

AVEI NEWSLETTER



The new AVEI laboratory in full swing

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See photos and testimonial about our newly-built lab and second dormitory here at AVEI, page 2.

Read about our new automatic motorized press, the Auram 6000, produced in collaboration with Aureka, page 3.

Learn about the completion of the Bamboo House on our campus and how bamboo and earth can work together, pages 3 and 4.

Read about Satprem’s work at the Auroville Festival in Delhi and his exhibition here in Tamil Nadu, pages 4 and 7.

Our team is growing! Meet our three new team members on page 8 and read an article by one on page 7.

View the dates of upcoming courses on the last page.

Please feel free to share this newsletter with your friends and colleagues as we spread the knowledge of earth architecture to the world!

Earthily yours,
The AVEI Team

**New Lab and
Dormitory on
Campus**

Last month, the Auroville Earth Institute completed the construction of a new building at its premises, and is now the home of a research laboratory and a second two-person dormitory.

The laboratory – which had been a long-term need of the Institute’s – will provide the space and facilities to allow researchers to better conduct precise testing on

topics including soil properties, mechanical behavior of CSEB, Poured Earth concrete, waterproofing methods, thermal insulation, and other inquiries.

The dormitory will host two employees or interns, and marks an important upgrade in the comfort and quality of current staff quarters, at once reducing crowding and allowing for a larger staff.

The new building’s roof vaults showcase a new thermal insulation technique developed here at

the Institute called Thermocrete in order to reduce the cracking that results from the fluctuating temperatures caused by changes in solar radiation. It consists of a 5 cm layer of a mix of polystyrene pellets in a matrix of cement and soil, in a ratio 1 cement, 0.5 soil (sieved 2mm), 5 polystyrene, and 0.65 water. This insulation is applied on top of the waterproofing as it is meant to reduce the thermal expansion of the latter and the vault below. The layer of thermocrete is protected by a layer of 1.5 cm thick of lime stabilized earth plaster. ■



Interior of the laboratory



Interior of the dormitory



Completed building

Introducing the New Auram Press 6000

For years, the Auroville Earth Institute has provided manual presses for the production of CSEB in collaboration with the manufacturing company Aureka. The Auram Press 3000 is sold worldwide, including the USA and Europe.



The Auram 6000 sifting dirt

But there is an increasing demand for automatic motorized presses, as labor is growing increasingly expensive in countries around the world. This has prompted AVEI to undertake the creation of a fully automatic hydraulic press. Recently the Earth Institute, in collaboration with Aureka – the workshop producing the Auram equipment – developed the Auram Press 6000, a new line of fully automatic presses.

As of September 2012, trial tests are being run on the prototype press, and pilot testing will be conducted in the coming weeks. It has been designed for a theoretical output of 420 Blocks per hour, though The first trial



The Auram 6000 compressing blocks

testing has thus far shown a practical production capacity of 360 Blocks per hour. The press is being readied to go on sale at the beginning of 2013. The Auram 3000 will continue to be available and further research into manual presses will continue.

Video of the new machine can be viewed on our website at www.earth-auroville.com/auram_6000_en.php. ■

Bamboo House Renovation Completed

The Auroville Earth Institute finished the renovation of the model bamboo house located on the AVEI premises at the beginning of September. This house is the product of collaboration between the AVEI and the Auroville Bamboo Research Center in 2009 which aimed to provide a low-cost and temporary housing solution for tropical climates using local materials. In the wake of Cyclone Thane, the bamboo house was damaged and needed repairs to the roof. The opportunity was also taken to make several structural and aesthetic improvements. ➔



The completed Bamboo House

The previous roof was composed of a plastic sheet weighed down by a lattice of bamboo and coconut rope and filled in with an earth mix. The design and implementation was defective, leading to leaking, which required a tarp to be permanently affixed on top to assure impermeability. When the bamboo house was renovated, a new roofing method was employed to improve the water-resistance and robustness of the roof. This method employed a steel truss instead of the prior bamboo for a sturdier structure. Upon this truss were placed a layer of plywood, then a layer of polystyrene insulation, and fi-

nally a P.V.C. corrugated sheet.

Through the joint participation of Architect Jan Sebastian and Architecture Intern Sourabh Gupta, further work was carried out on the walls, internal structure, and decking. The back door was removed and the pivoting woven bamboo doors were replaced with wattle & daub panels with ventilation screens. The daub was composed of three layers, the first two including just soil, sand, coconut fiber, and water, and the third layer also including the addition of cow dung. To improve the structural sureness, certain sagging beams were reinforced

with steel cables. And finally, the interior walls were painted with a traditional lime wash made from lime powder, fevicol glue, and water. The electrical wiring was also redone in the house.

