



Raintree

Notes from the campus

ANNIVERSARY ISSUE

Illustration by Sayali Bhagali, IDC



Amaltas

There can be few summer sights more spectacular than an amaltas in full cry, standing centrepiece on a large emerald lawn. None of our campus laburnums—amaltas in English was christened the Indian Laburnum—enjoy so fine a setting, yet can set their surroundings alight with their fiery displays. A native of the subcontinent, the amaltas, *Cassia fistula*, bears its creamy-gold flowers in delicate, droopy sprays that to begin with glimmer through its light-green foliage like frail chandeliers, but proceed shortly to cover the whole tree in a lavish fleece of gold (the European laburnum, by comparison, is dull and rosy). The flowers turn, on fertilization, into long, brown, cylindrical seed pods, much loved by monkeys for their pulp. On campus, the tree is unfortunately short-lived; within a few seasons, as if worn out by its own flamboyance, it falls prey to lethal infestations. Perhaps as an offset to early mortality, it spreads readily, and some spot or other is always amaltas-ablaze during the months of April and May.

REPORT

At the Heart of the Campus

■ PROF. SHYAM R. ASOLEKAR, NEHA CHAUDHURI

(This issue's lead is culled from a draft report on Sustainable Campus prepared by Prof Shyam R. Asolekar and his team of students. It has been summarised and written for Raintree by Neha Chaudhuri, campus resident.)

The dramatic, large-scale challenge to the existence of earth's ecosystems caused by human activity can be summed up by one simple fact. Human beings have introduced such concentration of tin in ocean waters that (unlike a few hundred years ago) its detection has become easier now to the detriment of sea life. For everyone who has been at the beach, or on a ship and has seen far into the horizon on a clear day, it must be a difficult fact to digest, given the vastness of the ocean.

The fact is that in the 21st century, even the places human beings haven't reached in large numbers, have been assaulted by the pollution generated by mega structures – industrial and residential. 150 years of industrialization have ensured melting glaciers, an ozone hole and

drastically changing weather patterns. Though dense human activity may remain in pockets, its impact will spread thin the world over.

Why worry? And what does this have to do with a sustainable campus?

The earth is not as vast a place as we imagine it to be; not boundless in its bounty. It has a system based on intricate relationships between the living and the non-living, renewable and non-renewable resources. And only some of the components of the system cannot compensate for the whole. Today's realization is to nurture and enhance synergy to the extent that what you consume in your life-time enhances the quality of your life, but still leaves enough for future generations. Living by exploitation of natural resources is looking with a mis-focused lens on nature.

Placed in this perspective, doesn't our campus, which has seen so many new buildings, newer people, in the last

few years, seem precious? Precious and vulnerable: a place that requires nurturing and protection than being pandered to with the ego and pride of statements like 'Oh there were regular sightings of leopards five-six years back.'

"Practice before you preach" goes an old saying. Hence, it would be appropriate to disclose the formulation of a policy for "Eco-Campus". Our place as a premier academic institution demands that we respect and accept our responsibilities towards conservation; develop sustainable solutions and strategies which preserve the pristine environment bestowed on us. The aim of the policy is to take necessary initiatives and device futuristic models to work closely with various stakeholders while developing methods to create an environmentally sustainable campus for future generations. This is the firm belief of the Green Campus Initiative (GCI).

(contd. overleaf)

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What is the Green Campus Initiative?

The GCI is a committee which looks into various environmental problems faced by the campus, and presents its recommendations in the form of a report. Appointed by the Director in February this year, it has had three meetings over issues concerning ecologically responsible garbage disposal, recycling, conservation of water, electricity and maintaining IIT Bombay's green cover.

Its members are: Prof. Jothiprakash (Civil Engineering), Prof. Milind Rane (Mechanical Engineering), Prof. K. V. K. Rao (Dean, IPS), Prof. Suparna Mukherji (CESE), Prof. Chetan Solanki (ESE), Prof. Anand Rao (Civil Engineering), Mr. B. K. Sahoo (Executive Engineer, Electrical) and Mr. B. S. Patil (Health Office). Prof. M. B. Patil (Electrical Engineering) acts as its Convener. The committee is only an advisory body and will submit its final report in the second week of May. Although it was instituted for three months and will come to the end of its tenure on 21st May, the committee members hope their request of making it a permanent body is given due consideration.

The Eco-Policy was prompted by many reasons. The campus is in a constant state of restructuring and expansion to provide quality facilities with increasing scope of academic courses and research that has inevitably resulted in the deterioration of the environment quality.

With a robust body of knowledge and multidisciplinary advantages, IIT Bombay should set an example in terms of environmental sensitivity, holistic approaches to energy conservation, ecological preservation, innovation and development of intermediate technologies through its policy measures. The specific objectives of the policy are to:

- Optimize resource consumption by reducing wastage
- Energy conservation
- Abatement of pollution (air, water and solid waste)
- Device strategies for optimizing resource consumption
- Develop alternative energy sources/strategies
- Use intermediate and/or green technologies

Consider the following figure (Fig.1) showing the electricity consumption distribution of IITB campus.

150 years of industrialization have ensured melting glaciers, an ozone hole and drastically changing weather patterns.

Did you know that the IITB energy bill for 2007 was **Rs. 10.2 crores**? The electricity bill comprises two parts: one related to the energy consumed (per kWh or per unit energy consumed) and the other is the maximum demand charge (per kVA of maximum demand during the month). The existing tariff rate is Rs. 300/kVA for maximum demand and Rs. 4.3/kWh on an average.

Based on the efforts of the committee, many changes have been suggested to minimize electricity consumption. Procurement of new, energy efficient ACs has been suggested along with the suggestion of installing solar water heaters instead of the old geysers in all areas. But the committee can only suggest changes. As a community, if all of us ensure proper use of electricity by switching off fans and lights when not in use or by using a common area - like the library - to read, we can actively nurture our environment. Residents, students and faculty have an equal part to play to sustain the 'Kashmir of Mumbai'. Many people speak of the campus with awe and disbelief of the existence of such understated beauty in the city. Will we ensure it remains so over the years?

Coming to the solid waste generated in campus: it is classified into food waste, paper including newspapers and magazines, cardboard boxes food wrappers, horticultural waste including dry leaves and plastic bottles, electronic waste, abandoned vehicles especially bicycles.

IIT Bombay has 13 student hostels, and 1 hostel for project staff, with a catering facility in each. Who knew that each hostel generates around 150 kg of solid waste per day in addition to around 2500 kg from the canteens? Paper waste constitutes the major part of solid waste. Enormous quantities of paper are utilized in the campus as 100% virgin copy paper by printing on one side of the paper.

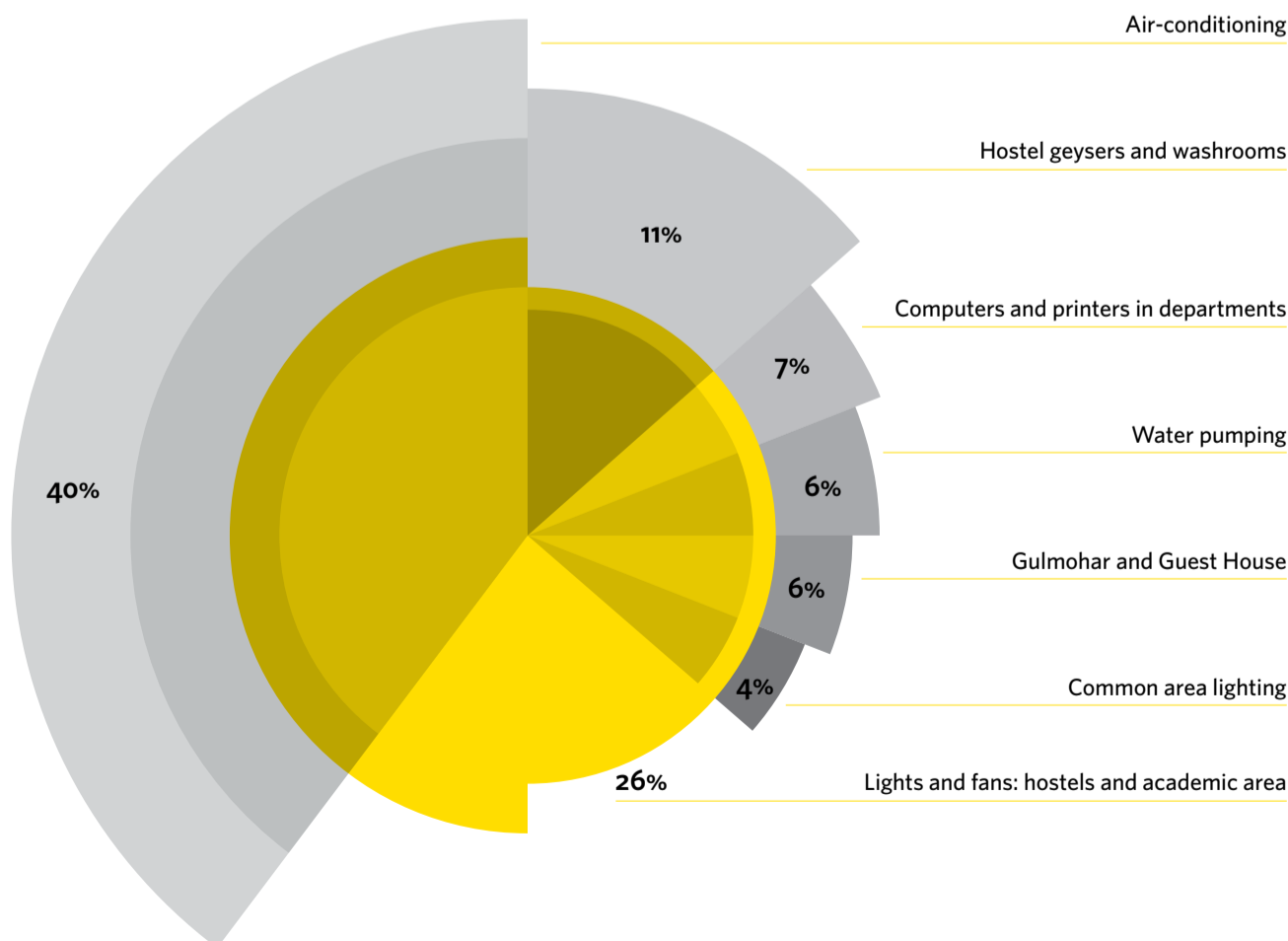


Illustration by Farweej Bhutia, IDC

On an average, 13000-15000 reams are utilized annually for 4000 students; almost 3500 reams per student per year. A mind boggling number of trees must have been cut somewhere to make so much paper in the first place.

Measures are recommended to tackle solid wastes by making avoiding plastic at all means and by re-starting the two existing biogas plants in IITB, NISARGUNA and ARTI, each with 300 kg capacity. Burning of leaves and littering the lake is illegal and strict action is suggested against people who break this rule. The Earth Club has initiated the task of identifying a safe disposal channel and mechanism to ensure an environmentally friendly exit of the

FIG. 1 Electricity consumption distribution of IITB campus



THE CAMPUS is a micro community in itself. The institute has an ideal location between Powai and Vihar Lakes with beautiful adjoining hills. The institute is located on 220 hectares/550 acres of land in the north eastern suburbs of Mumbai with the Powai Lake bordering it on the west, flanked by hills on the northern side. It has a diverse environment abundant with varieties of flora and fauna. An arterial road with high density traffic hinges on the southern border of the campus. There are fourteen departments, ten centres, three schools and four Interdisciplinary programs. Nearly 5300 students, 450 faculty and 1500 staff reside on campus.

CHEMICALS used in laboratories for research work and biomedical waste from the hospital are two main sources of hazardous waste in the campus. IIT Bombay disposes a huge amount of electronic items amounting to 1000 tons per year. New and emerging electronics goods are the driving force for departments to phase out older electronic goods in working condition. Dumping of abandoned vehicles in campus and house-hold scraps also form significant part of solid waste generated in campus.

Drinking water is used for all purposes including bathing and washing utensils. Recycling of grey water is not practiced on campus.

harmful e-wastes on campus. Minimization of food waste by accepting proper practices of preparation and storage of food, effective menu planning by student teams, awareness campaign and levying adequate penalty/fine have been recommended. Many measures have been suggested for solid waste generated in the Academic Area.

The quality of water supply is generally good as the supply is directly available from the water treatment plant at Bhandup. Drinking water is used for all purposes on campus. Recycling of grey water is not practiced on campus. Generally, chemicals are directly discharged into the sewer lines after some dilution. IIT Bombay does not have any system to internally augment supplies in case need arises.

Consider the pattern of water consumption (Fig.2). Rain water harvesting and grey water recycling schemes have

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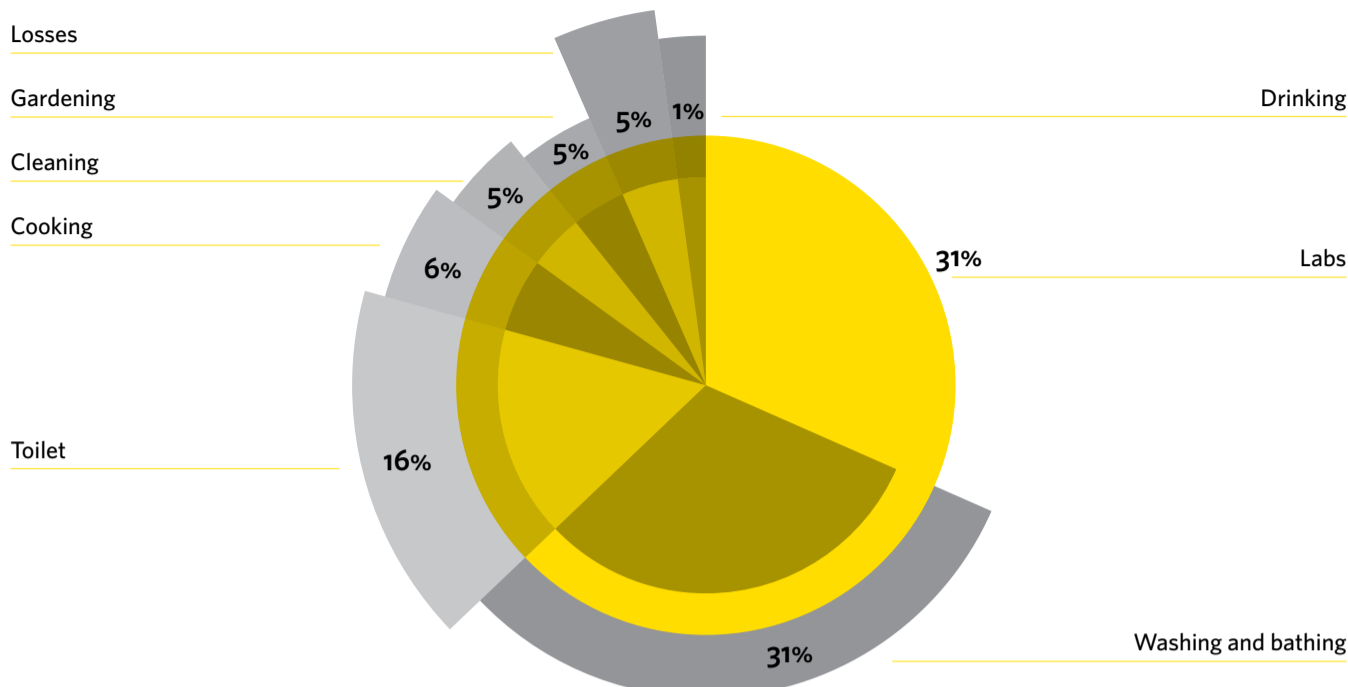


FIG. 2 Water consumption distribution through IITB

been suggested to augment water supply and re-use grey water. However, at the individual level, we can all use the resource more consciously. Measures have been recommended for monitoring the consumption of water in hostels and laboratories.

The ecological system that this habitat provides many animals and plants cannot be emphasised enough. The WWF Report has factually documented this and

submitted recommendations to maintain and nurture the flora and fauna of our campus.

Ultimately, we're all on a journey together if we take it upon ourselves to protect the campus ecology. And there's no destination because the important thing is going in a certain direction - towards seeing nature as vulnerable, requiring kindness and looking after - just like a child who requires a mother to encourage growth and flowering. ■

Living with Birds and Bees

■ JAYA JOSHI



The thematic focus of this Anniversary issue of *Raintree* is Campus Ecology. It's an attempt to not only celebrate the ecological hotspot we call Powai Campus but also discover how deeply rooted we are in this living, breathing entity.

