

# Special Features

## Work apace to develop geophysical map of India

Over a cuppa



The pre-birthday gift, if there is anything like that, received by Dr Shyam Sundar Rai, scientist at the National Geophysical Research Institute, Hyderabad, was one of its kind. The Union Government announced in February that he was awarded the prestigious J C Bose Fellowship. Dr Rai who will turn 56 on March 16, has joined the small community of the J C Bose National Fellows who work typically, for five years on their projects they proposed for the fellowship with government funding. For about 20 years, Dr Rai cultivated and managed the Seismic Tomography projects at NGRI. He heads the ambitious, challenging and technologically frontline research project to investigate earthquake dynamics and evolution of the Himalayas. He was also involved in the development of the curriculum of a unique five year integrated Master's programme

in Earth Sciences that is being offered in the newly set up Indian Institute of Scientific Education and Research at Kolkata. He is passionate about overhauling the Indian science education to make it inclusive and diverse in terms of marrying pure sciences with social sciences, democratising teaching methodology to enable students and researchers to be bold in their ideas and work and lastly, to link universities with science labs so that both can learn and gain from each other by 'coupling their strengths'.

**Excerpts:**

**What project have you proposed for the J C Bose Fellowship?**

We will be developing for the first time a geophysical map of the entire country. This will form the base map for all future research in earth sciences. Just like we take a CT scan to look right into the brain using special X-ray machines, we will be deploying a network of sensors across India to see what's going on inside the earth. We have done this earlier but in patches in the Himalayas, Andamans and



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so on. In the first stage we will cover South India. In 4-5 years we should be able to generate the mosaic of the entire country. Like the Genome Map of India was developed for the first time, my project will develop the geophysical image map of the entire country.

**Is this what is called seismic tomography?**

Yes indeed. We need to study the physical properties of the earth. All that's happening on the earth surface is essentially controlled by processes happening inside. So to understand the phenomena and to predict we need to know what exists inside and then generate a predictive model.

**Such observations are useful only in predicting earthquakes, tsunamis and so on?**

Our project embraces much more. It is critical that we know what's happening in the first 100 metres of depth of the earth which essentially provides food and natural resources to us. Changes in the first 100 metres impact such parameters as groundwater, natural resources and environment. Besides, as we need to double our food production in the next 10-15 years, knowing the soil conditions will help. We are focusing on this new area in a big way, in agri-geophysics. We are trying to integrate social sciences, industry and geophysical research. For instance,

econo-physics is an area that is drawing the best brains and has big money.

**You are also trying to integrate scientific research with universities?**

In the developed countries, research is not done in isolation from educational institutions. But in India even the best of our labs does not have an inbuilt education programme. As researchers, we don't interface with students. We need to have close links with at least universities. We have realized the potential of such continuous and constant interaction. For instance, we have Osmania University barely a km away. If NGRI can have interface with OU's Dept of Earth Sciences both would benefit: we can use 'fresh' thinking and ideas of students and they can use our research facilities.

**You also believe in giving freedom to young scientists in thought and action?**

Any hierarchy kills talent and creativity. Youth should have the freedom to ask and talk anything. You have to believe that there are others better than you... Let me quote Dr Garden West, under

whom I worked in the University of Toronto. He would say that every incoming generation is smarter than the outgoing one and that's the only hope that keeps us alive for future generations.

**Considering you had to be away from home for long stretches as part of your research, how did you manage to have a harmonious family life?**

Unless we have support at home there's no way we can succeed. My wife Asha told me in the beginning itself that you take care of your responsibilities at work and on field. When you are here we take care of the family (of two sons) together. There's nothing unidirectional about life. You achieve with the support of many people and you give back to family, friends and society by succeeding in what you have undertaken.

**As a scientist do you feel your loyalty is to the country or science?**

Personally I feel science is global. But we are Indians first and as an Indian, I believe Indians should be first. **R Akhileshwari in Hyderabad**

## Blending tradition with modernity

# Back to earthly homes

Once houses built in mud dotted Indian villages. Now structures constructed using mud are gaining acceptance.

So you thought only poor people lived in houses made of mud or bamboo? Not at all. Architects are now building fancy houses and resorts using mud, bamboo and other ethnic materials for their esteemed clients from even the tinsel world! For instance, Habitat Technology group has been building a two-room bamboo house on a cliff near Vizhinjam in Thiruvananthapuram for Bollywood actress Mallika Sherawat. Many of mud exponent Prof Eugene Pandala's clients who opted for earth architecture to build their dream homes are affluent.