The result is a beautiful example of the success of combining bamboo structural elements with earth as filler. It also doubles as housing for members of staff from the Institute. ■

The Auroville Festival in New Delhi

On September 15th, Satprem Māini traveled to Delhi to participate in the Auroville Festival, a week-long festival showcasing the philosophy and accomplishments of Auroville. Through a series of panels and keynote addresses, the festival covered such topics as urban design & architecture, afforestation & environmental issues, alternative economic models, education, and the arts. Satprem participated in the panel entitled "Sustainable & Ecological Living" with about one hundred and twenty people in attendance. While he was limited to speaking only five minutes about the work of the Institute, his presentation garnered such responses from attendees as "the most impressive presentation".

In addition to the panel discussions, the festival included an art exhibition displaying paintings, sculptures, pottery, and photographs reflecting Auroville and the artists' relationships with the community.



Steel trusses & ply-wood ceiling



Interior with new lime wash on walls

Cactus Juice Waterproofing

With the on-going collaboration of Lara Davis from ETH Zürich, the Auroville Earth Institute has continued its research into the waterproofing properties of cactus juice, which was begun in July. This research is based upon the use of cactus juice as an additive or coating to ensure improved water resistance in earthen construction, as has been utilized over the centuries in Maya architecture from Central America. The Institute based its recipe for the cactus juice on the recipe of Meskerem Assegued from Ethiopia, who conducted some initial experiments. The research employed precise ratios in order to be able to find the ideal ratio and application mode.

The first round of tests conducted studied the effects of the addition of cactus juice to lime stabilized earth plaster applied on CSEB and the use of cactus juice and varying proportions of water in the composition of adobe. These samples then underwent a series of experiments to test their properties of absorption. The plastered CSEB were framed with aluminium flats stuck with silicone to allow 1 litre of water to be poured on them. A glass pane covered the blocks and water to prevent evaporation. The test consisted of measuring the time for water absorption. Best results came from the sample whose lime stabilized plaster coating did not actually include cactus juice,

but did include the most lime and a high ration of soil sand: One litre of water took 17 days and 13 hours to percolate through this sample.



Adobe Brick with Cactus Juice after 90 hrs

The adobe bricks, with cactus juice and without, were tested by being partially submerged in water, whereby the water absorption and subsequent adobe erosion could be observed. After ninety hours, the adobe bricks with the cactus juice additive had performed markedly better, only displaying erosion at the base where they had been in contact with water. The adobe bricks without cactus juice had experienced significant erosion of the entire bricks.

In the second round of testing, two coats of plaster were applied onto the blocks and the same testing procedure was conducted for the water absorption test. The most successful combinations from the previous round of testing were developed with



Preparing the second round of samples

various ratios of lime, soil, sand, marble powder, water or cactus juice. Some samples were made with a lime stabilized earth plaster mixed with a juice made of a local berry, which contains significant levels of tannin, and alum powder to see the effects of these additives on the waterproofing properties. The combination of cactus juice and tannin juice did not work. The best performing sample had 1 part lime, 0.25 part soil, 1.5 parts sand, 0.25 part marble powder, and cactus juice. It held water for 20 days, 16 hours and therefore had a low absorption rate of 2 ml/hr.



Applying a second layer of plaster

In the third round of testing, the cactus juice was prepared with lime but without salt. Two layers of the lime stabilized earth plaster were applied of two thicknesses in order to observe the influence of the salt in the cactus juice fermentation process as well as the impact of a thickness of the plaster coating. The results were similar between the samples prepared with cactus juice and water with varying proportions of aggregates. One sample made with cactus juice is still holding water after 18 days. This test is in progress and we look forward to reporting back the results. ■

Thermocrete Insulation for Vaulted Structures

The Auroville Earth Institute has concluded extended analysis of the benefits of the insulation of vaulted structures using Thermocrete, a composite made from 1 part cement, 0.5 part soil, 5 parts polystyrene balls, and 0.65 part water. Initial testing, described in the June/July issue, looked at the heat exchange from the interior to the exterior of a vaulted structure insulated with a 5 cm layer of Thermocrete. To test this, a stove was placed inside the vaulted structure and the temperature difference between the interior and exterior was measured. The results were particularly striking with a 32°C difference, the interior being 80° and the exterior being 48°C.

For the next test, the vaulted structure was heated from the exterior by the sun and the ambient temperature inside

the vault was measured. This testing was further divided into three different testing conditions. In the first test, the insulation layer was exposed directly to the sunlight and here a 2 to 5°C temperature difference was measured between the exterior and the interior. Next, the insulation layer was covered by a stabilized plaster coating, which exhibited a 20°C temperature difference inside the vault during the peak temperatures at noon, comparable to the temperature in the shade. Finally, the third test examined a ceramic layer with plaster, which exhibited a 10°C temperature difference inside the vault.