My Ecological Quotient compared to most campus-ites is abysmally low. The closest to having a relationship with ecology (till a few years back) was through documentaries made by film makers like David Attenborough. A lot of us saw these as kids and as grown-ups. His films were beautiful and transported one to a magical world of plants and animals, almost unreal. Here, I should mention that while I enjoyed his films, I stayed away from watching those on groups of animals that I didn't find so endearing like reptiles and bees. I even had some adjustment problems with the bees, snakes and monkeys when I moved into my apartment in the campus. We had never been close before and now that we were neighbours, they wanted to get chatty. I wasn't in the mood. But I'm happy to report that after a few mild disagreements, we have come to a peaceful settlement. We still don't party together, but have learnt to coexist. And today, I think

I could watch films on these animals. If not with the same level of enthusiasm that I would have while watching meerkats and whales, but with a little more acceptance.

So I'm taking my time but I am converting. And I'm thinking, if this could happen to me in less than two years, then how would it be for kids who were born and bred here and for staff, faculty and their families who have spent years in this wilderness?

The issue has been structured in such a manner that while we look into the different and variegated world of campus ecology, care has been taken to look into all aspects of what we define as our environment. In other words the issue focuses on scientific/inorganic aspects as well as our organic world, and finally deals with issues of sustainability. Our May-June-July 09 (Red) issue was all about the changing face of the campus and infrastructural developments. It gave you an idea of what the campus will look like in years to come. This issue, on the other hand, is about what the campus was like in the past. From being a barren, tree-less campus till the early 70s, how did it become a rich natural landscape for flora and fauna? This issue is also about where we are today.

Two of my favourite stories are anecdotal pieces received from two most prominent wildlife enthusiasts at IIT Bombay - Profs. G. C. De and Shirish Waghulde. Tales from my Backyard sent by Prof. De is a fascinating (handwritten) note that came all the way from Kolkata by post.. Prof. De, in Prof. Waghulde's words, was a pioneering conservationist who turned generations of students into nature enthusiasts. While he remembers having spotted 200 different birds during his time, Damayanti Bhattacharya's piece - Spirit of Place - on the WWF's recently submitted report on the biodiversity at IIT Bombay talks about the current and mentions the latest figures. Sadly, the numbers have halved. Read this for some startling observations and clever recommendations made by the WWF research team. This is Damayanti's personal take on the report. If you're also a David Attenborough fan, you will enjoy this story.

The article - Find me the River - on one of the campus's lesser known ecological assets - Mithi River by our alumnus and social activist Janak Daftary, traces its origin and reveals some interesting facts. The issue also features anecdotes revolving around the theme, some light-hearted and some dangerously funny.

This time, the editorial team was extremely pleased with some top quality contributions received in the form of stories, poems, photographs and sketches from our readers. Thank you very much. Please keep them coming.

And yes, before I close, I'm going to tell you about the amorous parakeets. 7-8 of them, outside my living room window would come and sit on the telephone wire which had a cool breeze coming from the lake behind and thick carpet-like canopy of trees below. In twos, they would take turns to go to the facing window ledge - large and comfortable. You could be having your morning tea and reading the worst possible news from your daily newspaper, but one look at them, and you would be reminded that love is still alive. Well, this was then. Now there's construction work, and with it, has disappeared the thick carpet-like canopy of trees below. They still come, but their restlessness and agitation is evident. And no, they don't come in twos anymore. I'm hinging my hopes (and so are the amorous parakeets) on our Eco-Policy and the recommendations made by the Green Campus Initiative Committee. The plans look promising and I hope they will soon be made a permanent and active body. Read about these in the comprehensive report - At the heart of the campus - written by Prof. Shyam R. Asolekar of CESE department and Neha Chaudhuri.

We tried exploring the option of printing *Raintree* on recycled paper but could not due to prohibitive costs. So here's an alternative plan to reduce *Raintree*'s ecological footprint. Those who receive a paper copy but would rather prefer an e-copy can send me their request on pro@iitb.ac.in. The number of responses received will be deducted from the total number of copies we print. ■

INBOX

Letters to the Editor



I was delighted to get a copy of *Raintree* a few days back. The very name of the publication brought sweet memories to my mind. The Raintrees, that were on both sides of the road in front of the Chemical Engg. Dept, provided a cool and calm atmosphere. Particularly, I liked the bus stop in front of the Chemical Engg. Dept. Dr. Waghulde told me that one tree will adorn the first page of each copy. I recall with pleasure that my 5th year student Zaveri, who was the founder-Secretary, Wild Life Club-IITB, kindled an interest in birds. After sometime, I told some members that

we know more about the birds and butterflies, but most of us hardly know anything about the trees and plants that fill our campus. My comments worked. Shirish Waghulde with his friend Kerkar labeled quite a few trees with their scientific and local names. The issue also brought back memories of Ganorkar who retired from CRNTS.

PROF. (RETD) SUBRATA MAHAPATRA

I have the read recent issue of *Raintree* and I enjoyed it a lot. A big round of applause from my side for all the efforts put in by all its members.

AKASH NIGAM Ph.D Scholar

It is a great treat to receive a copy of the 5th issue of *Raintree*. It pleased me mainly on two counts, a) switching on to memory of old days, b) treatises on school education. The red lettered description of the Indian coral tree reminds me of the many occasions when I watched birds - residential as well as migratory - feeding noisily on nectar of Pangara flowers. As a part of the conservation programme of IITB between 1972-76, we planted many Pangaras for fencing of outlying wild areas, particularly Kol Dongri where concrete poles were judiciously interspersed with Pangaras.

As for alternative education, I appreciate your lead piece *Looking in and out of the classroom* and *Portrait of Mrs M* is also remarkable.

Permit me to add some comments on your 11 page tome out of my experience. There is no dearth of issues and the need to do something in this field. Valuable variations will sprout while engaged behind the plough. However while enriching oneself with various achievements of Europe and America, India has to evolve models suited to its socio-economic diversities, cashing on our covetable cultural traditions and practices. Solutions should be capital lean, labour-intensive, stake holder managed, small-scale enterprises depending least on the government.

PROF. (RETD) GOPAL DE

Letters should be sent by e-mail to pro@iitb.ac.in. We regret that owing to the volume of correspondence, we cannot publish or reply all the letters. Letters may be edited for length and clarity.

ERRATA

Minor corrections from the previous issue: Mr. Arvind Gupta is not a B.Tech. in Electrical Engineering from IIT Bombay, as mentioned. He is a ME, B.Tech. from IIT Kanpur.

Mr. Anthariksh Bothale, Student, is in the Mechanical Engineering Department and Ms. Anasuya Mandal, Student, is in the Chemical Engineering Department.

REPORT

Spirit of Place: Tales from the Label Maker

■ DAMAYANTI BHATTACHARYA

*Life is like heady wine.
Everyone reads the label on the bottle,
Hardly anyone tastes the wine.
Buddha once pointed to a flower and asked each of his
disciples to say something about it:
One pronounced a lecture
Another a poem
Yet another a parable
Each outdid the other in depth and erudition.
Label-makers!
Mahakashyap smiled and held his tongue.
Only he had seen the flower.*

What does it mean to evaluate the crafting of an educational Institution in the spirit of the place it serves? IIT Bombay is only fifty years old but this landscape is older and in many ways a living, breathing entity. As the institution continues to craft, build and mould itself to change with the changing times, its surrounding environs are also changing apace. Recently, I read a report prepared by the World Wide Fund for Nature, India which was a "study of the biodiversity of Indian Institute of Technology, Bombay campus"; commissioned by the Environment Advisory Committee of IIT Bombay (henceforth WWF report). From the report, I learnt that "the IIT-Bombay campus is important not only from education point of view but also as a green lung and a carbon sink". Divested of the jargon what it means for me is that every time I enter the campus, I leave behind the noise, dust and grime of the world outside and return to my very own private sanctuary. Immediately, my frazzled nerves start to calm down. I fill my lungs with clean air. The path home is a patchwork lace of light and shade from the trees above. The further I walk inside, the incessant noise of the world 'outside' fades away, to be replaced by bird song and tranquil surroundings that never fail to soothe me.

IIT Bombay campus is important not only from education point of view but also as a green lung and a carbon sink.



Illustration by Chinmayee Samant, IDC

KEY EXCERPTS FROM THE WWF REPORT

Prof. Mahesh Patil

The institute commissioned a study of the IITB campus by WWF, India, on the biodiversity perspective in September 2008. The study was conducted for six months, and a report was submitted based on observations on scientists. The detailed report is available at http://www.iitb.ac.in/deanpl/images/basic/WWF_Report.pdf.

The biodiversity of the campus comprised of a total of 843 species of flora and fauna (including the unidentified forms). Of these, the urban sector had 634 species while the vegetated sector had 646 species. The comparison of the vegetated and urban sector clearly reveals the imbalance in the urban sector, where the percentage of flora is increasing and it does not support the fauna. This is mainly due to exotic trees in the urban sector. It is important to know that only 4 acres of vegetated sector was studied, emphasizing the importance of the vegetated sector with its vast diversity.

The same report on campus biodiversity taught me that within a brief study period spanning just 6 months the total number of species observed here numbered 843, 44 % of which comprised of

flora and 56% of fauna. Overall, trees were the most dominant flora followed by herbs and shrubs. Invertebrate fauna formed a larger percentage, with insects being the dominant fauna, comprising almost 63%, while vertebrates were only 30 % of the total fauna, with birds comprising 21%. There are as many as 84 alien species of which 17 are invasive species which were probably introduced into the campus from outside and largely detrimental to the local vegetation. But what speaks volumes of the rich biodiversity of our campus is the fact that there are as many as 100 species of flora and fauna here that are accorded protection status as per the different wild life laws of our land!

There is wide ranging floral diversity. "Plants belonging to several habits like epiphytes, woody climbers, climbers, grasses, herbs, shrubs, and trees have been recorded. Plants belonged to 91 different families and total of 374 species of flora have been observed, of which 15 species are yet to be identified." Obviously trees are the most dominant flora on campus but it might be news for a lot of us who live here is that Powai campus houses 150 tree species of which six are as yet unidentified; followed by herbs that include 100 species (one unidentified), 56 species of climbers of which six are to be identified. In addition, there are 41 species of shrubs 29 are indigenous and nine exotic while three species lacked information.

When I read the names of the trees found on campus, some were known and immediately recognizable like the

There is also the Common Godzilla Ant, is this the one with the humongous bite? And the White Footed Ghost Ant, in other words, even-if-you-cannot-see-me-we-will-still-get-you-ant.



ubiquitous Mango, Coconut, *Jamun*, *Phanas* and other fruit trees that are forever inviting the *banar sena*. Then there were *Gulmohar*, *Raintree*, *Palas*, *Amaltas*, *Copper Pods* that regularly paint the campus in as many hues as there are seasons. Some trees I have learnt to recognise only after coming to live here, like the *Kanchan* trees currently in bloom all across campus in a riot of pale purple pink and white flowers. Then there is the *Anjeer* tree just outside my flat - favourite food for a colony of giant fruit bats. For that matter, I always knew that bats were just bats: smelly old things that came in the same shape and size and hung upside down in deep, dark and slimy places. The campus taught me otherwise.

Plants belonged to 91 different families and total of 374 species of flora have been observed in Powai Campus. Trees are the most dominant flora and the campus houses 150 tree species, followed by herbs that include 100 species, 56 species of Climbers, and 41 species of shrubs.

Finally, there were some names in this list that are alien, exotic and mysterious - *African Tulip Tree*, *Sita Ashok*, *Scarlet Cordis*, *Siamese Cassia*, *Singapore Cherry*, *Vilayati Chinch* and more. What do these trees look like? Where can they be spotted? I realised that even after spending almost ten years here there is a lot within this landscape that remains yet unknown and unexplored. If I took a walk around campus, I could probably easily locate the odd *Papaya* or *Tagar* plant but what does a *Hound's Berry* or a *Shoe Flower* or a *Karvanda* look like and where would I have to walk to find it? I have heard of a *Touch-me not*, but never of a *Press-me-not* (there are 82 of them in campus) and when I read '*Sharpunkha*' I misunderstood it as '*Surpanakha*'. So, if Herb trees had a nose this one would probably be without one.

By the way, IIT Bombay has 18 different varieties of grass growing in abundance, 54 species of climbers including six unidentified ones. The campus also has 4 species of *Woody Climbers* - indicators of dense forest implying a healthy ecosystem.

When you climb down from the hill after the Convocation Hall towards Gymkhana grounds and Staff Hostel there is a giant *Madhumalti* just off the pavement on the left hand side of the road. Every summer this stretch is transformed into a perfumed avenue and all of you who have ever

walked down that road in daylight or in darkness must have been aware of redolent smell of the *Madhumalti* even if you never turned around and looked up to see its flowering magnificence.

The WWF report would have us believe that there is a veritable 'bug's world' out there. The distribution of fauna on campus indicated that there are invertebrate fauna consisting of Turbellarians (flat worms), Oligochaetes (earthworms), Crustaceans (campus has land crabs and wood louse), Insects, Diplopods (millipedes), Chilopods (centipedes), Arachnids (spiders, scorpions, ticks, and mites etc) and Gastropods (slugs). Insects formed almost 90% of this invertebrate population numbering 302 different kinds of which 53 were unidentified.

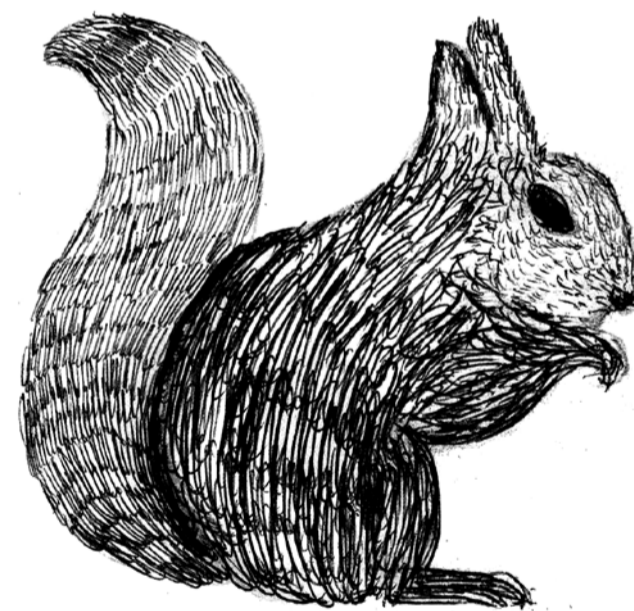


Illustration by Farwej Bhutia, IDC

The table of insects mentioned ants - a pest in all our homes, largely harmless except for the occasional bite of fire ants known to cause terrible itching. There are many times I have rued the presence of these pesky irritants in my home but never would I have imagined that there are as many as 25 different varieties of ants on campus! There are ones rejoicing under the name of *Yellow Crazy Ant*, or the *Black Crazy Ant* - what is with ants and the crazies? There is also the *Common Godzilla Ant*, is this the one with the humongous bite? And the *White Footed Ghost Ant*, in other words, even-if-you-cannot-see-me-we-will-still-get-you-ant.

(contd. overleaf)

REPORT

Spirit of Place: Tales from the Label Maker

(continued from page 5)

Moving to more pleasing specimens, the campus is home to five families of butterflies and 12 moth families. Among the butterflies Nymphalidae was the largest family with 27 species followed by Lycaenidae (23 species), Peridae (16 species), Hesperidae (13 species) and Papilionidae (7 species).

My son has a square green box with perforated holes in them. At some point we made the mistake of getting him a stick with a net and after that our peace was quite at an end. Although he had grand visions of himself as a great butterfly trapper, all he managed to catch most often were the occasional moths, grasshoppers and beetles. Come sundown he would return home with his daily offering trapped inside his green box and then dinner was eaten while observing the curious behaviour of various insects. Thankfully his young heart could not handle the sorrow of the idea that a baby insect hungry, frightened and alone was crying for its mother - the spiel we sold to cajole him to return his furry, many legged friends back into the wild.

There is increased human interference in the vegetated areas and that although the campus does have a suitable amount of vegetation; this increasing interference is disturbing the occurrence of wild mega fauna.

