PASSAGEWAYS JOAL · SENEGAL 07 - 09



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STATE NENT

Passageways (known as Portes et Passages

in Senegal, Africa) is an interdisciplinary association made up of artists, academics, architects, scientists, and related professionals based in and outside of Senegal, Africa, promoting "holistic development" throughout West Africa. "Holistic" is defined as the accentuation of the integral relationship between the various aspects of society including environmental, technological, cultural, and social. Through this approach, Passageways seeks to develop community-based projects and promote intercultural and interdisciplinary exchange in visual culture and science between Africans and the world community. Passageways is presently developing a Holistic Art Center in Mbodiene, a rural area of Senegal, where we possess 10 acres of land.

The targeted project for this proposal is the design and construction of our first model building, which will serve as the nucleus

for all of the Holistic Art Center's activities; incorporating aspects of the utilitarian elements of all subsequent buildings in order to facilitate immediate functioning of the establishment.

The primary focus of this initiative is environmental, the secondary is Technological. Our approach seeks to make use of local, recycled and natural resources.

We will incorporate the latest in renewable energy technology with a focus on self-sufficiency (e.g., wells, irrigation systems, composting toilets, biogas, passive solar and renewable energy).

Technological studies include use of materials such as the overabundant seaweed as a replacement for straw in bale-building (due to its high level termite protection and usefulness in climate control); use of local earth-rich clay for brick and tile making and cow dung and clay mixtures for brick forms.

PRINCI PLE IN VESTIG ATORS











COLEMAN A. JORDAN (USA) Designer/Professor, Board Member of Portes et Passages since 2001. Assistant professor of Architecture and Design at the School of Architecture with an appointment in the Center for Afroamerican and African Studies at The University of Michigan. He received a W.E.B. DuBois Fellowship from Harvard University to work on research related to his area of research the Black Atlantic, and recently exhibited an installation in the "harlemworld: Metropolis as Metaphor" exhibit sponsored by the Studio Museum in Harlem.

MUHSANA ALI (USA/Senegal) Visual Artist. President of Passageways USA/General Secretary of Passageways Senegal. Ms. Ali is founder and visionary behind Portes et Passages du Retour Association and its U.S.- based sister-non-profi t organization, Doors and Passageways of Return Foundation, founded in 2001. Ali practices art for social change - her mediums include painting, sculpture, installation and interactive art, video production. She has an MA in Art Education and a BFA in Fine Art. Ali is the recipient of a Pew Fellowship in the Arts and a Fulbright Fellowship.

PAULA GERSTENBLATT (USA) Artist and Social Worker. USA Member of Passageways since 2005. Ms. Gerstenblatt is a professional artist, grant writer and masters level social worker who has combined her passion for art and social change for the past twenty years. Her mediums include painting, writing and assemblage pieces. She has a BA in Art, a masters in social work, and has exhibited in the SF Bay Area and abroad. She has travelled extensively, including Europe, the Middle East and most recently, Ghana to paint and collaborate on research projects on slavery and the Black Atlantic.

MAMADOU SARR (Senegal) Socialogist. Senior board member of Passageways since 2005. Sarr is Head of the Cabinet and Head of Special Projects at the City Hall of Joal. He has been involved in numerous national and international projects dealing with interactions between art, society, culture, environmental issues, agriculture and fi shing. He is an experienced project and programmes coordinator and agriculturalist.

AMADOU KANE SY (Senegal) Senior Board Member, President and co-founder of Portes et Passages, Visual Artist. Co-director of project in Senegal. Sy will arrange logistical concerns and serve as a translator during the workshop. He will jointly coordinate the project from Senegal and will assist in the facilitation of local logistical arrangements. He will also be jointly responsible for project implementation and future sustainability.