The conclusion of these tests shows that Thermocrete can be very effective for reducing the effects of solar radiation on earthen vaulted structures, which can have 60°C radiation at noon on the outside of the stabilised earth plaster protecting the thermocrete. The thermocrete avoids the vault to rise in temperature at noon and keeps

a temperature inside the vault equivalent to the temperature in the shade (~40°C at noon). This is an important discovery for the reduction of structural deformation due to heat which results in cracking of the vault and the waterproofing. ■

Knowledge Technology Week in Kuching

From September 3rd to the 7th, the Institute's librarian Hilary D. Smith attended Knowledge Technology Week in Kuching, Malaysia. This international conference, organized by Malaysian information & communications technology giant MIMOS Berhad, grouped together nine conferences & other events, including the International Conference on Dublin Core & Metadata Applications 2012 (DC-2012). In the organization of the Auroville Earth Institute's digital resources using the DSpace digital repository software, Hilary employs the Dublin Core metadata elements, and this conference provided her with the opportunity to learn about their flexibility and customization options as well as the development of complementary technologies. On the same trip, she was able to attend a pre-conference tutorial on Application Profile & Ontology Design which introduced her to the key concepts in domain and knowledge modeling as well as some of the software for this task, such as Protégé. With



Vaulted structure with tiles ready for testing

Protégé, she hopes to be able to create a thesaurus for the control of subject area terms related to Sustainable Construction.

Over the course of the conference, Hilary connected with librarians doing work on information resources and similar fields in the region, who expressed their enthusiasm for the activities of Institute's library and their willingness to collaborate through special training sessions or consultation. Hilary also joined the Asia Forward Taskforce for the Dublin Core Metadata Initiative, which aims to train and provide support for metadata creation and maintenance in Asia, an area of the world that currently has weak training resources.

Highlights from the conference included a potential training session in advanced DSpace maintenance hosted by the German National Library of Economics and introductions to two librarians working in Singapore who work in and have on-site colleagues in Tamil Nadu.

"Skies & Deserts", an exhibition

From July 15th to 22nd at the Sri Aurobindo Ashram Exhibition Hall in Pondicherry and again from August 26th to September 9th at Pitanga art gallery in Auroville, Satprem Maïni held an exhibition of his personal photography entitled "Skies & Deserts". Featuring pictures taken during his travels in Africa, India, and the Americas, the collection bore testament to Satprem's extensive travels in the pursuit of increased awareness and utilization of earth architecture techniques, as well as his gift for capturing the striking beauty of arid landscapes, eclipses, menacing storm heads and shining sunsets or sunrises. In all more than 620 people visited the exhibitions at Pondicherry and Auroville.

Some visitors left such comments in the visitors' books: "Incredible and timeless images. A witness

to the true beauty that is in the world... We live through innumerable such points of time and space; but hardly realise their wonders. But a moment's concentration and we enter a magic door to infinity or at least bind an invitation into it. Congratulations to the photographer for the choice of them and the art captured." ■

'Service to Man and Service to Earth'

Written by Samuel Barnes

For four weeks this September, AVEI convened intensive workshops in various techniques of earthen architecture – two weeks were devoted to the theory and masonry of Arches, Vaults, and Domes, and two more to the construction and masonry of the Institute's ubiquitous CSEB (Compressed Stabilised Earth Blocks). More than seventy students, hailing from all over India and the world, devoted their days to learning the skills needed to create stable, beautiful, and practical structures for their far-flung communities. Though their ages, educational backgrounds, and attitudes were diverse, the students were united in their collective commitment to serve humankind in the essential role of builder.

After arriving in Auroville two weeks ago, it has been my privi-



Algeria, Timimoun Dunes, a photo from the exhibition by Satprem Maïni

lege to take part in the twelve day CSEB training under the guidance of Satprem and T. Ayyappan. I came here with the intention of garnering the knowledge needed to lead construction of simple dwellings in communes that have begun in and around my home of New York City. Though after a few weeks in Auroville I am just beginning to understand what will be necessary to complete such tasks, the instruction I have received in that span makes me feel that such work is vital, valuable, and attainable. In talking with my fellow students the same attitude prevailed: people planned to put their new-found knowledge to use building homes for their families, schools for their village, and modular apartments for their neighbors-in-need.