Next to the insects what scored highest in terms of varieties of species are the birds of which there are 104 species in total which were sighted and recorded. I am not a bird watcher but this campus has turned me into one. I can differentiate between house crows and jungle crows, between different kinds of Kites, recognise a Kingfisher, a Myna, a Koel, a Drongo or a Rose-ringed Parakeet. Not bad for a city slicker, I'd say.

The campus is also home to fish, amphibians and reptiles. We have monitor lizards, Brook's Gecko, and three families of snakes represented by four species and one unidentified snake. None of the snakes were common in the campus except for the Rat Snake which had a fairly good representation.

There is an old Rat Snake that lives in a hole at the bottom of a *Jamun* tree next to our home. Now I am not a snake lover, quite the opposite, in fact. But over the years we have learnt to peacefully co-exist and now when we get the occasional visitor from the 'city' visit we are quite fond pointing out our old venerable neighbour to be oohed and aahed over while I feign studied nonchalance.

We IIT Bombaywallahs are quite proud of our crocodiles and I think all of us secretly consider it to be the campus mascot - this honour should then be reserved for the Marsh Crocodile - the lone representative here of the Crocodylia family.

SALT 'N' PEPPER ■ DR. ARUN INAMDAR

'...Keeping in view the likely impact of this project on the environment, we've decided to shift it elsewhere...!
Yes..shift the environment elsewhere!'



The WWF report also stated that "although there were some interesting observations like the Rhesus Macaque, Hanuman Langur, Indian Grey Mongoose, Ruddy Mongoose, the Indian Flying Fox and the droppings of Civet Cat; the mammal diversity was not as expected in the campus".

I have always felt proud that ours is a sanctuary not just for the biped variety like you and me but also for other quadrupeds and wild animals. But with increased construction all over campus it is but natural that there are fewer and fewer places on campus that remains wild and free which an animal can all home. So it did not come as surprise to read about the "increased human interference in the vegetated areas" and that although the campus does have a suitable amount of vegetation; however the increasing interference is disturbing the occurrence of wild mega fauna.

The IIT Bombay campus has a mix biodiversity comprising of native, alien and invasive species. Of the 100 species 10 are floral species and the remaining 90 are fauna. Given that 645 species of flora and fauna were identified in the campus and 100 of these have protection status at several levels, it makes the campus a biodiversity hotspot. But how safe is it? We routinely destroy vegetation, cut undergrowth, and remove dead wood and logs and concrete over green patches in a bid for 'beautification'. Plastic bags are still disposed off indiscriminately, glass bottles (often alcoholic) are thrown away even in vegetated heavens like Soneri Baug. So how long will the campus remain a sanctuary?

When it comes to conservation, what the WWF report suggests is that instead of conceptualising conservation in terms of species we need an approach that seeks to protect the habitat of the species as there is little chance of them going extinct in their natural environment once it is safe. So the report recommendations are as follows:

1. The cutting of vegetation post monsoon season should be avoided as far as possible; this will help in increasing the bird population and some of the insect diversity as well. The campus has a rich diversity of Mycoflora which are the best recyclers of nutrients, however these recyclers are denied their role in the ecosystem due to the clearing up of dead logs in the campus.

There are some areas in the campus like the hill side where plantation of native species can be undertaken. Even if plantation is not undertaken, the existing flora can be conserved by avoiding construction in places that have a healthy plant life, eg. Kol Dongri and several patches in the academic section.

2. The control burning of grass along the Hill side should be replaced by fire lines if possible.

3. The campus has a large variety of exotic species. Though the existing exotic species should be allowed to grow, introducing and adding new species should be avoided in the campus as they are affecting the survival of native plants. Exotic plants provide food and shelter to a number of insects that are harmful to the native plants as well as human well being.

4. The nursery in the campus has a good number of exotic species of saplings which should be replaced by the native fruit and flower bearing species to increase the insect (butterfly) and bird life.

Moreover there are some areas in the campus like the hill side where plantation of native species can be undertaken.

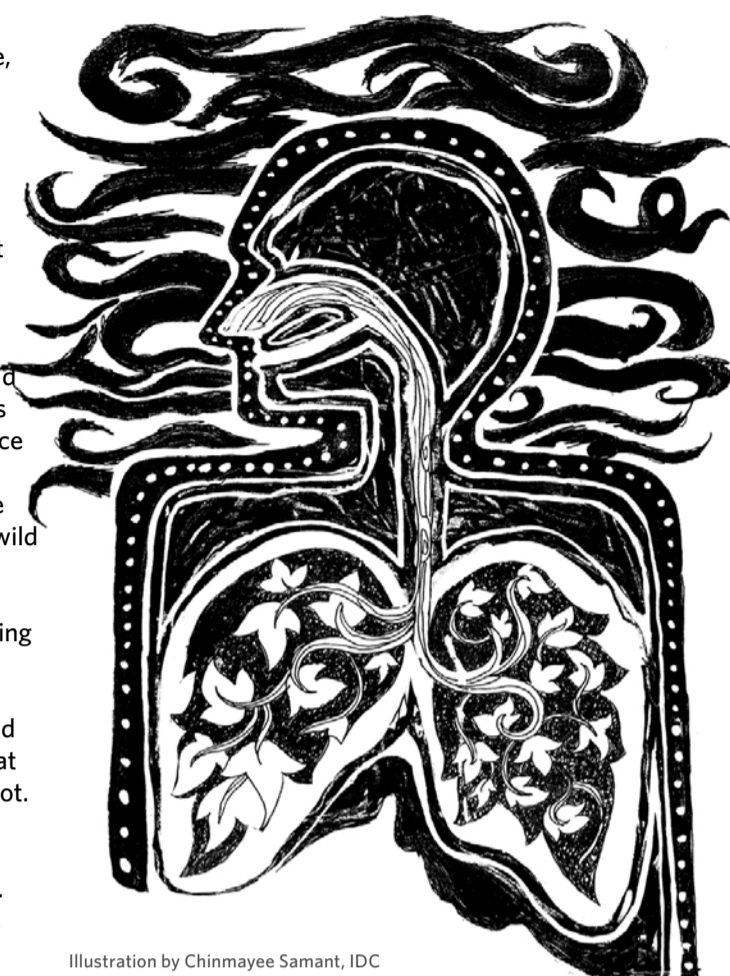


Illustration by Chinmayee Samant, IDC

The IIT Bombay campus has a mix biodiversity comprising of native, alien and invasive species. Of the 100 species 10 are floral species and the remaining 90 are fauna. Given that 645 species of flora and fauna were identified in the campus and 100 of these have protection status at several levels, it makes the campus a biodiversity hotspot.

Even if plantation is not undertaken, the existing flora can be conserved by avoiding construction in places that have a healthy plant life, eg. Kol Dongri and several patches in the academic section.

5. In several areas in the campus especially behind some of the laboratories, it was observed that the used as well as unused chemical bottles were disposed off, which can be hazardous to health and environment.

Measures should be employed to check such misuse of resources and if surroundings of the labs are found littered the occupants of that particular building should be fined and involved in a clean-up drive.

6. The area behind SAMEER is filled with plastic garbage. This region has a good diversity flora and fauna and increasing plastics is destroying the diversity. The plastic should be given off to rag pickers or some alternative should be devised.

7. The campus has several vegetated areas like Soneribaugh, Hill Side, Kol Dongri, Opp. SAIF, Opp. SAMEER that have rich biodiversity. These patches should be conserved. These can be enclosed by proper biological fences that will help the faunal movement at the same time restrict anthropogenic activities. The campus can have several interpretation zones e.g. butterfly zone, herb and shrub zone, bird watching zone, etc.

8. Of the several vegetated patches, Soneri Baug is the most diverse, in both the flora and fauna. However, easy access to this region is ruining the area of its richness. The road along the Soneri Baug should be closed for vehicular

traffic and the visitors should be prevented from carrying plastics, soft drinks or alcoholic beverages and littering the place.

9. It has been noticed that there are people who misuse the vegetated patches (Soneri Baug, Hill side) for alcohol parties, this should be stopped as the people leave the place in a very bad shape affecting the environment. Both the regions mentioned above have a check post at one end while the other end is freely accessible and open to all. This can be improved to prevent destruction of the existing flora and fauna.

10. During the study, it was also observed that along the Devi temple, Soneribaug and Kol Dongri, people are involved in trapping water birds, these individuals were some campus residents as well as outsiders. Though our team did speak to them and discouraged the activity, this should be continuously monitored and awareness should be created to conserve bird life.

One could go on and point out the numerous reasons why maintaining the unique biodiversity of our campus is so vital for all of us. Scientists would point out that a healthy biodiversity would provide us with many natural services. It would enable soil formation and protection, protect our water, enable nutrient storage and recycling, facilitate pollution breakdown and absorption and contribute to climate stability. Environmentalists would expound on its

There are some areas in the campus like the hill side where plantation of native species can be undertaken.

Even if plantation is not undertaken, the existing flora can be conserved by avoiding construction in places that have a healthy plant life, eg. Kol Dongri and several patches in the academic section.

importance in maintaining the diversity in genes, species and ecosystems while biologists would point out that although there might be 'survival of the fittest' amongst a given species, each species depends on the services provided by others to ensure survival. Engineers also take lessons from nature, to see how various species work, produce and consume resources, trying to mimic these amazing feats that millions of years of evolution have produced. I am neither a biologist, nor a scientist or an engineer. So I will end with just this - the label makers have finished their task. It is for us now, to see the spirit of our home and seek within for answers. ■

KEY EXCERPTS FROM THE WWF REPORT

As per the national and international wild life laws, the campus has 100 species which fall under different categories of protection. It is necessary, in the existing conditions, that whatever development takes place is done in a sustainable manner. Human needs of education and development may be considered or at times given a priority but not at the expense of the vulnerable flora and fauna. As per the old records and observations by campus residents - that the campus used to be visited by some large vertebrates - this was not the case during the present study. The reason is fragmentation of habitat and obstruction in the vegetated sectors marked during the present study can be accorded special protection and if any development is planned in these areas it should be reconsidered.



QUICK TAKES

Tales from my Backyard ■ PROF. G.C. DE (RETD.) Department of Electrical Engineering

Prof. G. C. De (Retd.), Department of Electrical Engineering, is a pioneering conservationist, wildlife enthusiast and birdwatcher extraordinaire; he was an inspiration for successive generations of students who interacted with him and turned them into avid nature enthusiasts themselves. On behalf of Raintree I am happy to introduce him to the campus community and to present a brief account of his recollections.

Introduction by **PROF. SHRISH WAGHULDE**, Department of Metallurgical Engineering and Material Sciences.

It seems to be a tall title and it's a hopeless task to fill its content, if the sprawling experiences of 30 years are to be packed in the span of 30 lines. However, let me try to fork out the first day of the place from the thick covers of dust and the settled flotsam of my memory stream. I wanted to know how to access IITB to report to duty on next Monday as the interview was held in the city some months back. But men in the city working in IBM had no idea except that Larsen and Turbo is on the banks of Powai lake and accessible by bus from Andheri station. IITB was equally unknown to folks around the L&T terminus and there was no vehicular track to move further. So I walked along the pipeline on a typical monsoon day in Powai. The first building, visible from the opening between the present day Hostels 3 and 4 was Staff Hostel, which was reached through a slushy track in a showery September.

In fact the campus was a glorified village in those days. There were none of the departmental buildings, Electrical Engineering, classes, labs and staff enclosures were confined to present day electrical workshop sheds. Teaching staff quarters, consisted of only B1- B6, and C1-C24 flats. Most of the faculty jostled in the Staff Hostel. The only asphalted road was possibly between Staff Hostel and Main Gate, strewn with lots of puddles and heaps of overflowing stilts. None of the roadside trees were there. In fact original plants consisted of Mango, Coconut and Date Palm trees beside the lake bank vegetation and wild groves of Soneri Baug, Kol Dongri, and the hill face of Hostel 1, which was the only student hostel at that time. None of the shops beyond the campus existed and the groceries used to come from Sion. Only a bus service to Vikhroli used to be provided by the Institute with 4 trips a day.

I used to climb, trek and even ski while I was abroad and had come to enjoy wild and raw nature. One summer, on campus, instead of sitting at home with academic work, I decided to walk to the banks of Vihar lake. On the way I was startled by the metallic shrill call of a long tailed bird, moving upward along the bare hill face beyond the pipeline. Next day it was the same experience at the same hour. I became curious and consulted Whistler's "Birds of India" from our Institute Library to identify it as the Indian Tree Pie. During that summer vacation, I started exploring the rich bird life of Powai. Gradually I became a serious field watcher, sanctified with a life membership of the Bombay Natural History Society.



Over the years my diary noted almost 200 birds, resident and migratory, of routine and rare occurrence at Powai and few others around Vihar, Tulsi and Kanheri. It tallied well with the observations of Salim Ali and Humayun Abdulali recorded in the book "Birds of Bombay and Salsette". Even the Orange-Headed Ground Thrush observed by them at Powai lake was found at the slushy mud flats off Soneri Baug after 40 years! The greatest thrill was stored when observing the breeding life of Tickell's flycatcher around the Chembur hillocks, presently harbouring the BARC Complex and remarked as an avian wonder as their normal breeding ground was upper reaches of the Western Ghats.

It is not only bird count that matters. There were many idyllic moments like watching about 500 ducks glibly floating on Powai lake off Kol Dongri in winter months, the commotion set forth by a sweeping falcon during their midday slumber, successful dives of Ospreys and exit with a pounder of fish in their talons, hunting of a wolf snake by a Crow Pheasant. The yearly visits of the same species at the same spot were like territorial enterprises. We observed nesting of some birds, for example, Red Wattled Lapwing at H-7, Rose-Ringed Parakeet at Soneri Baug, Black Drongo at Kol Dongri and another 5 species from B-3. Several partial studies were also done including one of the Pariah Kite near Metallurgical Engineering Department.

What about the presence of other animals? Among mammals, jackals and hares were found in abundance. Jackals' dens were found at Kol Dongri and at the hill top where I located my first love, the tree pie. Some rumors and lots of circumstantial evidence abounded regarding the presence of the Leopard in the forest between Vihar

Over the years my Diary noted almost 200 birds, resident and migratory, of routine and rare occurrence, at Powai and few others around Vihar, Tulsi and Kanheri.

and Kanheri. But all attempts to spot them by BNHS experts near the Deer park had ended in failure. Only in the eighties and the nineties were they spotted and caged in many places including in IITB.

So far as reptiles are concerned, there were crocodiles in all the three lakes, Monitor lizards near Vihar, turtles in Vihar lake and tiny tortoises in the pond near the Director's Bunglow. Several species of snakes were also noticed in our campus including Russel's Viper and Green Vipers. Amphibians were aplenty. Sensitive morning walkers along metalled roads would be appalled by the number of carcasses of toads and frogs caused by vehicular traffic of the previous night. I used to have unwanted green frogs, jumping into the rear room of the first floor B-3 flat through the balcony and the window repeatedly. One could not also miss the nuptial cacophony of toads from ponds and puddles at community weddings during the monsoons.

The campus was very rich in insect life. Unfortunately I did not take disciplined notice of it. My B-3 flat was a veritable watch tower with a secluded grove and pond in the rear. From my working table I could easily develop a representative collection of moths of Bombay over 20 years.

There is so much more that one could add but parsimony is a difficult art. ■

QUICK TAKES

Because there is no Planet B ■ SUSTAINABILITY CELL, IIT BOMBAY

We were wondering if there was a Wild Life Club of sorts still in existence on campus. Although we did not encounter a lot of success with that, we discovered a thriving Earth Club. The name sounded promising, so we went prospecting for Earth Club and discovered that what was once Earth Club had morphed into IIT Bombay's Sustainability Cell. The notion that "there is no planet B" is what brought a group of students together to bring about some change. Today, they are a committed and active group, propelled by the common value of sustainability. Apart from a lofty vision statement, their immediate aim and sphere of action in their own words is:

1. Achieving sustainability within the IIT Bombay campus and creating awareness for the same;
2. Spreading activities beyond the campus by assisting organizations (both govt. and non govt.) and industries.