SCOPE

In this project the goal in constructing this complex is to utilize locally accessible natural materials that currently are not being used in favor

of more popular materials such as cement, sheet metal, and wood. This wide spread usage of these popular materials renders most buildings and homes out of reach economically and the environmental damage of deforestation and the encroachment of the Sahara Desert have been rapidly overcoming much of the Sahel Region of Africa. Imported materials also damage the economy in many regions as the exchange of commodities is rarely seen in many of the smaller villages and towns. By using mud bricks or other local materials to build this center,

Passageways will encourage further usage of these materials in hopes that people will begin to take a more active role in making their homes and businesses unique and more of a reflection of the culture and people that live in these regions. Using materials other than cement is also important in terms of reducing the need for airconditioning, electrical and gas requirements of various systems that lead to an overabundance of usage and constent power outages. Mud bricks develop the efficiency of the buildings and allow for a healthier interior environment for inhabitants. The

following materials reflect the most easily accessible possibilities in earth brick, stone, and recycled elements.

THE SCOPE OF THE PROJECT

- · Construct the first building of the Holistic Art Center
- · Develop a building using local materials
- · Connect the local community to the economy of the built environment
- Use environmental passive solar energies and examine other technologies in the context of "green" material to reduce power outages.





Project site is 4 kilometers North of the Joal-Fadiouth township. We integrated the first stage of the project with the introduction of a design studio with graduate students in architecture at the University of Michigan. Planning with the Passageways organization allowed for a ground breaking ceremony peace to be construct over a two-week visit to Senegal in February of 2008. Senegal is culturally a Muslim traditional region where prayer is regularly practiced throughout the day. Therefore, the ground breaking space was designed as a place for prayer for the beginning of the project. The design feasibility and planning for the construction began soon after. The graduate students worked on independent projects to propose ways of designing environmentally conscious structures for the site in Senegal. This was a semester long project that incorporated studio project ideas that were presented by the students to the Passageways organizers.

What followed were more material studies on site at Joal with meetings with engineers, environmentalists, and contractors to discuss the limits and possibilities of working with material from the site such as seaweed and black clay that are abundant in the

region. We conducted design charrettes to discuss the major planning and layout for the first building.

Material testing took place to examine what local mixes of material would be most efficient and accessible to the nearby population. The first mixes used were the black clay with seaweed, black clay and earth with the traditional cow dung, black clay with ashes from cow dung, and black clay mixed with termite mound. All of the mixes were tested and retested with different results of durability and consistency due to proportional amounts of clay to aggregates.



Site:

The warehouse where Passageways is located now in Mbodiene with cattle owned by the Fulani that roam throughout the region feeding on any lands accessible.







PHASE

- L.





2007

Prior to obtaining the AIA Upjphn Research Fellowship work had begun on Passageways in the form of developiing a relationship with the community and community leaders of the cities Joal-Fadiiouth and the immediate site of Mbodiene. In ? a warehouse was leased by the gonvernment of Senegal to Passageways to begin work on engaging an artists center that would bring artists from arouund the world to work with Senegalese artists and to allow the space to be occupied by Senegalese artists as a place for residency while generating work of their own in an investigative manner.

Passageways was later given 10 acres of land to develop adjacent to the site. This site would be the beginning of seeking funds for the full building and revisioning of what has been termed for now, a holistic art center to celebrate the nearby communities by assisting with social justice projects and environmental efforts to better the living conditions.

One of the first focus groups were the women potters of Ngeniene. Workshops in the summer of 2007 was the catalyst for the investigation that was to be done during the period of the Upjohn Research Fellowship.





Here are the first samples from the first workshop with the local women potters and visiting ceramic artists from abroad. The women potter workshop worked with a black clay on the Passageways site to explore the consistency and sustainability of the clay for pottery. We at Passageways also sought to test the susatainability of the clay for its buildability as well.

With the help of the women potters and chemist David Challier, we Used a combination of mixes and porportions of clay to test its durability. The women potters created newer forms than those they were used to producing and togehter as a group shape were made the could potentially be built with in the future.