Kerala's building architecture has in the last one decade showed signs of heading backwards to earth and nature. Mud structures have been making a comeback, that too, not as a low cost alternative but as chic, cosy homes and even tourist resorts which cater to high end tourists. Mud as a medium of construction is being popularised by a small band of enthusiastic architects like Prof Eugene Pandala and G Sankar. Their customers have mostly been the elite including IAS officials, businessmen and progressive intellectuals. Prof Pandala has now designed what is claimed to be the largest mud resort in Asia at Velamunda in the bewitching backdrop of Banasura hills, 18 km away from Mananthavady in Wayanad district.

At first sight, the Banasura Hill Resort looks every bit rustic though in reality, it is a glorified tribal hamlet with gates made of bamboo poles and soft lighting almost resembling chimneys from outside. The main building of the resort with a carpet area of 20,000 square feet is a massive two-storey structure made entirely of mud with a roof of bamboo and coconut palm fronds. What differentiates the building from an actual tribal hamlet located a kilometre away is that all the 31 spacious rooms, villas and suites are tastefully furnished.

Within the 'muddy' walls are a multi-cuisine restaurant, coffee shop, conference hall, ayurveda spa, library, playing area and gym. Mud plastering over cement has also been employed in a couple of these facilities.

"Earth had been a tried and tested natu-



Main building corridor of Banasura Hill Resort in Wayanad district of Kerala

ral building material for thousands of years and in combination with latest building techniques can be used to construct modern ecological structures," says Prof Pandala who used rammed earth technique in the resort.

**Sensible alternative**

"In this technology, we use damp or moist earth with or without additive which in this case, is 5 per cent cement," he says. For those who doubt the strength and durability of the technology, Prof Pandala says, "earth is flexible because it can be moulded and shaped when wet, and rammed and pressed when moist, but it hardens when exposed to the sun making it a durable building material." An authority on mud structures, Prof Pandala is working on a government building in Madhya Pradesh

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being made entirely with mud.

While it requires a lot of guts to actually go for mud to build one's dream house, variety of factors seem to have made people see sense.

The proponents of mud houses are mostly driven by an urge to build environment friendly dwellings as well as address the question of depleting natural resources as manifested in the acute sand crisis in Kerala. The mud to be used can often be excavated from the construction site as in the case of the Banasura Hill Resort. "If we have to excavate the mud from elsewhere and transport it, then the technology may not be viable," said Mr T Shankar, CEO of Assyst, a US-based software development company who also owns the hill resort.

"Earth buildings are renewable in that sense because the material can be reused

and recycled indefinitely as a building material and returned to the earth," says Prof Pandala.

He points out that mud is non-toxic, non-allergic, rot and termite proof, controls humidity and offers great sound isolation. Perhaps the crowning glory of the technology lies in the way it can balance fluctuations in temperature throughout the year, that is store both warmth and coolness.

Mr Shankar had initially envisaged the resort only as a quiet getaway for his company's staff and families located worldwide. However, he hit upon the idea of developing it into a resort after the structure blended harmoniously with the micro environment around giving it a stunning appeal.

**R Gopakumar in Wayanad**

## Khadi a must in this high-flying institute for girls

If I had been a girl, I would have come to Banasthali for my education," India's first prime minister Jawaharlal Nehru had said about Banasthali Vidyapith.

Some of the lucky ones, who are holding key positions, were present when the institute celebrated its platinum jubilee recently. Those on hand were Lok Sabha Speaker Meira Kumar, first woman Speaker of Rajasthan State Assembly Sumitra Singh and Gujarat Governor Dr Kamla Beniwal.

Perhaps the only fully residential women's university in the country that offers an integrated system of education from nursery to post doctoral, Banasthali (land full of forests) Vidyapith is a fond tribute to a daughter's memory. Pandit Hira Lal Shastri and his wife Ratan Shastri founded Banasthali to fill up the vacuum caused by the untimely passing away of their promising daughter Shanta Bai. She was a multi-faceted genius, like her father who was a writer, Sanskrit scholar, a passionate social worker and freedom fighter.

*Ek mako phool pyaro, adh khilyo kumhala gayo  
Shokbeetyo, harsh chhayo, phool bag laga gayo.*



A girl learning horse riding in Banasthali Vidyapith

(A mother lost her most beloved flower that withered half bloomed but joy replaced grief when the flower paved way for a garden.)

These beautiful lines inscribed outside Shanta Bai Kuteer at the Banasthali Vidyapith speak of the lovely flower withering way before it bloomed. Penned by late Pt Shastri, the first chief minister of Rajasthan, in his daughter's memory, the couplet truly sums up in a symbolic way the inspiration behind Banasthali Vidyapith, a pioneering

centre of women's education in the country.