They have an impressive array of partners including TERI, EMC (Environment Management Centre), and have undertaken some interesting projects. For instance, last year they organised "Eco Ganesha", a workshop to spread awareness about the pollution caused by Ganesha visarjan. Currently, they have just tabled a research report

on E-waste management with recommendations sent to the Computer Centre. There is also the project at Hostel-7 which has taken up the task to set up a Biogas plant to utilise kitchen waste to produce Biogas and replace the LPG as the cooking fuel.

Their website <http://iitbsustainabilitycell.wordpress.com/> has an attractive array of articles and an interesting poll underway. They are asking campusites to vote on which sustainability initiative they would like to see on campus. We have cast our votes. Please visit to cast your own. Join to become an agent of change. ■

QUICK TAKES

Once upon a Wild Life Club... ■ PROF. SHIRISH WAGHULDE Metallurgical Engg. and Material Sciences

This is an account that can easily start like a fairy tale, "once upon a time..." No fairy tale this, but once upon a time there was a Wildlife Club at IIT Bombay. If you look at old photographs of IIT Bombay you would notice that the campus appears barren. A Conservation Committee headed by Prof. G.C. De (EE) was responsible for much of the greening of the campus as we see it today.



The move towards a Wildlife Club began with an attempt to protect the wild and untrammelled marshes of Soneri Baug. The story goes like this: Around 1976, it was decided to build the Boat Club jetty at its present location in Soneri Baug. Kol Dongri and Soneri Baug were ear-marked as Conservation / no-development zones in the Campus Master plan as it existed then. It was also proposed that the access road be tarred and widened to accommodate 4 wheelers. The Conservation Committee did not see merit in making the jetty accessible to 4-wheelers and felt that such a move would disturb the ecology of the area. A group of students also supported this opinion and the Wildlife Club was formed. Seeing the growing interest in the club activities, the Students' Gymkhana formally nominated Ameet Zaveri as the first Wildlife Secretary for 1977-78. The post was converted into an elected one in 1978-79. Wildlife Club was given an independent budget under the Cultural Committee and it organised its first field trip to Melghat Tiger Reserve in the summer of 1978.

In the same year, based on the notes of Prof. De, the Wildlife Club published a checklist of birds of IITB. The list contained about 250 species - many of them migrants. Many students took to birdwatching and some of them kept regular records. A revised list, based on the sightings since 1978, published sometime in 1983, contained only about 180 species. Prof. G.C. De and Prof. A.S. Mahajan (PH) provided invaluable help and guidance to the club in its formative years.

Prof. G.C. De was a keen birdwatcher and had maintained meticulous records of birds seen in and around the campus. Noted ornithologists like Salim Ali and Humayun Abdulali would routinely ask him to accompany them on their trips in the area. Observations of the nesting habits of the Red-wattled Lapwing and the Pariah Kite were undertaken under the guidance of Prof. De.

In the eighties the students of the club prepared a checklist of butterflies and also of plants and shrubs in the area. The club also undertook the exercise of labeling the trees on campus. The canvas shoulder bag, which is so popular even today, was introduced to the campus in 1980 by the Wildlife Club.

Over the years the Wildlife Club gained in popularity among students. There were activities galore, nature walks and outings, screening of wildlife films, exhibitions, snake shows, and talks and slide-shows by renowned naturalists. The 13-part series, Life on Earth, by David Attenborough, was a regular feature of the orientation programme at the beginning of each academic year. Club members were also active in tree planting on campus and protests against indiscriminate tree-felling.

Nature enthusiasts used to regularly trek from IITB to Borivili via the Vihar Lake filtration plant and into the

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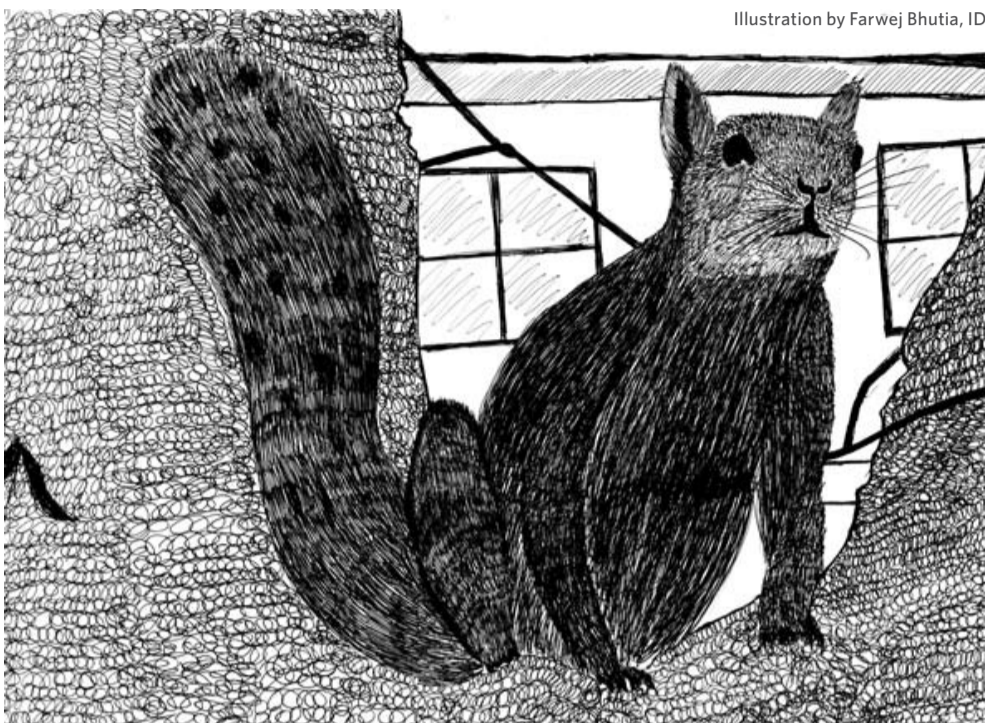


Illustration by Farwej Bhutia, IDC

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National Park for a day's outing. Birdwatching outings to Karnala Bird Sanctuary and Bhimashankar Sanctuary were organized from time to time. A field trip to a National Park or Wildlife Sanctuary was organised in each vacation. The activity became so popular that it culminated in the Symbiosis programme - five to six groups of 20-25 students were taken on field trips to a national park/wildlife sanctuary.

Field directors / forest officers of these parks were quite impressed and pleased with the reports sent to them after each of these field trips. The Chief Wildlife Warden of Jammu and Kashmir wrote: "I have gone through your report and in fact I am grateful for the keen interest evinced by you and the list you have prepared of the birds record will be of a great help to us in compilation of check list of birds for the various regions."

Reputation and credibility of the Wildlife Club grew and sometime in the mid 80's the field director of Ranthambhor National Park invited the club to participate in the annual tiger census. Subsequently, other national parks and sanctuaries also invited the club for their census.

The club also had developed roots that went beyond the IITB student community. Every year it organised nature walks in Soneri Baug/Kol Dongri for students of Campus School and Kendriya Vidyalaya.

In the monsoon of '83, a baby crocodile (about a foot long) had strayed into H-4 mess. It probably had been washed away with the overflow from Vihar lake. The mess workers caught it and decided to use a bucket as a temporary holding cell. But the croc was not too happy with his new cramped home. It snarled at every visitor and snapped at any hand foolish enough to try to touch it. Enthusiastic students tried to feed it on a diet of earthworms which got majestically rejected as a puny affair unworthy of the interest of a croc, even if a baby one. Finally it was decided to release the baby on the banks of Vihar lake. The surrogate parents watched anxiously while the baby lay on the banks bewildered or perhaps unable to believe its sudden stroke of good fortune. In the meanwhile kites had started circling overhead and the light was slowly starting to fade. Disheartened, as we got up to leave, the baby crocodile suddenly moved and, with nary a thank you, sprinted into the water and into the sunset never to be seen again. A happy ending worthy of a movie.

There are so many memories that stand out when it comes to campus wildlife. The 'happy family' of jackals - Pa, Ma and two kids that came visiting regularly outside H-7 in the late 80's. The sight of three crocodiles basking in the sun on the hot rocks in Kol Dongri and a Monitor Lizard on the H4 hill. Hares were common enough in Kol Dongri and

Soneri Baug and could be sighted even around Electrical Engineering and Metallurgical Engineering departments on quiet Sunday mornings. Watching White-bellied Fishing Eagles or the Ospreys fishing on the lake or the Black-winged Kite hovering above a prey near the pipe line were veritable treats for a birdwatcher.

Student interest in campus ecology went beyond just an interest in local flora and fauna and on occasion escalated into spontaneous action. In the late 80's, an International Pharma Congress was held on campus. The organisers chopped down many trees near the SAC to create parking areas. Overnight, posters with photographs of the massacre were put up all across the Institute. Next morning there was a spontaneous gathering of students who staged a silent protest march inside the Convocation hall during the inauguration of the Congress. It resulted in an apology and some tree plantation by the Congress organisers.

Watching White-bellied Fishing Eagles or the Ospreys fishing on the lake or the Black-winged Kite hovering above a prey near the pipe line were veritable treats for a birdwatcher.

The thick canopy of trees on the hill behind H-3 and H-4 was the product of true labour of love. Not only were saplings planted by students but for 2-3 years after that, they were watered round the year by students who physically carried water up the hill every evening. This particular initiative saw a terrific response from students so much so that there were times when there were more volunteers than jerry cans available and some had to wait till the others finished with their bit of watering.

The Club left a deeper impression on some students than on others. It inspired some to join the Indian Forest Service. One of them is a professor at the Wildlife Institute in Dehradun today.

It seems a pity that the once active Wildlife club is now a product of the past, when there is an even greater need for awareness and conservation within campus today. Last week we celebrated Earth Day while the truth is that we need to go on as if every day is Earth Day. We humans continue our so called march of progress and in the process seem to be leaving behind a ravaged mother earth. ■

THE WAY WE WERE

Of Swimming, Keys and Rupees ■ BAKUL DESAI Alumnus, B.Tech. (1982), Chemical Engineering

This is a story narrated by my pal Jetu featuring an eccentric bawa from the class of 83 named Rohinton Mewawalla aka Chikna.

I know that an “eccentric bawa” is a tautological statement; it’s like saying hot sun or cold ice or a four-legged dog or whatever. But this chikna fellow was clearly over the top. I still remember the hand-glider he tried to make and would see him carry it back to the hostel in a mutilated condition after he had crashed it on some hill or the other. Coming back to Jetu’s story, chikna was fond of swimming and Vihar Lake was his favourite pool. If you remember the fellow, he was slim, fair and the most “chikna” bawa compared to others from his tribe like Sharook, Irani, Kersi Dotiwalla, Khushroo, Lakdawala, Chikliwala, Rustom “quack” Sethna and Rustom Homi Sethna.

So this chikna, eccentric bawa Rohinton Mewawalla wore speedo swimming trunks that were a dazzling red and skimpy as a jock strap. One day, he heard that the authorities had started cracking down on all illegal swimmers who treated Vihar as their pool. The guys would come, confiscate the clothes of the swimmer if they lay on the bank and wait for the swimmer to reach ashore, bundle him off in a jeep, drive down to Andheri police station and leave him there to find his way home.

This was a really strong measure and scary enough to deter even the bravest but not for nothing was this chikna

known as Mr. Eccentric. His passion for swimming in Vihar was greater than the fear of even death penalty, leave alone something as petty as this. So what did he do? He stitched a pocket on the inside of his dazzling red skimpy jocks, put in a Re. 1 coin and his room key and walked to Vihar in his trunks and dived into its cold crocodile infested waters.

And did the inevitable happen? Yes, it did. There were no clothes to confiscate but the cops were glad to sit beside a gora, chikna, skimpy red speedo-ed bawa who would be their companion from Vihar to Andheri and it was with a heavy heart that they let him off at Andheri. And what did our intrepid friend do? Simple. He stood in a bus queue, boarded the 396 when it came, dug into the pocket of the skimpy, pulled out a coin and said casually to a flabbergasted conductor “Ek Powai”. I do not know the reactions of the amused bus passengers but there were several from those who espied him walking from the main gate back to H4, where he dug into the pocket of the skimpy yet again to retrieve his room key and finally disappear from vision.

(The name of Mr Chikna eccentric Bawa has been changed to protect his privacy)

This anecdote is a sneak preview from the forthcoming book, Madhouse: True stories from the inmates of Hostel 4, IIT Bombay. ■

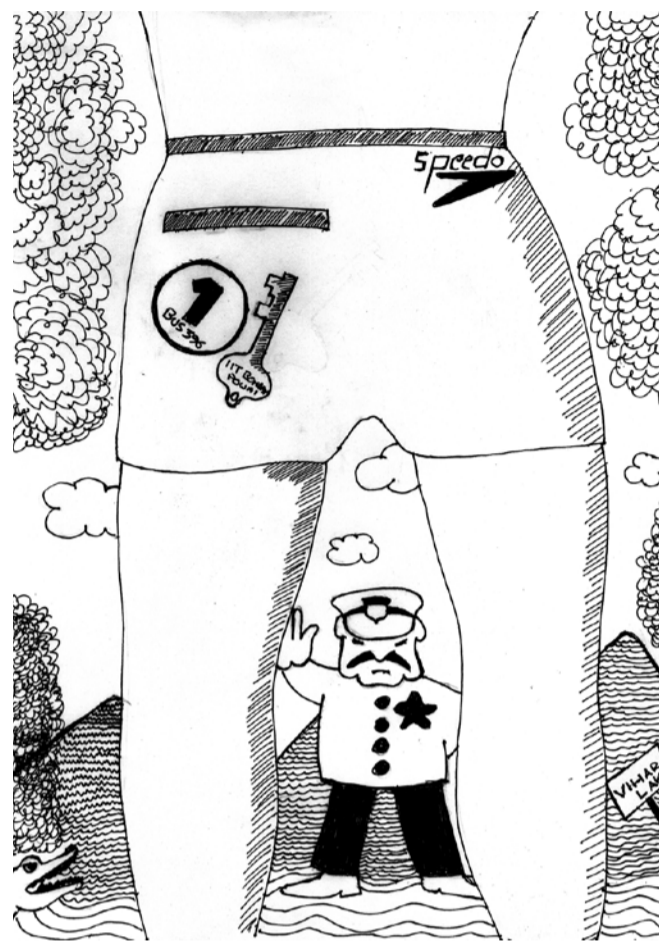


Illustration by Farweej Bhutia, IDC

HIDDEN CORNERS

Kol Dongri



Photograph by Venkat Damara, IDC

Picture yourself standing at a spot surrounded by a lake on three sides, the horizon beyond the watery expanse ribbed by hilly spurs, largely uninhabited, all around, and to your back, sprawling acres of near-pristine woodland, rich in flora and fauna, murmurous with birdsound...such was the south-western pocket of the campus from the 1970s until the turn of the century.

Secluded and tranquil, the near-idyllic patch went by the name of Kol Dongri. Kol Dongri still exists, but in a transformed avatar today, both in the prospect it offers and in its inner constitution. Though Powai Lake still laps at its shores, it’s grown a lot shallower and infested with weeds; to all sides the horizon is now cluttered with high-rise

buildings; the woodland itself is being fast eaten into by building construction.

One of the three principal areas of forested land on campus (Sonaribag and Vihar Dongri are the others), Kol Dongri was originally spread over some 40 acres of an oblong spur of land jutting into Powai Lake. One of the belts of teak forest straying out from the Borivli National Park to the north, the sequestered corner has been home to lofty forest trees such as mango, tamarind, red silk cotton (*Bombax malabarica*), haldu (*Adina cordifolia*), safed kuda (*Wrightia tinctoria*), pongam (*Pongamia glabra*), and coral tree (*Erythrina* species). The area is rich in bird life too, not least because the mudflats fringing Powai Lake

serve as transit camp (and also destination) for ducks, herons, and a number of waders along their migratory winter routes.

The campus is these days on an exponential ‘growth curve’, the numbers of students and staff sharply and continuously rising, new buildings coming up at a hectic pace. Kol Dongri, in all this, appears to be one of the sites targeted to accommodate the expansion. With H12, H13 and their extensions having come up there, already about a third of its original spread is lost, and there’s no saying what will come up next. So do go over and enjoy what’s left of this still-splendid nook before more of it is covered in concrete. ■

UPDATE

Eco-friendly Infrastructure for IIT Bombay

■ BAKUL RAO Associate Professor (Adjunct) CTARA

Resource management is no more simply a buzz-word or a fashionable seminar subject but a reality which is touching everyone by experience. Today's organised townships/housing complexes have a well structured site management/maintenance units to regulate and enforce guidelines concerning resource and waste management. Civic authorities, with all their resource limitations - natural and financial, provide limited assistance to such settlements.