We also began to test and find other materials like seaweed and seashells that were immediately local to our site and common among the nearby communities.

This process lead to the design of a teaching studio with a group of students from the University of Michigan's Department of Architcture graduate studio.

DECEMBER

2008



The Studio PHASE I

ARCH 562: Architectural Design 2G2/3G5 Support from the AIA Upjohn Research Fund and the University of Michigan Department of Achitecture

The Passageways studio traveled to Senegal, Africa, to design a collaborative resource center to assist the community of Joal economically and environmentally.

Mbodiene region of Senegal is a rural area located 4km from the historical fishing village of Joal. Joal suffers rapid overpopulation due to migrant workers attracted by the fishing industry, which has led to problems of inadequate housing, water, and waste. The fishing industry has attracted additional waste disposal problems causing pollution and extinction of species. Similar problems face the city's capital with governmental focus on technological development in a country with only a seventy percent literacy rate. Solutions that emphasize purposeful use of the land and individual creativity have been overlooked causing flight from rural areas to cities, and from cities to the Western world by any means necessary.



ANUARY



Our studio designed projects to offer options for Joal's changing society placing emphasis on locally available resources using technology that organizes, structures, self-sufficiency and creative development. Chronic problems of power cuts were to be mitigated with renewable energy sources.

Passageways' Holistic Center will serve as a model through its construction and design methods for future development of the region.

Our project took on three phases. Phase I was our preparations for understanding Senegal and West African cultural influences. The students conducted research to examine elements such as climate, traditions, and dwelling structures in West Africa. Within this phase, we worked with artist Elshafei Mohamad who introduced us to an art process of West African music and intuitive expressions with color. The students used many different colors and mediums to present collaborative art pieces that negotiate space and resolve.







The image above is an outreach workshop with junior high school students from Detroit. We collaborated to produce more intuitive pieces of art to work with a community in Detroit. Student work continued as we planned our trip to Senegal for the site groundbreaking. Passageways members took part in the process from beginning to end.

FEBRUAR

THE STUDIO LEAVES MICHIGAN TO VISIT THE SITE IN SENEGAL, AFRICA FOR 2 WEEKS









Studio Phase II was to travel to Senegal and go to Joal to work on the site and experience the cultural differences for two weeks. In this two weeks, the students, clients, and community worked on a ground breaking celebratory project to give spiritual peace to the site before construction-as suggested by our clients. What was created and designed by the students and clients was a contemplation space facing east for Muslim cultures to pray and others to use as a nondenominational place for rumination. The students were able to explore materials to design with to take advantage of the resources on site like, stones, seaweed, and mud. Bamboo comes from a further region but is being considered as it is resistant to termites.







Images: student generated ground breaking spiritual site with the well nearby being dug for access to grey water sources.





MARCH

Development of work continued upon our return from Senegal through research in renewable energies and students' proceed with independent projects to examine, design, and research materials and ideas for the overall site.

APRIL

Passageways research in Senegal for access to renewable energies and final presentations of student work occured. Muhsana Ali from Senegal and Paula Gerstenblatt from San Francisco were guest reviewers from Passageways that visited the Taubman College of Architecture and Urban Planning graduate program University of Michigan to critique the students work and see what research may have surfaced to assist in the building process.

kiln built for firing ceramics.

Construction of well



Jennifer Cramer, a graduate student in architecture that traveled to Senegal with the larger graduate studio, was returned to Senegal to produce a feasibility study on the work-to-date that would be used in making the final decisions on how to proceed with the building costs and management. During this time, models were created as well as meetings to discuss different building techniques that would be beneficial for our situation. Questions that were raised were how to involve the community in the building process? What is the most efficient and accessible means of materials and construction that can be easily adapted to the surrounding villages? How do we promote the use of the construction that we develop in an era where captial representation is intrinsic in the materials used to construct contemporary dwellings, such as cement, metal, and wood. The current popular materials are inefficient as we have stressed due to importation expenses and climatic incompatibilities. During this time Jennifer produced a dossier stating the direction of the project based on discussions and experiments performed during the months of May through September of 2008 by the Passageways members and outside consultants.







