzompa project integrates innovative architectural detailing within a primarily adobe structure, shattering the belief that the vernacular and contemporary are mutually exclusive. The construction of the Center for Women became an educational experience for both the community and regional volunteers and it will ultimately stand as a symbol for the modern integration and functionality of adobe within a community that has begun to doubt it.



Figure 42



Figure 43



Figure 44

Adobe for Women, 2011-2014, San Juan Mixtapec and Ayuquillila, Oaxaca, Mexico

Root Studio advertises the practicality of vernacular materials through its involvement with a non-profit organization called Adobe for Women. In 2011, Joao Caeiro, his partner Fulvio Capurso, and Juan José Santibañez, established the organization with a mission to construct 21 adobe homes for impoverished women and their families in the disadvantaged towns of San Juan Mixtapec and Ayuquillila. Both of these towns exhibit high immigration rates to the United States and in many cases women and children are left behind to provide for themselves. Both towns are examples of communities that are forgetting traditional building techniques because of a dependence

on manufactured materials imported from cities. Many families find themselves too poor to buy industrial materials, while also lacking the knowledge to build inexpensively using vernacular materials. Funded by private donations, Adobe for Women builds homes for families selected by their communities to be the most in need of aid. For weekend builds, Root Studio solicits young volunteers from all over the country. It offers an educational experience in traditional building techniques as well as tangible homes for the families (Figures 45 - 53). In many cases, the families have quickly picked up on the building techniques and expedited the building process of their homes by building on their own time when Caeiro and his team are not around. Today the project is almost complete, the families are all living



Figure 45



Figure 46



Figure 47

in their new homes and only a few finishing touches remain to be added. Through involvement of the communities and regional volunteers in the construction, Adobe for Women teaches how to properly build with adobe, and the finished projects stand as examples of the legitimacy and affordability of the vernacular within the communities.

Reviving building techniques in these small towns is particularly important because it demonstrates the affordability of adobe. The adobe used in the Women's Center at Atzompa was purchased from one of the few companies that make them in the capital. However, this is not a practical option for towns such as San Juan Mixtatepec and Ayuquillila for several reasons. For one, they are isolated from the small industry that produces them. Concrete blocks are more accessible and can be con-

veniently purchased in nearby stores. According to architect Tiago Santos of Root Studio, if access to manufactured adobes were even an option for these towns, the cost of building a home with them would be approximately equal to one built from locally purchased concrete blocks. So on top of the negative connotations developing towards the social relevance and quality of adobe as a material, the unfortunate reality is that it is neither a convenient nor cost-cutting option for these communities if purchased from a manufacturer. Given the limitation of industry, it is difficult to rationalize why a desire to build with adobes in this town would exist when concrete is accessible, similar in cost, and perceived as socially predominant.

In its involvement with Adobe for Women, Root Stu



Figure 48



Figure 49



Figure 50

dio has demonstrated the economic viability of adobe through the revival of traditional building techniques. For each home, adobes were made on site from locally gathered resources effectively diminishing overall cost. In addition, members of the community partook in the process and learned how to make adobe from scratch. The final cost of each home, taking into account that the adobes were made by hand, comes out to approximately 25,000 pesos. To put that number in perspective, the Mexican government offers an affordable housing option to rural communities which costs 100,000 pesos. The government homes are made from concrete blocks, and equipped with a tin roof. Like the home María Cruz Angela Ramírez's son built in González y González, the government homes are poorly suited for the arid climate. When the sun beams down on the tin

roof during the day they are unbearably hot and at night they are cold because the materials fail to absorb heat. Santos commented that these homes are often used for storage due to their inhospitable thermal quality. Adobe for Women provides a winning solution to inexpensive housing well equipped for the Oaxacan climate.



Figure 51



Figure 52



Figure 53

Candelaria Chapel, 2013, San Bartolo Coyotepec, Oaxaca de Juárez, México

The Candelaria Chapel is a project designed and built by Root Studio in 2013. It is located in the suburban town of San Bartolo Coyotepec, just outside the city of Oaxaca. Similarly to Sport City and the Center for Women, the Candelaria Chapel establishes a visual collaboration between adobe and contemporary detailing. However, in comparison to the previous examples, the Candelaria Chapel displays the most all-encompassing example of Root Studio's fight against the adobe stigma. Sport City and the Center for Women stress proper precautions to take when building with adobe, however their effect is more aesthetically driven. Given their convenient proximity to the city of Oaxaca and the suf-

ficient funds of the clients, pre-made adobes were used in their construction thus waiving an integral part of the revival of traditional building techniques more effectively expressed in rural projects by Root Studio. Adobe for Women stresses the practicality of adobe in rural settings with limited resources. Root Studio teaches these communities how build adobes by hand, allowing them to become more self-sufficient. However the completed homes lack the visual correlation to modernity expressed in Sport City and the Center for Women. The Candelaria Chapel combats the adobe stigma both visually and in its revival of traditional building techniques.