With increasing population in the campus, IITB now like never before needs to look for a more integrated strategies for management of water, energy and material resources along with wastewater and solid waste. Hence the need for a built-in-infrastructure that promotes an eco-friendly style. Care is taken to make resource conservation schemes as far as is feasible in 'self-sustaining' schemes, thereby drawing upon less and less on amenities provided by civic authorities.

To manage the increased student population, infrastructure in the form of hostels, laboratories and classrooms are being built, which in turn is bound to increase the water and energy usage and solid waste and wastewater generation. However, the supply side of resources like water and energy have remained the same. Thus, IITB needs to apply the fundamentals of Eco-friendly Infrastructure and redesign for new resources supply and usage patterns. Eco-friendly infrastructure seeks to utilize renewable resources with a high level of efficiency and in a manner sustainable over future generations. Some of the areas where Eco-friendly infrastructure can be explored include:

- Recovery of water with either new or upgraded Sewage Treatment Plant (STP).
- Either roof-top or area rain water harvesting scheme to collect rainwater or recharge of aquifers (Stormwater drains channelling run-off rain water to Recharge Wells).
- Dual water Supply : Potable Water (for drinking, kitchen and bathing purposes) and Treated Water (recovered from STP for toilet flushing purpose).
- Parks and gardens maintained using treated water.
- Solid waste collection, processing and application of manure to enhance soil fertility.
- Gradual migration from tubelights to Compact Fluorescent Lamps in the campus and adoption of solar street lamps.

Eco-friendly infrastructure seeks to utilize renewable resources with a high level of efficiency and in a manner sustainable over future generations.

The feasibility of certain options need to be worked out. A lot of research work has already been carried out in IITB in developing technologies, which can be classified as eco-friendly infrastructure especially in the field of wastewater treatment and solid waste management by Prof. H.S. Shankar and Mrs. Aparna (Varsha) Inamdar.

SOIL BIOTECHNOLOGY OF IIT BOMBAY

Soil Biotechnology (SBT) work at IITB commenced in 1987 through initial support of the Department of Biotechnology, Government of India and is now covered by one US patent admitted, one US product patent awaited and two Indian patents pending. Respiration, mineral weathering and photosynthesis which are the fundamental reactions that sustain life on this planet have been built into the SBT developed by Prof. Shankar of Chemical Engineering.

SBT has been applied to treat sewage, agricultural produce waste, canteen waste and can also treat storm water & sewage purification for ground water recharge, drinking water purification including arsenic and iron removal, non chemical purification of swimming pools, hospital waste



Waiting to be recycled?

Photograph by Rangoli Garg, IDC

processing for - disposal, and air purification. SBT media is formulated from local primary minerals; geophagus worms regulate bacterial population as top carnivores of a forest. Additives also formulated from primary minerals serve to regulate pH. Suitable bacterial cultures are incorporated to take care of industrial chemicals. Photosynthesis provides the micro environment.

SBT is a bioengine for supplying oxygen consisting of 2 tanks (one for raw water and the other for treated water). The size of the bioreactor is such that it holds one day volume in both the tanks suitable for the organic load. The raw water is distributed through pipes and the whole process of purification occurs in a single pass. Thus only one feed pump is used and the energy consumption is low (0.03 kWh/cum compared to 0.3 kWh/cum or more in activated sludge). There are no moving parts and no bio-sludge for disposal. Added to this is the superior space & energy & cost intensity, evergreen ambience, applicable for small & large which make this technology user friendly.

In waste water purification respiration serves to remove oxygen demand, mineral weathering regulates pH and photosynthesis provides the micro habitat and the aesthetics to recover water. In SBT Arsenic (III) is oxidised to Arsenic (V) which is precipitated along with iron in a separate tank and thus effecting arsenic removal. In agriculture & soil production respiration serves to supply energy for soil processes, primary minerals regulate pH while photosynthesis draws the dissolved minerals from soil for plant production.

Oxygen transfer in SBT is higher compared to systems using power for oxygen transfers. The flow field varies from near mixed flow for short beds to near plug flow for

SBT has been applied to treat sewage, agricultural produce waste, canteen waste and can also treat storm water & sewage purification for ground water recharge, drinking water purification including arsenic and iron removal, non chemical purification of swimming pools, hospital waste processing for - disposal, and air purification.

A lot of research work has already been carried out in IITB in developing technologies, which can be classified as eco-friendly infrastructure especially in the field of wastewater treatment and solid waste management

deep beds. Hydraulic loads of 0.5 cum/sqm day is typical although upto 2 cum/sqm can be obtained. Organic loading of 0.2 kg/sqm day is typical although upto 0.5 kg/sqm day is achieved. Mesophylic life of SBT facility can be open to atmosphere in warm climates, with closures & temperature control in cold climates and multiple levels for space limiting environments. One hectare can purify a) 5.0 MLD of sewage to Class A primary water quality, b) 5 MLD of drinking water and additionally remove arsenic & iron, reduce bacterial levels by 7-8 log orders. Similarly process 30 ton/d organic municipal solids to rich soil in a 3 hectare evergreen farm. SBT environment, however, cannot handle salinity > 2000 micromhos/cm or 1500 mg/L salts. Many plants have been set up and it has been found that in some cases failures have occurred because of the overloading only.

VERMICULTURE FOR SOLID WASTE MANAGEMENT

Mrs. Inamdar a trained immunologist while working with Prof. Shankar on waste recycling as a microbiologist came in touch with Prof. Bawalkar and was impressed with the vermi-culture technology. She started her experimentation in the multi storey C type building where she was staying and could convince her friends and neighbours to segregate the solid waste at a time in 1993 when the Municipal Solid Waste Management Handling Rules were not there.

The technology she adopted was that of Vermi-culture which unlike Vermi composting uses deep burrowing earthworms '*Polypheretima elongata*'. Most of the times the earthworms used in Vermi-composting are imported species which are less resilient to the temperatures and humidity conditions of our country. Also, the earthworms used in Vermi-composting ingest the solid waste and are thus susceptible to any toxic material. In Vermi-culture the indigenous earthworms maintain aerobic conditions in the soil columns through their burrowing activities and bring about complete stabilization of the waste with the help of beneficial micro-flora.

(contd. overleaf)

UPDATE

Eco-friendly Infrastructure for IIT Bombay

In the absence of such aerobic conditions, the organic matter decomposes anaerobically resulting in the formation of foul smelling compounds.

The most important advantage of 'Vermiculture Biotechnology' with deep burrowing earthworms is that these earthworms, being sensitive to light, always remain hidden underground. Hence, waste processing can be done safely at individual household or housing society level without even a hint of earthworm presence (which may not aesthetically appeal some people). The product of vermiprocessing - 'Vermiculture' - contains not only earthworm cocoons, but several plant nutrients and beneficial micro-flora as well, which are responsible for making nutrients available to the plants on 'need basis' unlike in case of chemical fertilizers.

The versatility of the vermi-beds can be a boon to apply the technology for IIT residential and hostel complexes.

Processing of organics/solid waste is carried out in a vermibed. Such a vermibed could comprise a simple earthen pot, a pit dug in the soil or a bin constructed over the land depending upon the amount of solid waste and land available. The bed consists of a layer of broken bricks or limestone at the bottom followed by a 4-6"

soil bed and then a layer of culture. Normally, it takes about 3-4 weeks for the earthworms to come out of the cocoons (incubation). After this, the bed is ready to receive organics on a daily basis. The day to day solid waste generated can be added in layer (about 2-3" layer) followed by the garden waste (cuttings and leaves). A right amount of humidity needs to be maintained to help in degradation, but flooding needs to be avoided as it could lead to anaerobic conditions resulting in foul smell.

Advantages of using 'deep borrowing' species are that being local species they are low maintenance and protect themselves from field conditions and predation and require no external additives while processing. These earthworms process large variety of organics and have the capability to work even in temperatures as high as 40°C and are known to have long life (12-15 years).

Vermi-culture has been carried out at various industrial and residential places to cater to different types of waste including residential solid waste, kitchen waste and canteen wastes. Various types of vermibeds including earthen pots to over ground constructed beds with drainages have been tried. The versatility of the vermibeds can be a boon to apply the technology for IIT residential and hostel complexes.

The above mentioned work in field of wastewater treatment and solid waste management have been well appreciated outside the campus. Efforts for making IIT an Eco-friendly campus can be initiated by trying to adopt/

(continued from page 11)



Photograph by Rangoli Garg, IDC

adapt these technologies into our context. Though some efforts have been taken more on an individual basis, it is important to scale up the effort. Also, as mentioned earlier it would important to develop an integrated plan for the campus where resource conservation and recycling measures are integral part of the development of the campus to cater to the future needs. ■

PERSONALITY

Decoding Simple

Interview with **PROF. SANTOSH KUMAR GUPTA** Chemical Engineering Department

For this young boy, from a typical middle-class, business family of Allahabad, life had already been charted by his grandfather. He was to study Arts or Science, appear for the Civil Services Entrance Exam and become an IAS officer. He didn't have any plans and this seemed like a good plan till a close family friend told them about a new IIT coming up in Kanpur, not too far from Allahabad. He got through JEE in his first attempt and after spending three days at the campus, packed his bags to never return again.

An uproar among his friends followed this incident. He gave in and wrote the exam again. This time, the zonal JEE topper of 1963, he came with stronger conviction and stayed on to become Prof. Santosh Kumar Gupta as a lot of us know him today. A faculty member in the Chemical Engineering Department at IIT Kanpur from 1973 to 2008, he has been a professor at IIT Bombay since 2008.

He has won many awards and accolades. Prof. Gupta is a Fellow of the Indian Academy of Sciences, Bangalore; the National Academy of Sciences, Allahabad, India; and the Indian National Academy of Engineering, New Delhi. He is a recipient of the Herdillia Award of the Indian Institute of Chemical Engineers for Excellence in Basic Research in Chemical Engineering. He has served as Visiting Professor at the University of Notre Dame, the National University of Singapore and the University of Wisconsin, Madison. He occupies the L&T Chair at IIT Bombay.

I travelled to and from Ajmer with him for the JEE exam. His memory is razor sharp and he has vast and terrifying knowledge of all things relevant, obscure and, obtuse. He has abundant energy, sleeps little and can tirelessly go on for hours. He's talkative, entertaining and enjoys storytelling.

To sneak-a-peek into the professor's mind, here is a transcript of a free-wheeling conversation with him. Is it straight and uncluttered or a complicated maze?

Introduction by **JAYA JOSHI**

What made you run away from IIT Kanpur the first time?

I came from a strict no-onion-no-garlic eating family. Most hostel canteens didn't, and still don't, follow these restrictions. I couldn't understand why. So I couldn't take the food. Living away from home was also something I couldn't come to terms with and then, of course, there was the ragging.

But then you went back the second time as a zonal JEE topper. What was that like?

This time, I was better prepared. Also I knew that I didn't have the choice of returning home. IIT Kanpur had just started its new campus at Kalyanpur. Earlier it was housed at the Hartcourt Butler Technological Institute (HBTI), Kanpur, just the way the new campuses are going about now. Our batch was the fourth batch and we were the first to undergo the American semester system with grade wise passing and promotion with all American books like Sienko and Plane for Chemistry, Thomas for Mathematics and Resnick and Halliday (1st Ed) for Physics. We also had a lot of American visiting professors. It was good.

As far as being a JEE topper is concerned, well, someone had to be one. But things were different then. The country was divided in to five zones and we didn't have All India ranking (AIR) at that time.

How was that different?

With the zonal system of ranking, each IIT had to reserve a certain number seats for all other IITs. Suppose you wanted Mechanical and Mechanical seats were already filled at IIT Kanpur, you could still get Mechanical at IIT Bombay through its Kanpur quota. I think this was a healthy practice and I regret that it has changed now.

Now, the IITs have almost become regional in terms of the population mix. With the AIR system in place, the farthest the students have come from in Chemical Engineering department at IIT Kanpur is Bhopal or Jaipur. All others are either from UP or Bihar. In my batch there were people from Bombay, down South and the East. It was a great mix. This cultural mix is good education as it allows people to



Photographs by Venkat Damara, IDC

be sensitive to each other. Bombay is relatively lucky, but if you look at Delhi, Madras or Kharagpur, I doubt if they would have too many kids from other states joining. I've been talking to Directors of IITs about this and I hope that we either go back to the earlier system or find some other method to get a balanced mix in each IIT.

So Mechanical, I understand, was for the top rankers those days. Did you choose Mechanical or was it always Chemical from the beginning?

I took Mechanical as was expected of me. We had a

different curriculum then. For the first three years, it didn't matter if you came from Mechanical or Chemical department as all the students had to take a common 'core' programme in Engineering. In my third year, I chose to change my department from Mechanical to Chemical.

Why?

(laughs) Well now when I look back, the reasons were silly and funny. The faculty in Chemical Engineering department were known to be friendly and warm and that was not the *image* of the faculty at Mechanical at that time. Things are different now. And also Chemical did not have any stigma attached to it. Bhopal had not yet happened, so Chemical with its friendly teachers seemed more attractive to me over the apparently stern Mechanical. And I chose Chemical.

Now, the IITs have almost become regional in terms of the population mix. With the AIR system in place, the farthest the students have come from in Chemical Engineering department at IIT Kanpur is Bhopal or Jaipur. All others are either from UP or Bihar.

Just like that?

Just like that. I didn't know if I was following a dream or passion then. That, I think, builds with time. Life took a turn, friendly teachers became the reason and I just went along. I was so convincingly engaged with my work that I never went back on that decision...never even reflected on that decision. A lot of times, and I think most of the times, life comes to you and you have to learn to be happy and take it on without regrets. And I was happy.

So it must've been good then?

I think so.

I'm going to dwell a little more on Chemical Engineering. What is it about the branch that led you to do research in it after your Undergraduate course and then join academics?

In 1968, it was a sort of dream for most of my peers to study abroad. In my batch, of the 165 or so who graduated, almost half of them went abroad for further studies. When I had gone to do my PhD, I didn't have any visions of being a professor. It was my PhD advisor, Bill Forsman at the University of Pennsylvania, Philadelphia, who kept pushing me to join academics after my PhD. I applied to IIT Kanpur and got a job. I slowly got absorbed in it and continued to do things I should've done and were expected of me. And the decisions taken over a period of time for whatever reasons turned out to be right decisions. I mean, I don't think I ever had any epiphany or a spiritual flash about where I saw myself in 10 years time.

Some of your batch mates must've joined the industry.

Why did you think of doing a Ph.D?

I guess I was a good student. And at that time we didn't have options of doing research in the industry like we have now.

How old were you when you started teaching?

I was 27.

You've been in academics teaching and pursuing research for 37 years. I'm going to come to research later, but first I want to talk about teaching. What is your teaching philosophy?

When I joined IIT Kanpur, Prof. Arvind P. Kudchadkar (who retired as Deputy Director at IIT Bombay later) was the HOD of Chemical Engineering there. He assigned me a course on Applied Fluid Mechanics to teach. This course had nothing to do with my Research area on Statistical Mechanics/Thermodynamics. After a few days of teaching, a group of students went to him and complained about my teaching. Arvind sensed that I was too strict and did not smile enough and advised me accordingly. Now, it was my first year. I was tense and nervous and to be able to deliver a lecture seemed good enough for me. I don't think I thought too much about niceties like smiling at that

time. So that was good advice. My teaching philosophy, over the years has been to become a friend and a mentor.

Are you happy with the quality of students?

The quality of PG students has improved significantly over the years. The commitment (*not* quality) of the UGs has started waning unfortunately, because they're capable of so much more. You'll be surprised to know that my first fifty papers were all from UG students. In the 70s, a typical aspiration for a higher ranking B.Tech. student was to go abroad and pursue research. But now the UG students have their own dreams. The motivation to do research is lesser now. One of my UG students had three research papers (very highly cited), from his work with me. Similarly, an Indonesian UG student at Notre Dame also had three research papers with me.

What's your research philosophy?

After so many years, I look at research as a service to my students now. I enjoy nurturing them into doing things themselves. In that process, if they also write a few papers, it's great, but it's primarily to elevate their standards. Unlike teaching, which is a more 'me to them' process, in research, *they do* and I guide them in doing. So it's more active learning. This is the time when they learn evolve as good scientists and engineers. My job is to make it as exciting as possible.