Material testing began with the seaweed and black clay found on the site. We worked with builder, Hasam Cisse (Badu) to do the intial test for structural sustainability and the appropriate nature of collecting enough material for building. The outcome was such that the seaweed dematerializes faster than expected but the abundance of clay on site is extensive and when mixed with mud and other aggregates, it is very efficient.

JUNE





After processing, we uesd the black clay for developing models and planning of the first building. This process was very helpful as many of the contractors/builders that we worked with were not used to working directly from 2D drawings. This also gave an opportunity for everyone to weigh in on the design and organization.



Here we are negotiating with builders and artists on the size and material usage for the first structure to be built. One of the issues we faced with the project is the extreme weather conditions that affect the land. Here we are trying to construct a system of building that will allow the initial building to be built before the rain season in June -September.

Construction began on the security fencing and shelter in June to prepare for the initial building process that would be delayed until after the rain season. Rush for construction is critical during this time period due to the rain season in the fall. All construction stops during this time in Senegal as the rain can be devasting to the ground and new structures.







We ran a workshop to produce many models that would capture the character that we were looking for in this more organic structure. We ended with a one storey version of an elongated structure that housed the directors of the Passagaeways organization on site for meetings, a kitchen, and space for studio prodution.









This is a clay model collectively constructed by all involved in PASSAGEWAYS as well as the children and other visitors that wished to assists.

AUGUST


Brick Options:

Fired Bricks

Three sizes of bricks are available from a local brick manufacturer:

Size (cm)	Cost (Cfa)	Shape
22x10x6	200 (with hole) 250 (without hole)	
35x10x15	350	
35x15x20	700	

Images:

Laterite stone is found throughout the region at mandy different scales..







Mud Bricks

Mud bricks are the most feasible and affordable option that is available for the construction of this project due to the availability of clay and other materials used in their production. Through meetings with local masons it was determined that by using clay found in termite mounds combined with resources such as straw, ash, seaweed, or cow dung that a very strong structural brick could be made. Experimentation with the above listed components is one element that we researched and developed so that this method might be utilized by the local community instead of depending on concrete. All of these materials are available in the local area and brick making would be carried out by a local brick maker which would allow the employment of local artisans in this project.

Some rudimentary research was undergone during May/June 2008 in which clay from the site in Joal was crushed and re-hydrated, then either hand packed or form packed to create bricks. After drying, the amount of cracking and the general structural stability of the bricks was observed. Combinations of clay/ash, clay/ash/dung, clay/ash/seaweed, etc. were tested. As stated above, Badu, the local mason, determined that the lighter clay which comes from termite mounds was a better quality material for the bricks and would produce more structurally stable buildings if used in the brick making.



Rocks

In the Joal area the abundance of stones makes for an easily accessible material which can be used in brick making and foundation laying techniques as aggrgate or building. One particular type of red stone/laterite is used in building as an aggregate and also an element that reduces the amount of cement required when making cement blocks. This in turn reduces the cost of producing blocks as the stones can be collected from the surrounding area. A second type of stone is the calcium stone which is also very accessible. This stone is found in the ground underneath the upper clay layer of soil. Calcium stone is very useful as an aggregate and can be crushed to add to the building foundations or used as a substitue for cement type stucco.



This is an image of the laterite stones and gravel that are found on and near the site.

(1) Crushing of the clay pieces in order to help in re-hydration. (2) Water was added to the clay and then let sit in order to allow the clay to soften. Impurities were removed while the clay was liquid like and then the clay was placed in fabric to allow the extra water to seep out. (3) Additive materials such as ash and seaweed were tested as means to strengthen the bricks. Different amounts were also tested as certain ratios caused more or less cracking or breaking in the bricks. The mixtures are combined and then either formed into bricks by hand (4) or put into a form(5). This method utilizing a form is what is most common among the local brick masons of the area. (6) After forming the bricks were allowed to cure in the sun.