All of this will be done with regard not only to humanity, but with reverence and love for the living Earth. Often these aims are perceived to be in conflict; what is won for mankind must be ripped from the bosom of the natural world. But the essence of the Earth Institute's project is a reconciliation of these paths. As I was being trained to use soil, sand, and cement to erect structures that will enhance the lives of my human family, I was continually reminded of the wonderful diversity of soil that surrounds and supports us on this earth. Each has different qualities, attributes, and localities, but all originate from the same cycle of life and death that has given birth to us.

The great sage Vivekananda once said that 'Nara seva is Narayana

seva': service to man is service to God. As I study the arts of architecture's essential anthropic function in the midst of Auroville's flourishing culture, I have at last been able to understand the union of these two principles, along with the addition of a third: service to man is service to God, and each in their core is comprised of service to the Earth.



Building an arch during the training

Meet our new Volunteers and Interns!

The Institute is happy to announce the arrival of two new architects, Perna and Swati, and a Public Relations intern, Sam.

Samuel

Samuel is a servant, a supplicant, and a student of the living Earth. For the last three years he has studied at the Honors College of the City University of New York, where he has created and worked in the interdisciplinary concentration of Consciousness Ecology – a study of the interdependent relationship between mind and nature. He has come to Auroville to absorb the art of earthen construction and the ethic of intentional community. Sam aspires to share these wisdoms in the land of his birth, and wherever else on earth his

journey takes him.

Sam has spent many months travelling across the United States studying and practicing sustainable agriculture and experimenting in alternative modes of housing, building, and living. While on these journeys, he has come to be an apprentice of the indigenous knowledge of both India and of the Native American Indians, studying with masters of Tantra, Ayurveda, Sun Dance, and Reiki and fusing their teachings in his own life. At home in New York, Sam is an instructor of Kundalini Yoga, an employee of the Council on the Environment of NYC, and a community organizer with Occupy Yoga, the Green Bus Tour, and Unitribe, with whom he works to create collective experiences that merge the divide between ecological integrity and spiritual realization.

Sam is an avid writer, dancer, drummer and cook. He most at home anywhere he can use his hands and his heart to make life better for others. He will be documenting his travels in India at daydreaminc.wordpress.com.

Swati

Since childhood I showed prowess towards creative pursuits and architecture felt like the most natural progression. The last five years of college proved to be a self-realization process brought about by an in-depth approach to design. I am particularly drawn towards architecture which imbibes strong urban (design) context. →

After graduating as a Bachelor of architecture from Singhgad college of architecture in Pune I had a choice of either joining a well paying firm in Delhi with an impressive lineup of commercial and institutional projects and dive in head first into the rat race OR come to Auroville.

Call it naiveté or optimism but my expectation from Auroville as an experience changes every passing minute and so far it has been along a positive note. I was particularly interested in Auroville Earth Institute because you rarely find firms which have research, design and project management being handled under one roof by a limited team.

I believe in getting to the grass root level of a situation. Hence my ultimate aim is to apply the solutions at an urban level. I hope to take with me from Auroville enough knowledge and experience to be able to implement sustainable techniques at an urban level. My Auroville journey has just started and highly selfishly may I dare say that it shall end the day I feel I have learnt and lived all that it has to offer.

Perna

I, Perna Thacker have been a student of architecture in the Academy of Architecture, Mumbai.

Coming from a place like Bombay, this is a refreshing contrast to the lifestyle and building technology rampant there. In one the surroundings are made to adapt to building adapts to its surroundings.

I believe it is essential in today's time to give a little more importance to the context of the place and use the resources while building. Auroville gives that opportunity to explore sustainable options for building.

I always thought that building out of earth meant small structures, and then a professor showed us images of a museum tower in earth. It opened my eyes and I realized that there are even massive churches that are built in earth and stand even today. It is a fascinating material; sustainable, unobtrusive and very advantageous. The techniques he learnt at the arch vault dome workshop conducted here, he passed on to us. This and a bamboo workshop at Auroville conducted by my class and really opened my eyes to this direction of architecture and the umpteen possibilities here.

Since my second year in Architecture, I always wanted to come here and explore. Architecture shapes the place you practice in and influences places around. Hence this place, to understand the impact of my design on the environment and explore better design and material options for the same.

I have finally come here as an architect for a year and hope I am able to give back to this place as much as I am gaining from here.

Remaining Training Courses in 2012 and Schedule for Early 2013

December

10th to 15th - AVD Theory
17th to 22nd - AVD Masonry

February

4th to 9th - CSEB Design
11th to 16th - CSEB Production
18th to 23rd - CSEB Masonry

April

1st to 6th - CSEB Production
8th to 13th - CSEB Masonry

June

3rd to 8th - Ferrocement
10th to 15th - AVD Theory
17th to 22nd - AVD Masonry

July

1st to 6th - CSEB Design

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