You have won many awards and fellowships. How do you view your achievements in academics, research and life?

I get satisfaction from my research, teaching and comments on my teaching. Rest everything is pretty much incidental.

Have these helped you in any way?

I don't think so. It just gives you a little ego trip. How can they help? You don't get anything extra because of these things. At my age, I don't need anything anymore. The Chair Professorship I got from IIT Bombay is great, but I really don't need extra money since I am well settled. The sixth pay commission was very kind.

So, what did you think when the faculty went on strike to protest the sixth pay commission?

I'm sure they had their reasons. Can't comment on their behalf.

The quality of PG students has improved significantly over the years. The commitment (not quality) of the UGs has started waning.

Did you go on strike?

No. But I was with them. I feel we're losing good people to the industry and that's not good for the academic sector. When I joined, there was no choice. Academics was the only choice for PhDs. It's not like that anymore. Very few research organisations existed in the 70s. Things have changed now. Three of my recent PhDs joined R&D organisations because they knew they could do things that were creative and also get paid for it. This option was not there in the 70s. If we want to attract and keep young academics, we will have to give them money and I still think we have not done justice to them. I wish the recommendations of the sixth pay commission were better, at least for the younger faculty. With the foreign universities coming in, this problem will only intensify. If these universities decide to introduce an M. Tech. or a PhD programme, we are bound to see troubled times ahead. On the other hand, if they want to be like most other private engineering colleges in India with just a UG programme, then things will be different, because there are still many people who like to do research and may not care for the big monies.

So now that you've spent time both in IIT Bombay and Kanpur. How do the two institutes compare with each other?

I can only speak of the Chemical Engineering Department, because that's where most of my time has gone. I'm happy here. It's a great department. It has very good young (and older) faculty. They produce research of excellent quality. The only thing is that on a per-head basis, Kanpur (Chemical) has been producing more.



What are the strengths and weaknesses of both places?

Infrastructure and resource wise, and in terms of quality of research produced, both institutes are at par. The IIT at Kanpur carries a bit of regional baggage that comes with being in a city in Uttar Pradesh. Here, the culture is more cosmopolitan. Academically, however, there could be higher productivity in terms of number of papers per head per year. There are almost fifty M. Tech. students taken every year. I don't think they are driven hard enough in Bombay. In Kanpur, we stretch their limits like crazy. My M.Tech. students in Kanpur produce about two papers each and some are very highly cited. I don't think that average exists over here. From the 50 students, if we can get even one research paper each, we'd have 50 more papers from the department every year.

What do you recommend?

I've said before that they have to tailor the M. Tech. programme towards research. All my life, till 7 years ago, I've only produced 1 full PhD and 2 shared PhDs. In the last 5-7 years I've had 5. So a department can excel even if there are not too many PhD students. Of course, doing research with PhDs is always more efficient. Most of my papers have come from B.Techs. and M. Techs.

We have to think about attracting more people to higher education. While at IITB, I have given seminars on the importance of higher education because the next generation will need research oriented higher education and there are good, well-paying jobs available for them. We have to tell the UG students outside of the IIT system that the next generation has to get into knowledge production. The jobs we're doing right now will require improved knowledge and skills.

So doing an M.Tech. and a PhD and doing it seriously should help their generation. It may not have helped them in my generation, but in their generation, it will definitely take them places. One of my M.Tech. students, who's graduating from IITB soon, was interviewed by Bechtel, and all he was asked was about the research he was doing here. Which means the thinking is changing in the industry. They want people to bother only about research. It will only get better with time. But this message has to be spread.

If he wouldn't have changed from Mechanical to Chemical Engineering, we would've lost out on one of the four most important contributions made by Chemical Engineers in the world in the area of evolutionary algorithms. His jumping gene adaptation of genetic algorithms has helped reduce computational effort and is used not only by scientists in the field but also outside it. This of course is just one of his many achievements. When you look at him and his work today, you see a man committed to the cause of Chemical Engineering. Each time I probed him about his passion in this field, I expected some kind of a drama or revelation. I didn't get any. All I got was the sketch of a man who simply followed whatever life presented with least resistance and made the most of it. Sounds simple. But can be just the opposite. We know it well that it takes special skills to retain the simplicity implicit in simple. ■

UPDATE

Find me the River: Mithi Blues

■ JANAK DAFTARY Alumnus, B.Tech. (1975), Electrical Engineering

In a list of campus ecological assets, IITB alumni would immediately think of the Powai and Vihar lakes as the toppers. The supporting cast would include the greens in the campus and the hills surrounding it, ignoring for the moment the micro (and other) waves emanating from some perpetually-stressed alumni. The Mithi river would figure in the margins, if at all. Actually, Mithi is nature's beautifully crafted production based on these lakes, hills and dales. She pours into the sea at Mahim, with a runway of about 15 km, more devious than a typical electrical machines exam paper. In an impertinent but salient personal recap, I have to say that many, many hours of studying the rain over Powai Lake from H1 to H7 from my room had been at the expense of electrical engineering fundas.

In a list of campus ecological assets the Mithi river would figure in the margins, if at all.

Hydrologically, the Mithi originates with overflow of Tulsi lake waters into Vihar, and combined with overflow from the Powai barrage, the river hits the streets of the city somewhere behind NITIE. She is the provider to the huge mangrove-mudflat-marine eco-system along her meandering traverse, bringing in tidal sea-water for nourishment. She used to offer a rare species of prawn which was sought by international gourmets, apart from the regular fish, crabs, et al. Fisher folk in the suburbs would manage a handsome catch merely by hauling in fish with baskets. Generations of youngsters would frolic and revel in the waters, before the advent of spas, Jacuzzi and saunas. Transport also plied on the river. Alas and alack, development (read technology) caught up, reducing Mithi to its current polluted, toxic and constrained form.

Much reviled for her falsely alleged contribution to the flooding after the '05 deluge, Mithi is the only river in the world whose mouth is smaller than her girth. The common perception attributing damage does not factor in the 3 course-changing-90 degree-bends inflicted on her to facilitate the runway expansion. Nor is it polite to point out in high society the massive reduction in rain-water percolation due to extensive "complex" development on the hill outside campus.



Before the prolific builder destroyed vegetation and paved the hillside ensuring the precipitation runs pell-mell into the Powai Lake in hours, nature had provided percolation to recharge the lake over months – not over but under the Adi Shankaracharya Marg. And we all know where the flood waters in Powai went during the deluge.

But there is good news yet. Activists, your chronicler included, are endeavoring through PILs to remove walls/encroachments and stymie destructive 'beautification schemes' initiated by government agencies.

There is also a nascent people's movement which has been on several Mithi Yatras. The Mithi Nadi Sansad has been formed under the leadership of Shri Rajendra Singh, Magsaysay and Stockholm Water Awardee, aka Jalpurush (waterman) of India. On 21st March'10, the eve of the World

Water Day, a motley group of Mumbai public (not too many, it's the country's financial capital after all) even on Sunday celebrated with a "wild river dance" on the Mithi in sync with the international rivers' world-wide event. Read about it on the following links:
<http://www.hindustantimes.com/News-Feed/mumbai/Choked-Mithi-joins-world-river-conscience/Article1-521807.aspx>
<http://www.indianexpress.com/news/To-save-Mithi--city-dances-on-riverside/593806>

Campus residents wishing to add up/get involved can mail to: mithiyatra@jalsangrah.org.

In conclusion, I'm happy to observe that the campus view from the MB terrace is now more tree-tops than in the seventies, jai ho, campus ecology. ■



QUICK TAKE

The key is ME ■ PROF. MAHESH PATIL Department of Electrical Engineering

Shailesh Gandhi, the famous RTI activist (and an IIT alumna) uses the following argument to prod people into using the right to information to improve at least their immediate neighbourhood. Say, you spend X hours per week in plain complaining (cribbing) about things like corruption, negligence, etc. Now, suppose you stop that activity, but spend $0.1 \times X$ hours instead, to file RTIs on the same topics that you used to complain about. What is the net effect? You save $0.9 \times X$ hours. More importantly, you have made a real difference because of your RTI applications.

Simple logic, but it is so relevant in so many ways. Environment is not just the trees and the birds; it is a whole lot more than that. There are things that each of us can do to minimise our environmental footprint that involves materials and energy required to make things, fuel required to transport things (and the associated contribution to global warming), transport of things to a garbage dump, and so on. It is best illustrated with examples that we can connect with in this campus:

Environment is not just the trees and the birds; it is a whole lot more than that, and there are things that each of us can do to minimize our environmental footprint which involves materials and energy required to make things.

I consume on an average two cups of tea/coffee per day in one of the tea stalls on campus, amounting to some 600 cups a year. If I take my own cup even one out of two times, I save 300 paper/plastic cups a year. Multiply that by 1000 (no. of people who drink two cups a day), and the number becomes 300,000! Significant, isn't it?

How does it help the environment? One, the material (paper/plastic) and the energy to make the material is saved. Second, fuel required to transport the cups (and to transport the used cups to a garbage dump) is saved. Third, if it is a plastic cup, it would have left a permanent mark on the environment since plastic is not biodegradable.

Of course, on the negative side is the energy and material used for my porcelain cup, but it is obvious even to a layman that it is very small compared to 300 disposable cups (and even smaller if the porcelain cup lasts more than a year). If there is enough pressure from customers, the coffee shop owner too will start providing porcelain cups.

When I shop for vegetables, I need about ten plastic bags every time. The shopkeeper is legally not supposed to give thin plastic bags to me, but he gives them anyway. There is a fine of Rs. 5000 even for carrying a plastic bag less than 50 microns thick, but I know that I will not be caught, so I don't care either.

Say, I shop once in three days. That comes to 1200 plastic bags per year! Where do all these plastic bags end up? In the drains or in garbage dumps. I may imagine that the bags I throw are picked up by a rag-picker and are recycled. But it turns out that the cost of making a new bag by melting an old one is much higher than making a fresh bag, so the chances are, my bags will simply end up in a dump or a drain.

If I recycle 90% of the bags I use, the number comes down to 120 a year, a dramatic reduction in my eco footprint. Sure, I would then have to plan my shopping a little better, take the old plastic bags or cloth bags with me. Not impossible.

There are several other things each of us can do: switch off lights (and ACs) when not in use, save water in washing cars (using a bucket rather than a pipe can save hundreds

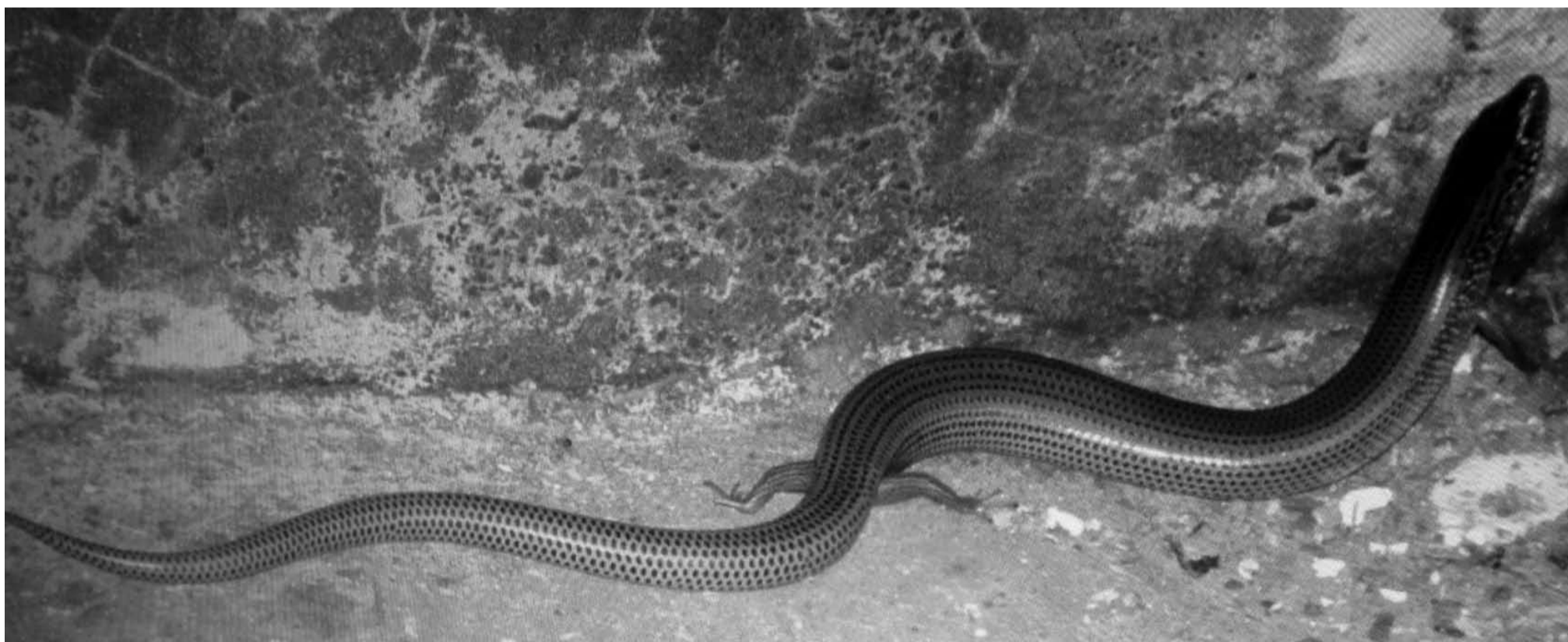


of litres per wash), re-use paper (write on the blank side of a used sheet rather than taking a fresh sheet), save water while washing utensils, walk/cycle to the office (it is good for health, too!), and so on.

Last but not the least, let us stop saying, "nothing is going to change." That is what people say when they want to shrug their responsibility. Let us say instead, "OK. Things are bad, but the change starts with ME. Let me reduce my own footprint, try to convince others to do the same, object to things that are obviously wasteful or uncalled for, and slowly but surely, make a difference."

Of course, we live in a world that seems to demand more out of us than it did fifty years ago, and we may ask: where is the time to worry about plastic bags and water? But time can be created (no, not in the pure physics sense) if we cut down somewhere, e.g., X hours of cribbing that Shailesh Gandhi talks about! ■

IN THE WILDERNESS



Pictured here is the snake skink, *Riopa punctata*, a slender, elongated skink with feeble limbs, so sinuous that it is often mistaken for a snake. As it spends most

of its life underground, it isn't often seen and remains a mysterious creature to science, its habits being little known; we are certainly lucky to have it on campus.

Photo: Robin Jess, M.Tech, Department of Aerospace Engineering

FEATURE

Music – For Ears of all Years ■ NEHA CHAUDHURI Campus Resident

The Cell for Human Values at IITB cultivates the five universal values– Right Conduct, Peace, Truth, Love, and Non-Violence in any campusite who shows an interest to nurture them. Everyone is welcome to come and share their experiences, help and find peace of mind, and foster a deeper purpose for living. To this end, Drupad Sansar – a mild, quiet pocket facing the Powai Lake and one of the places from which the Cell operates – has come alive lately with strains of classical Indian music. All thanks to Pandit Nayan Ghosh's presence in IITB since October 2009.

It took a couple of years of persuasion from a couple of professors for the renowned maestro to take such a plunge – to set up camp at IITB two days a week and teach four disciplines in classical music singlehandedly – tabla, sitar, vocal and musicology/music appreciation; not that he's a difficult man to require such extensive persuasion – just someone who has had his hands full with teaching, training and research as the Principal and trustee of the Sangit Mahabharti. His hands are fuller now. But he tells me that being at IITB is a pleasure, chiefly because of the enthusiasm, sincerity and focus of the people he has come across.

Swanand Khare, a research scholar in Department of Electrical Engineering, and a student of Panditji says "When the notice came up for the first time that Pt. Nayan Ghosh will be teaching music, I was ecstatic. I don't have formal training, but I am a big fan of Indian classical music. I never thought that I would be able to learn from one of the greatest musicians. After registering at Drupad Sansar, we had an interaction session with Panditji. I was very nervous in the beginning. However, after the first session everything changed. The way he talked to us and encouraged us made me feel at ease. He was very supportive and open to ideas about how the course might be conducted. Consequently, we were divided into batches according to our background in music and classes began. The way he conducted classes for the beginners was amazing. It was evident, from the way he taught us, that we were in for a course that would have a lasting impact."