SEPTEMBER

Building Methods

In search for potential methods of building and means to develop a distinct architecture several possibilities were researched. Meetings were conducted with three different individuals who are active in Senegal and West Africa and build with both natural materials and general materials. The following is information found through these meetings and research.

Nubian Vault (Vault Nubienne)

Voute Nubienne is a mud brick building method that produces vaulted buildings. This method involves traditional building techniques that can be combined with local brick making abilities. The goal of this group is to bring the ability to build in mud brick to areas and to help establish its use. It allows the possibility of designing the floor plan layout and can be adapted to allow two story buildings. The main fault of this system is the set width to the vault but it is possible to create parallel vaults which increases the width of the building. The dimensions of the vault are set in all but the length of the vault which could potentially be infinite.

The Nubian Vault process is not a West African building technique but was an ancient Upper Nile process using earthen roofing. This type of construction is being promoted to save energy, time, and money in villages throughout West Africa and specifically the Sahel Region. We are working with the promoters of the Nubian Vault to determine the limits and potential for our site.





Images from: www.lavoutenubienne.org for more information visit website

General Mud Brick Building

The utilization of mud brick walls allows for several aesthetic and practical benefits. The thickness of the brick walls is important in order to help regulate interior building temperatures and also humidity. The breathable nature of the mud bricks allows for cooler temperatures during the day and some radiant heating at night, while there is also a balancing of the interior humidity. The thickness of the walls can also be developed through design to help in space efficiency of the building by creating storage and shelving space within the walls themselves. Places where the walls are punctured will also be deep creating a natural sun shade for the interior and assisting in cooling as well. These listed benefits of the mud brick building technique are one of the main reasons why this would be the most beneficial building method for the project.

Labor Costs

After consulting with Hasan Cisse (Badu) in regards to the construction and labor costs for the projected building the estimated budget for labor was 259,000 CFA or \$621.10 US Dollars. This labor cost covered the required masonry labor and creation of the vault of the building.

Site Analysis Information

Through meetings with both another mason and engineer it has been determined that due to the clay content of the soil on the site that a foundation must be laid for the buildings. The natural clay content of the soil causes dramatic swelling during the rainy season and cracking in the dry season. A foundation made of compacted gravel and calcium rock would help reduce the potential for uneven settling of the ground.

Currently the common requirements for plumbing and waste disposal are general sceptic fields. In order to help facilitate reduction of water contamination we proposed the usage of composting toilets or biogas systems of composting. This would not only isolate the waste but allow usage in the agricultural initiatives developed by the project. Another proposal would be the installation of solar pump wells that would be drilled down to the water source. This type of well also helps decrease the contamination of water sources and would allow deeper wells which would maintain water resources longer than the traditional wells.

The site at this time does not have electricity and relies on solar lamps and candles for lighting purposes. Because of the frequent power outages in the area the usage of solar and wind energy will allow continuous and renewable electricity for the site. Solar panels and wind turbines will both be utilized in this area where sunlight and wind are extremely accessible. A general study on the utilities which will be installed; such as computers, kitchen appliances, etc. are necessary in order to determine the quantity of electricity to be required and therefore we are still in the process of developing a plan for installation of the necessary package of solar/wind power equipment.

Requirements for building are minimal in the area of the site and any required permits would be negotiated through Mamadou Sarr in his capacity as an official of the City Hall.

NOVEMBER

PROJECT PROGRAMING

The first construction to take place established a guard house and space for agricultural requirements on the site. This is to provide a security presence on the site and to also begin to revitalize the vegetation and begin reforestation. The tree have been placed on site and are currently giving fruit of papaya. The proposed administrative building is planned to be constructed so that the visibility of the project is made apparent and further work will be managed from this location. This has increase local interest in the project and made it possible for further collaboration with the community.