Like most of Root Studio's build sites, the climate is arid with highly fluctuating temperatures based on the time of day. Once again, adobe is the material of



Figure 54

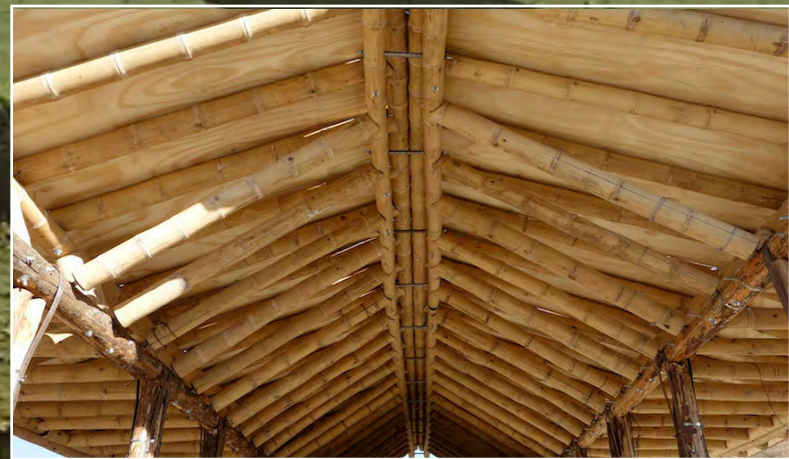


Figure 55



Figure 56

choice for the structural walls as it is well adapted to the climate. The adobes were made from the lightly colored earth taken from the site so the design is beautifully integrated within its unique natural setting (Figure 58). Like the homes in San Juan Mixtapec and Ayuquillila, the adobe used in the Candelaria Chapel was made on site with the help of locals and volunteers. Root Studio has succeeded once again in the revival of traditional building techniques and the communication of the practical benefits through an inclusive building process.

Visually, the Candelaria Chapel succeeds in establishing a cohesive relationship between vernacular materials and contemporary detailing. The structure itself is small with an approximate area of 30 square feet containing only a small table for offerings and a cross. There is a long path lead-

ing to the entrance of the chapel made entirely from locally gathered stone. At the start of the path there is a large iron cross placed symmetrically in front of the entrance to the chapel and on the other end is the entrance itself. In both the planned orientation and use of materials in the cross and entrance, Root Studio orchestrates a visual association between an industrial material that is perceived as modern and adobe (Figure 57). This is an aesthetic strategy that has been used in both Sport City and the Center for Women, and the pattern continues in the Candelaria Chapel.

Similarly to Sport City, bamboo is used in the Candelaria Chapel as an alternative means of contemporary expression. The topography of the site elevates as one approaches the entrance of the Chap-



Figure 57



Figure 58

el and so there is a short flight of stairs built into the stone path between the cross and the entrance. The roof extends far past the small adobe structure towards the stairs and is supported by locally acquired tree trunks (Figures 56 & 59). The structural framework of the roof is made entirely from bamboo and it is impossible to ignore its presence. Like at Sport City, Columbian bamboo is used for its superior structural quality. Although the bamboo is neither vernacular nor industrial, its collaboration with vernacular materials achieves an innovative aesthetic with a contemporary impression (Figures 54 -57). The Candelaria Chapel combines Root Studio's two stigma-reversal strategies. Caerio and his team provided an educational experience through the making of adobe by hand, reviving traditional building methods within the town of San Bartolo Coyotepec, and the completed

project integrates contemporary detailing which aesthetically ties the vernacular to the contemporary.



Figure 59

Conclusion

The use of industrial materials is more expensive, less sustainable, and a stark departure from a cultural identity, yet impoverished communities condemn the vernacular as dated and develop a dependence on less-practical resources out of a longing to be part of modern society. The perception of the vernacular has fallen into a vicious cycle. These materials are considered to be out of fashion, and because of this, cultures convince themselves that they are obsolete when really their poor performance is a consequence of a construction process that is fading due to a dependence on industrial materials. In the long run rural investment in industrial materials imported from cities will only continue to depress their local economies. [12] Homes made from vernacular materials are more comfortable, and with the right approach significantly less expensive than homes built using industrial materials. In addition to the immediate benefits of building a home from vernacular materials, a prioritization of vernacular materials over industrial materials could help rural communities work towards self-sustained economies. For these benefits to be realized however, Root Studio has recognized that fighting the adobe stigma is an essential part of the process. Through its design of emblematic buildings, and reeducation of traditional building techniques, Root Studio stresses the contemporary relevance, and practicality of vernacular materials.

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[7] Ibid.

[8] Ibid.

[9] Ibid.

[10] Ibid.

[11] Ibid.

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