"He is one of the foremost musicians of the country with equal proficiency in tabla and sitar. Being an instrumentalist, Panditji brings forth intricate issues in raagdari – the art of unfolding a raaga."



Illustration by Samiksha Deshmukh, Kendriya Vidyalaya, IIT Bombay



"IITians really stand out," Pt. Ghosh tells me patiently over the phone, "in sincerity and simplicity. Dedication and commitment are the hallmarks that distinguish them from all others I meet." I can sense honest pleasure in his voice. "When you talk to the students here, what strikes you most is that they are unaffected by the glitz of Mumbai culture. In a city where it's so easy to get carried away with the current and let it drive you any which way, the students here are a focused lot. They know all that is going on outside campus walls, but it doesn't distract them from their goals."

Prof. Pushpak Bhattacharyya, from the Department of Computer Science & Engineering, takes classes for vocal music and has only high praise for Pandit Ghosh: "He is one of the foremost musicians of the country with equal proficiency in tabla and sitar. Being an instrumentalist, Panditji brings forth intricate issues in raagdari – the art of unfolding a raaga. This is indeed a unique experience. He also has an immense repertoire of rarely heard ancient *bandishes*. Learning those *bandishes* again is very elevating. Overall, a musical session with Panditji does immense good to one's musical skill and repertoire, soul and consciousness."

Elaborating on Prof. Bhattacharyya's point, Swanand goes on to say, "The rare *bandishes* he teaches from his collections are age old classics composed by the likes of Tansen, Ustad Ghulam Hussein Khan, Gurudev Dynaprakash Ghosh, Ustad Allaaddin Khan. The appreciation batches are also very interesting and popular among students. Initially, he discussed the history and evolution of Indian classical music. Now we have listening sessions wherein CDs and cassettes of great maestros are played in class. Panditji tells us about those musicians and their expertise. He also helps us understand different styles of these musicians and their contributions to Indian classical music."

But ask Panditji about what he likes here, and he's prompt to tell you that apart from the students, *Drupad Sansar*

Sometimes Panditji talks about the history of classical music and biographies of its legends. This is the only history lecture I am comfortable with!

"What is really satisfying," Panditji says, "is that you can see the students try very hard to attend every single class. They are passionate about learning music."

is one of the most ideal places to teach and learn music. Nestled among trees, overlooking the lake, bursting with bird-chatter in the mornings and evenings – it's a serene venue for creating one's own rhythms of harmony. The eagerness of his students to learn – whether they be salt-and-pepper professors, young children from Kendriya Vidyalaya or young adults from IITB – delights him. Such an eclectic mix of students only spurs on the enthusiasm to teach and learn, to share the love of music and to spread classical music far and wide on our little island.

Another student, Jai Narayan Tripathi says with a smile that "...sometimes Panditji talks about the history of classical music and biographies of its legends. This is the only history lecture I am comfortable with!" He also adds that Panditji, "is very helpful and caring when it comes to buying instruments for students. Recently, he ordered a harmonium for me and he himself checked it ensuring that it was of the best quality. He is tech-savvy and you can find his regular updates on Facebook."

Query Pandit Ghosh about the general opinion of classical music in today's India and he's sad to say that most important authorities in the modern time on Indian classical music might as well be foreigners – Americans, Germans and British – with the kind of dedication they show in learning it. And that soon, if our children want to learn about our culture, they'll have to go abroad. Interest in classical music in India has been drastically overshadowed by the Bollywood culture – its glamour and short-lived fame. Reality shows on music and singers on television striving to sing only Bollywood songs – for fame or money – has further coloured people's opinions about the art of singing and appreciating music. "But, IITians are different. They know all this and yet are unaffected by it. Some of the students here are really committed. And I feel very happy about that."

"What is really satisfying," Panditji says, "is that you can see the students try very hard to attend every single class. They are passionate about learning music. That's why it has

Query Pandit Ghosh about the general opinion of classical music in today's India and he's sad to say that most important authorities in the modern time on Indian classical music might as well be foreigners - Americans, Germans and British - with the kind of dedication they show in learning it. And that soon, if our children want to learn about our culture, they'll have to go abroad.

been possible to accomplish such intensive training. For example, at Sangit Mahabharti, what we teach over nine-ten months is what students have learnt here in five months."

"I noticed from the initial sessions that, along with being a fantastic musician, he is the ideal teacher," says Kamlesh Gupta, a research scholar in the Electrical Engineering Department, "In fact, he invites queries and generously answers them. Since I am a teacher myself, I can understand how important such a quality is." He is an Assistant Professor in Shri Vaishnav Institute of Technology and Science, Indore. "Another very commendable quality" he says, "is how this artist of the



Pt. Ghosh explaining how to tune an electric tanpura to Jai Narayan Tripathi and Kamlesh Gupta.

highest level handles beginners. He is enthusiastic to take them on, unlike most other musicians of his calibre who prefer to work with advanced musicians. He narrates interesting stories and time flies by us." ■

The informal talk he had with students at the Tansa hostel was greatly appreciated by one and all and what better way

to imbibe the universal human values than by being in the presence of an individual who practices all of them, quips Mrs. Vidya Kulkarni with a smile. She has been coordinating his visits and classes at Drupad Sansar. Panditji is a simple person. The art of classical music is his life. He willingly shares his gifts with anyone who is ready to receive them and passes on the knowledge he has painstakingly acquired as easily as possible.

REVIEW

Subtle Satire

■ PRADEEP ANAND Alumnus, B.Tech. (1975)

Book review

Salt n Pepper by Arun Inamdar

I have always loved cartoons because they provide me with exaggerated, humorous and pointed peeks at our own faults, foibles and fallacies. In addition, they tickle my funny bone and bring an early smile to jumpstart the coming day. Since the 1950s, cartoons have been a regular staple of my daily life. Times of India's "You Said It" by R.K. Laxman and Shankar's Weekly, the pioneering Indian journal in political cartooning, provided a steady stream of humorous perspectives of life in India.

My alternate sources of cartoons were English and American humour magazines, such as Punch and The New Yorker. They were scarcely available in our neighbourhood in Mumbai. When I found one and read it, I had to reverse-engineer and excavate the contexts of these cartoons to enjoy them. I was saddened when Shankar's Weekly closed down during the Emergency in 1975.

Arun Inamdar is a rare artist who combines the best talents of a caricaturist and a cartoonist. Irony and satire emerge subtly from his works, including that of his self-portrait.

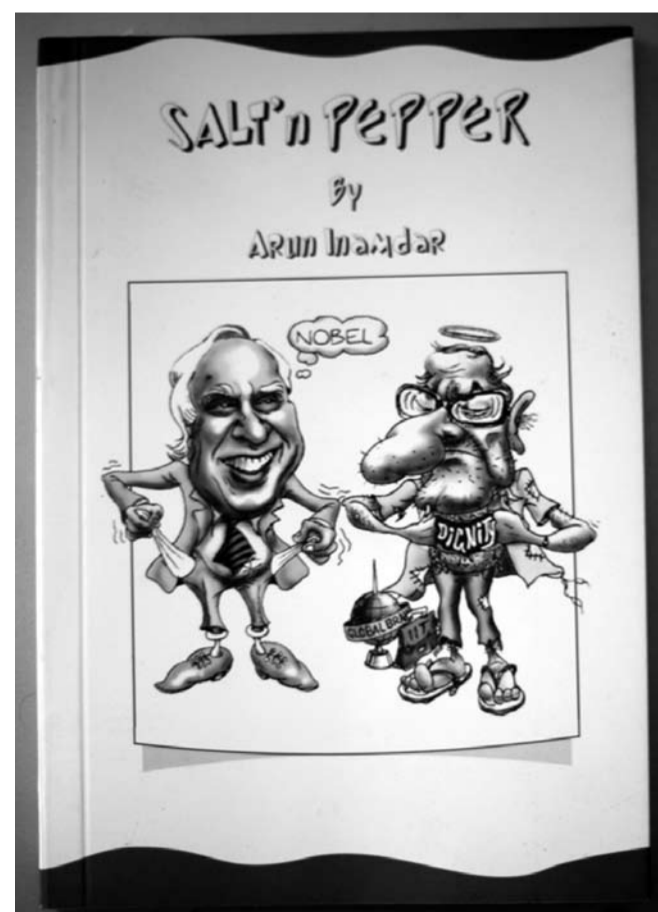
Flash forward: I have been living in the United States for over thirty years, when I get this large envelope from IIT Bombay. It contained a slim book titled *Salt 'n Pepper* by Arun Inamdar. When I opened the book I found, between the first pages, a warm and humorous note from Prof. A.Q. Contractor, Dean, Alumni & Corporate Relations and Professor, Department of Chemistry. In the note, he reminded me of "the most forgettable memories from

This compilation is proof that IITians can laugh at ourselves but only a rare few of us have the 'artist-as-humourist' talent and can use this canvas to display our sense of humour.

our hostel days." But, the note also brought forth vital memories of friends and the humour we shared with them. One of the key memories that most alumni carry away from the campus is the rapid, sharp light hearted banter we had with each other. I don't recall a single day on campus that was not filled with humour and laughter, even in the direst situations. There was always room for a sly crack, a PJ, and a smile. That infectious humour reignited itself when I began reading and experiencing *Salt n' Pepper*. Kirat Patel's foreword set the tone for the pages that followed, each one bringing an insightful perspective to the subject.

Arun Inamdar is a rare artist who combines the best talents of a caricaturist and a cartoonist. Irony and satire emerge subtly from his works, including that of his self-portrait. From caricatures of IIT Bombay's Director to the back cover (which superbly chronicles the loss of campus flora in a single drawing of a sawed off trunk of a tree), each illustration is a lateral mental journey that instantly connects the seemingly unconnected dots and brings forth its irony and humour.

Inamdar has a few favourite scenes—Powai Lake, Transportation, Campus Flora/Environment, Student Life, and Construction. These make contexts of the cartoons either universal or IITB campus-specific, enhancing the enjoyment of his work by all IITians, irrespective of our campus roots.



Photograph by Venkat Damara, IDC

This compilation is proof that IITians can laugh at ourselves but only a rare few of us have the "artist-as-humourist" talent and can use this canvas to display our sense of humour. We know that the reservoir of campus-based humour runs very deep; it is a gold mine. After sampling this nugget, I hope that Inamdar and IIT Bombay have a second volume in the works, to spread more smiles and good will, locally and around the globe. ■

BOOK EXCERPT

Life on the Campus (Chapter 4.6)

As part of our ongoing series, the following is an excerpt from *Monastery, Sanctuary, Laboratory - 50 years of IIT Bombay*, written by **ROHIT MANCHANDA**

Some issues ago *Raintree* carried an excerpt from *Monastery, Sanctuary, Laboratory* which traced those attributes of our campus, to do with climate, setting and local geography, which make it exceptionally rich in flora and fauna. The following passage, from the same book, describes the part that this ecological abundance has played over the years in shaping life on campus, brushing it with excitement, wonder and, at times, annoyance; it ends with a note on the modern-day pressures the campus faces which, if adequate care isn't taken, may whittle down its natural holdings profoundly.

TWO SWIMMERS, EACH AS SURPRISED AS THE OTHER

Over a good three decades, IIT-Bombay's watery surrounds played a very special part in setting the tenor of its citizens' lives. The Institute's two enveloping lakes, their waters shimmering to the north, south and west of the campus, have served to insulate it not just from the press of civilization but also from thermal assault. The lakes form an aquatic cladding, which, aided by the abundant green cover around, helps keep the campus measurably cooler than the city at large.

Aside from the purely climatic edge, the lakes have afforded for campus dwellers over the decades a rich fund of diversion and leisure. Powai Lake has been the campus's proud frontispiece, Vihar its secret treasure. Powai has been enjoyed by residents and visitors alike, for the Institute's guest house commands a panoramic view of its waterspread. And until the early 80s it could be a glorious sight: 'not a single weed', old residents remember, marred its margins. For many years through the 70s its banks played host to a thriving boat club whose patrons honed their paddling skills in its waters, sometimes in the dead of night - until the time the lake's bed was caked over with silt, its shoreline overrun by weeds.

To students who have lived on its fringe, such as in Hostels 7, 8 and 11, Powai Lake will have been both friend and foe. Friend for the calming backdrop it has provided to their anxiety attacks before submissions and exams, foe for the unhealthy miasma it can exude on monsoon evenings and winter mornings, triggering bronchial distress. Foe also for the numerous life-forms, not all of them welcome, that it sends crawling and fluttering into their corridors, messes and rooms. Some of these are vectors of disease: the lake's marshy perimeter is a perfect nursery for mosquitoes, and malaria and filariasis have been constant hazards of campus life.

Vihar Lake must surely loom just as large as Powai, if not larger, in the memories of those who have passed through the Institute. Evenings, for years together, residents would stroll up the access road under the pipeline, and take in the air and the scenery from Vihar's southern embankment. You had here the silken rippling expanse of the lake's waters, twilight-grey, a small island or two inlaid into them. You had also the languidly foraging cormorants, and the silent, swarthy hills of the National Park rising suddenly from its northern shores. In all, a panorama so flawlessly tranquil that it was easy to lose oneself in its contemplation, watching its pieces dim and dissolve in the gathering dusk.

After dark, some would stroll back to their rooms and homes; but for others, darkness didn't spell an end to their communion with the waters. They stayed back, or returned after dinner. Vihar Lake was open access, 24 x 7, and you could pretty much do what you pleased in and around it. There were those who - intrepid souls like Dr S.S. Talwar of Chemistry, or alumnus Dr S. Waghulde - trekked around its margins into the heart of the National Park's forests. They camped nights there, undeterred by thoughts of being chanced upon by the odd prowling panther or meandering snake. There were others who slipped into its waters for a swim - with sometimes unexpected results. Dr A. Chatterjee, who spent his undergraduate and doctoral days here in the 1980s, was such an avid swimmer that he'd sometimes go 'two or three times a day' to Vihar for a splash. 'It was like having your own private swimming pool,' he smiles at the recalled privilege, 'in your backyard. Often I went on night swims - as late as one or two a.m.'

On one of these nocturnal swims, Chatterjee swam across to the island in the lake. (It was customary for him to circle the island a few times before returning to IIT-Bombay soil, sometimes alighting on the island for a breather.) Climbing ashore, he was confronted with a numbing sight: there on the island sat a crocodile, gazing at him thoughtfully. Both human and reptile were too stunned to react - 'The croc was as surprised as I was,' says Chatterjee - but in a moment, the scaly one decided to do the polite thing. Recognizing Chatterjee's equal claim on the island, it slipped into the waters of the lake, and was lost to sight. Its courtesy only amplified Chatterjee's quandary, of course: he was now marooned between the devil and the deep lake. It was beautiful all around - the moon was reflected enchantingly in the lake - but he could scarcely feast on the scenery all night long. He'd like to swim ashore in some reasonable time - but what of this other, long-jawed swimmer in the lake? Yet there was nothing for him but to brave it: he decided finally to make a dash for the Vihar Park, closer to the island than the Institute's embankment. A torrid and mercifully uneventful swim later, he was ashore. There he ran into one of the Lake guards, to whom he related his misadventure.

'A crocodile?' the guard laughed away his shivers. 'Who worries about them? They never say anything!' - much as Chatterjee might himself reassure a panicking Japanese or Australian delegation visiting the Institute about a hysterically snarling pack of pie dogs or a colossal bull charging straight at them, snorting, kicking dust...Which brings us to that other zoological facet of campus life, the less glamorous of its wild inhabitants: its herds of cattle, its packs of strays, its insolent monkeys.

While the monkeys are truant visitors from the Borivli National Park, the cattle and dogs are domiciled citizens. And while the panther has been a stealthy intruder into the campus, skulking in the shadows, the cattle here have the air of sovereigns, masters of all they behold. They are treated every bit like royalty, too: they roam the campus free and unchallenged; sacred as they're generally held to be, they are saluted and fed wherever they go. Watchmen deferentially raise the Institute's gates mornings and evenings for them to saunter out and saunter back in. Spoilt by the affection and respect showered on them, they also become willful and maverick, often making pests of themselves.