After the construction of an administration building an assessment would take place in order to decide what next steps should be taken. Ideas for future projects include: an art studio and residency, an area for art display and selling, a birthing center, a health center, and an organic food market and restaurant.

This project wishes to be forward thinking in concepts of sustainable design and utilize the renewable resources abundant at the site. The conditions at the site are favorable for multiple alternative energy projects and there is potential for the site to be entirely self sustaining. By combin ing these concepts of design and adding to them a unique artistic approach this project has the ability to infl uence social constructs and help the surrounding community think about their impact on the land they live on and also to help the people see the potential they have in themselves as a culture to make a difference in their own country.

DECEMBER + JANUARY

The introduction of the Voute Nubienne process is a reintroduction/re-invention of a building process that Moussa Diouf has perfected through his experience as a brick mason in France for twenty years combined with an ancient African adobe structure from the Upper Nile. This technology uses, "clay, abundant raw material, mixed in a mortar and bricks dried in the sun and do without the use of formwork for the building of the arched." We have decided to begin with the Voute Nubienne process.

The construction of the first building to house a studio, residences and administrative spaces has involved the community through collaboration with students from University of Michigan and local participants including: a cooperative of local women ceramists, local youth, emerging Senegalese visual artists and builders,

FEBRUARY + MARCH



The decision to work with the Nubian Vault Association was made and meetings began with Moussa Doiuf to begin final construction in March. This would test the efficiency of speed at which the Vault Nubian could be constructed and the training for Senegalese in the area of Joal could begin.

The foundation was constructed with large rock formations of laterite. This process allowed for the layering of mud brick that was to follow. Over 5000 mud bricks were constructed on site. scale of the bricks are in two sizes. The larger block forms are 38L X 18W X 18H. The smaller blocks used for construction of the vaults are 24L X 14W X 5H. The scale of the blocks was decided by a factor of creating walls needed for the support of the vaults. The wall thickness needed is 60 centimeters for the outside wall constructions and 40 centimeters for the inside walls. Therefore, the construction allows for 58 centimeters for outside block walls with 4 centimeters of mud mortar between them and 36 centimeters of block with 4 centimeters of mortar for the inside walls.

Social work ethic...

One of the benefits of building with the Nubian Vault is that it creates a socialized work ethic where everyone works together eats together and stays on site through the nights to the next day. This mode of production celebrates the need and importance of everybody's role in the construction process.

The primary stage of building is too make the mud bricks/blocks.after gathering the materials such as the laterite for the foundation and the handful of wooden shaped templates for creating the blocks. The training for the apprentices begins here. They are often in charge of making the blocks which adds up into the thousands.









Very basic plans were drawn as the majority of the construction is done by design and building on site as the structure is developed. Clay models were used instead of tradtional plams and sections.





East Elevation

PROJECT PHASE I

- studio
- kitchen
- meeting/conference room









PROJECT PHASE II

- personal/director's office
- bedroom





APRIL + MAY

Final construction of the first floor is compltet and a second storey is to be added.



Work continues on for the second storey and addidtion fundraisning is sought after to continue the complex.

Other progams are planned with the women potters as to assist with desgins and development of products such as clay tiles. The Senegalese construction crew will continue to work with us.











The foundation is dug by locals and builders brought in from Burkina Faso. The Burkina Faso builders have been working with Moussa Diouf as the project managers and instructors for training the Senegalese in the Voute Nubienne process. The laterite stones were used for the foundation.





WORKERS STATUS

- 16 regular builders
- 10 from Senegal (7 trainees, 2 experienced, 1 project manager)
- 6 from Burkina Faso (all experienced, 3 trainee managers


























































































JUNE







CONCL



USION