Shanta Bai, who could read Vedas at the age of six, was good in music and fine arts and even in martial arts. She was disturbed to see that there were no schools where girls could study and at the age of 11, she expressed her wish to start a school. Perhaps to divert her attention her father asked her to collect mud bricks for the construction and she literally did that. But destiny willed it otherwise and Shanta Bai died due to

high fever at the tender age of 12, leaving her parents absolutely shattered, says Aditya Shastri, the grand son of Pt Shastri and now the Vice Chancellor of Banasthali.

Pt Shastri was so grief-stricken after Shanta's death that he remained bed-ridden for almost three months till Ratan Shastri motivated him to train other girls like they would have trained Shanta. The very thought inspired him and he immediately wrote to his friends sharing his wish. He wanted his friends to send their daughters to study. Perhaps taking pity and considering his mental state, six parents decided to send their children. He had no preconceived framework for the institution but he knew what was close to his daughter's heart. The "Panchmukhi" education concept— physical, practical, aesthetic, moral and intellectual—actually emerged out of her personality, recalls Aditya Shastri.

He had played a great role in unification of princely states in Rajasthan and was the unanimous choice of Pt Nehru and Sardar Patel for the chief minister's post. But he was a reluctant politician who decided to get back to Banasthali after three years in the corridors of power. His mission was social work and he did not want to neglect the

"garden" he nurtured in cherished memory of his daughter.

Inspired by Mahatma Gandhi, Pt Hira Lal Shastri had resigned from the home and foreign secretary post in the erstwhile Jaipur state in 1927 to work as a rural reconstruction worker in Banasthali. And he was so moved by the serene rural ambience that he decided to set up his education institution there like a Gandhi gram. Shri Shanta Bai Kutir was started in October 1935 in a mud hut which was named as Banasthali Vidyapith in 1943. In those days, when even sending girls to school was considered a sin, he started horse riding and flying course to inculcate self-confidence among girls.

The Vidyapith at present has nine faculties, 26 departments offering every possible professional courses to 8,000 students with a combination of all traditional ones. Aditya Shastri told Deccan Herald. The university is equipped with three Cessna aircraft and has a 3600-foot long runway to facilitate newly introduced B Sc (Aviation) course, he added. But Khadi wearing is still the hallmark of Banasthali, to say it believes in simple living and "flying high".

**Abha Sharma in Jaipur**

## Villagers here are scared of festival

Nearly 150 years have passed, but Durgapur has not played Holi

For nearly 150 years, residents of a village in Bokaro district of Jharkhand have not played with colours on the occasion of Holi. Most of the villagers prefer to remain indoors while the rest of the country indulges in revelry during Holi on the first day of Hindi month of Chait.

Located on the banks of Khanjo river, about 55 km from the district headquarters Bokaro, Holi has nothing to cheer about for 2000-odd residents of Durgapur.

The story has it that Durgapur ruler king Durga Prasad was very fond of celebrating Holi in a big way. But as the ill-luck would have it, King's son died during the celebration about 150 years back. When the villagers celebrated the festival of colours next year, there were a few deaths in the village. Worse, a three-year drought spell followed. It is said that King's son appeared in the dream of Durga Prasad and wanted his father to impose a blanket ban on Holi celebrations. Strange it may sound, the king also died on the day of Holi.

These developments sent shivers down the spines of the villagers and they resolved not to celebrate Holi.

Even now, the fear haunts them and they skip the festival.

When a few people in the village clandestinely celebrated Holi soon after the country's independence, there were deaths in the village and some lost their cattle.

"From my childhood, I have not celebrated Holi. Blame it on superstition, blind belief or bitter experiences of the past. I am very old. I wish I see villagers celebrating Holi. Hope I will be part of the celebrations", octogenarian Janki Mahto of the village said.

The villagers have not been able to overcome the fear. "They still think that tragedy will strike the village if the Holi celebrations are held," she adds.

"I found that people strongly believe their deceased king Durga Prasad's alma is residing in a nearby Durga hill and it will take care of the villagers. But over the years, villagers have become liberal in their thinking and allow youngsters to move out of the village. So, those who want to celebrate Holi leave the village and celebrate it at their relatives' places," said journalist Shanank Shekhar.

The villagers are not willing to believe that the deaths and celebrations could just be coincidence. Developments in other parts of the state and the country appear to have had no impact on the villagers.

**Sandeep Bhaskar in Ranchi**