In a letter to the Director written in July 1974, the 'Occupants of Staff Hostel No. 2' pleaded: 'We have already submitted a couple of applications for the construction of parapet wall to the ground floor verandah but no action has been taken so far. The construction of wall is highly essential as we are facing following inconveniences.' Inconvenience No.1 centred on the 'hygienically unfair' behaviour of campus cattle in 'spoiling' their habitation every night: 'The untamed cattles are sitting in the verandah during night time and spoiling the whole verandah which is highly unfair from hygienic point of view.'

Or picture this: on a rainy day, late for a class, you and your friend are one instant rushing into your department's landing; the next instant, you stand there frozen in horror, while your friend doubles up in mirth. You've collided full-speed with a freshly deposited, steaming cake of dung, spattering it over your legs; in the corner of the landing sit the authors of your misery, mother and calf, serene as saints. And then when you're in one of those ground-level classrooms, wrestling an equation, there's no saying when the wobbly calf might wander in for the lecture on network theory or fluid mechanics.

In these ways have IIT-Bombay's cattle stitched themselves into the tapestry of campus and academic life, their own lives an open book for all who care to see. They whelp in the small hours on our roads; long columns of them are found trotting down our academic corridors with all the solemnness of Zulu warriors, single-file; the bulls when in heat will think nothing of putting their sexual capers on public display. But while some of the vignettes our bovine herds stage can be thought-provoking, even endearing, there can also be occasions when the cattle, particularly bulls in the throes of passion, are a full-frontal danger. Time and again have residents had the closest of shaves, escaping by a whisker being rammed by half a tonne of rock-hard muscle moving at blustery speed, with possibly horrific consequences.

No less legion are the stories of annoyance, mishaps, and injuries involving the campus's coalitions of stray dogs. It's no surprise, then, that the Institute's human populace has been divided on the space they're willing to spare their bovine and canine co-residents. The debate at times has boiled down to one of modernity - and no less of what can or cannot be accommodated within the ambit of IIT-Bombay's desire to be a 'world-class' Institute. Dr B. Krishna Mohan of CSRE sounded a protest on behalf of those troubled by the apparent incongruity:⁷

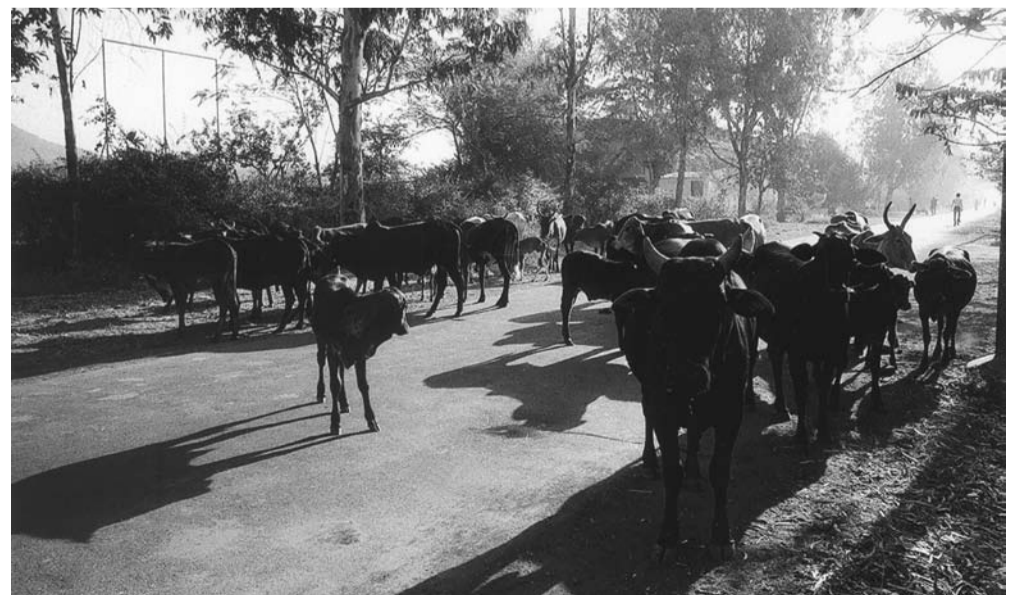
It is amazing how we, the 'elite' at least in the field of education, put up with these kind of things for so long: large numbers of stray cattle dirtying the roads and forming potential threat to motorists and pedestrians, wailing and barking dogs through the night...the list goes on.

Perhaps the most trenchant riposte was offered by Dr K. Trivedi, of IDC, who related this twist-in-the-tail conversation:⁸

I continue to be baffled by the logic which connects being 'world-class' and 'elite' with the presence of other living beings...When I was in Staff Hostel long ago, I told a new faculty member over dinner that there were crocodiles in the Powai lake. I was shocked by his immediate response: 'Why, can't they kill them?'

Trivedi went on to make this poignant pitch in support of preserving IIT-Bombay's 'wild' legacy: The cows were there when I joined IIT as a student in 1970. I was told they had been there before the campus. Actually IIT appropriated their land; and now wants to get rid of them. For me animals on the campus are not a problem; they enrich my life. I welcome the presence not just of cows, but also of snakes, crabs, frogs, fish and all the various life forms we are lucky to be surrounded with...Do 'world-class' minds in this 'world-class' institution solve only 'world-class' problems, and not of their immediate surroundings and life?

Here on campus, then, there has been high adventure laced into recreation laced into annoyance and delight - all as if on tap in IIT-Bombay's 'wild' precincts and surrounds.



Casting the longest shadows: A detachment of IIT-Bombay's bovine brigade monopolizing its roads.



Applying the human touch (left): A campus rat snake finds itself in an unfamiliar posture.

Room with a view (right): With vistas like this (captured in 1974) to be seen 'out of my window', life in IIT-Bombay's hostels couldn't have been all bad.

Add to this the range of civic amenities contained within, and it comes as no surprise that residents across generations have described campus life as 'picture-postcard' (Dr M.V. Hariharan's words), attesting that whatever irritants existed were clean overshadowed by the charms of IIT-Bombay's rolling hectares, the conveniences built into it. Others have spoken of how it afforded a 'priceless environment' for children to grow up in. And several non-academic staff, visibly emotional at the thought, have counted the chance to lead 'such a serene life' in a city as notoriously dyspeptic as Bombay as 'God's greatest gift' to them. They have also paid tribute to the vigorously academic setting that has enabled their children to rise professionally further, often much further, than they'd ever done. Several such campus children are now on the faculty of universities, or corporate executives, or infotech hotshots, both in India and overseas; the campus, then, has 'made lives' in ways that have earned it its residents' warm and everlasting gratitude.

Amenities on campus, over the 1970s, had improved, but on their own whimsical terms. IIT-Bombay's full-fledged primary and secondary care hospital of the 1970s was certainly an improvement over the one-room dispensary of the early 60s in size and scale - but inside, you could be ambushed by surprises. 'The hospital,' says Ghosh, 'was the most hilarious place IIT-Bombay has had.' A hospital - cold dungeon of needles, bandages, blood and drips - surely the last place to set off peals of hilarity in one's mind? Well, Ghosh explains. 'When I went there on my very first day, the Senior Medical Officer - one Dr N.W. Billiangady - conducted my medical examination. No blood test, just a stethoscope check-up. Suddenly he lowered his voice and asked me, "What is your name?" I told him, and he said, "That was the hearing test".'

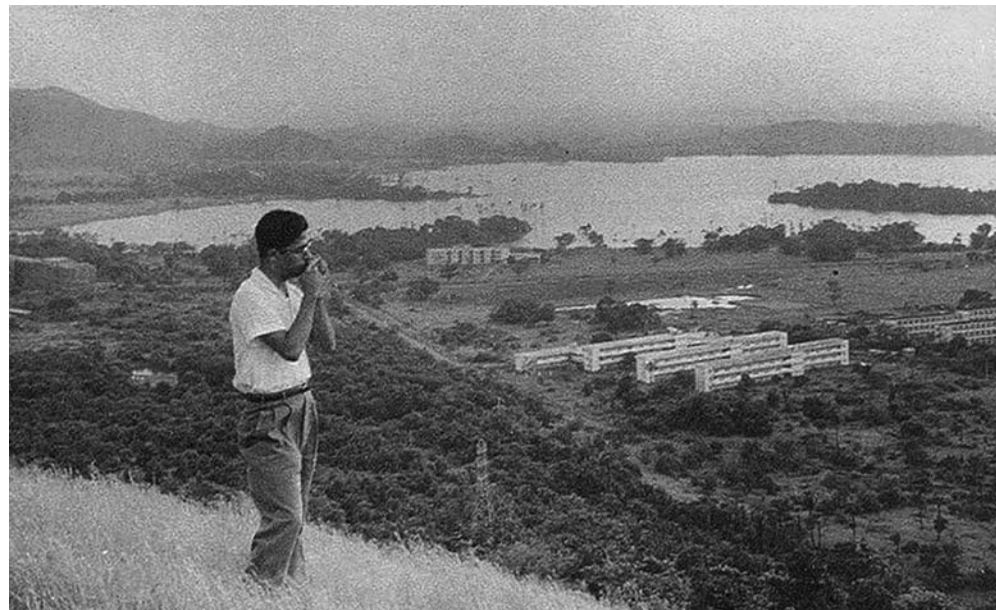
No less rudimentary, and effective, was the 'test' for pregnancy. 'But the most hilarious story of the hospital I have,' Ghosh cannot stop himself when harking back to the hospital, 'is about when we were expecting our first daughter. We went to the doctor - this was a male doctor - and said we suspected my wife was expecting, so we'd come for a confirmation. He was absolutely taken aback - he couldn't believe somebody could talk to a male doctor about such things. Recovering from the shock, he said to me, "My friend, you should know this is a very, very difficult diagnosis to make. But why worry at all? It's the kind of thing that...you know...will manifest itself anyway, no?"'

All of which goes to show that although IIT-Bombay was, as an institute of technology, supposed to be at the vanguard of all things scientific and technological, life on its campus could cloak you in an other-worldly air all its own.

GOLDEN MOMENTS, FANGS AND CLAWS

Slipping into the new millennium, one lake may have been degraded and the other sealed off; students and faculty may have been distanced from old, time-honoured ways; the campus may have become a lot less retiring; but one feature in which it had only gained was its wild side. So extravagant did IIT-Bombay campus's natural riches - dwelt upon in Chapter 6 - come to be that one could be excused for thinking it as much a wildlife preserve as it was an academic township. An outstanding feature of life on campus has been the intimacy its residents have been able to enjoy with nature's myriad moods and forms. The ways in which this has affected them has often been subtle. One needn't be blessed with the faculty of perfect pitch, nor trained in the Hindustani classical tradition, to be moved by the transcendence of a Kishori Amonkar or a Kumar Gandharva; likewise, one need possess no great fund of zoological or botanical knowledge to marvel upon the wealth of plant and animal life the IIT-Bombay campus showcases everyday. Just to be surrounded by its implausible bounty of trees, shrubs, birds, butterflies - not to mention snakes, spiders, and crocs - is enough to fill even the most biologically uninclined technologist with a sense of wonder. Here's entranced testimony from alumnus Neeraja Balachander, M.Tech. Biomedical Engineering, 2003:

The first time I came to IIT-Bombay to explore the application process was in January 2001. I remember just wanting to return to the campus as a student. When I did return, it was July 2001 during the monsoons. Then, it was as if the campus had undergone some magical transformation, from just an academic institution with departments and laboratories, to a forest, alive with wild flowers, old, huge trees, birds and what's more, snakes. On the first day itself, I saw a large cobra coiled against the H11 fence and people walking nonchalantly by it - I fell in love with the place.



Serenading the 'breathtaking beauty' all about, a lone connoisseur swirls out a tune on a harmonica. Note, in the background, the solitary Staff Hostel (by the Powai lake) and Hostel 1 to the right, locating this image in the early 1960s.

And when asked if she could identify a 'high point' during her sojourn on campus, she preferred:

Once when a few of us were walking near OAT [Open Air Theatre] by H1, we spotted a beautiful, milk-white Paradise Flycatcher in the mango tree there. It was flitting among the branches with the most acrobatic, delightful twists of its long, frail streamers. That was a truly golden moment.

Nor has the campus's scenic grandeur, the misfortune of its lakes notwithstanding, been lost. Alumnus Dr A.N. Dravid, here in the mid-1960s, recalled his fondness for the campus thus: 'The two lakes were almost a signature of the campus. After the monsoon, they filled to the rim, and with the greenery surrounding them, looked breathtakingly beautiful.' 40 years and more on, current student Aishwarya Ramakrishnan (Metallurgical Engineering) used the very same superlative when speaking of the thoughts stirred by the campus: 'Breathtaking beauty.. the lakeside, the hills, the greenery all around. It's still breathtakingly beautiful.'

Nature's embrace has also played its part in invigorating academic exertion, as attested by several faculty, alumni and students. One after another has declared how, for instance, the campus afforded a 'perfect setting' for intellectual absorption, 'cooling them down' or 'giving them that extra stimulus' to dive single-mindedly into their pursuits. As for those who have the eyes to look, and in whom scientific interest in things biological runs even moderately deep, the arena around them has offered daily delight and amazement. In an article published in the *Indian Forestry College Journal* in 1975, it was described thus: 'The campus of IIT-Bombay, flanked by two large lakes, ribbed by several hilly spurs, blessed with 250 cm of annual rainfall and still retaining remnants of vegetation of the shrunken Borivli National Park, contains many nooks and corners of idyllic natural beauty and would set on fire the imagination of any conservationist.'¹¹ More recently, in 2006, the campus was identified as one of ten hot-spots for tree diversity in Mumbai.¹² And it has to be said - if one may take the liberty of authorial intrusion here - that if I have loved the IIT-Bombay campus as I have loved few other self-enclosed places I've seen, it's because of its matchless setting, and because of the superabundance of life, both wild and not-so-wild, that it shelters.

But the quality of being 'wild' can cut, as we've noted, two ways. Wherever there are humans and animals sharing the same spaces, there will be a tussle, a fact that surfaces graphically when the apex predator of these parts, the panther, wanders in for a visit. The campus goes on high alert; the Institute's Security Section puts out notices advising residents to watch out. Here are snips from one, typical of its era, that will ring familiar bells in many minds: a circular issued on 12 July 2001, titled 'SIGHTING OF PANTHER IN THE CAMPUS'. I have not meddled with its occasional ambiguous, and touchingly expressive, turns of phrase.

Panthers were seen recently at various places in the campus during the last few days...For the purpose of precautionary measures, the campus residents are requested to observe the following: To shout loudly for help on sighting panther. Not to provoke the animal by stone throwing or attempting to hit it with anything. Not to take photograph, nor should the animal be followed or make provocative gestures. If the cubs are sighted, do not indulge in any provocation whatsoever, as the panther accompanying the cubs can be highly dangerous. Not to sleep outside, and doors & windows should be secured. Do not rear livestock such as cows, goat and fowls, as they attract panther.

And so on. Beautiful yet terrifying, majestic yet cunning (and with no taste for provocative gestures), the panther, embodiment of Jekyll-and-Hyde opposites, is a perfect example of a creature that can drive a deep emotional wedge between campus residents - and has. No different from the debate on cattle and dogs, it's a question of how one situates oneself in an era: of what sort of lifestyle we expect to lead in modern times. A key factor in the equation is the psychological. To some, living conditions that oblige them to share space with feral animals, exposing them intermittently to the threats they pose, are 'primitive', and irreconcilable with the Institute's self-image as a leading centre of science and technology. To others, an amalgam of this kind is not just workable, but a pointer to an alternative modernism, one that sees no conflict between the calls of technology and those of a peaceable co-habitation with the natural world.

THE NUMBER GAME

Number Game

The total number of species observed on Powai campus is **843, 44 %** of which is flora and **56%** is fauna.

As many as **100** species of flora and fauna are accorded the protection status as per the different wild life laws of our land! There are **150** tree species, **86** different types of butterflies and moths, **104** species of birds to be found on campus.

IITB's energy bill for **2007** was **Rs. 10.2 crores**. The existing tariff rate is **Rs. 300/kVA** for maximum demand and **Rs. 4.3 /kWh** on an average.

Air conditioning contributes **40%** of the total electricity consumption on campus. Lights and fans in the hostels and the academic area is a distant second with **26%** of the total consumption.

150 kg of solid waste per day is generated in every hostel coupled with an additional **2500** kg from the canteens.

On an average, **13000-15000** reams of **100%** virgin copy paper (for printing on one side) are utilised annually by **4000** students.

This equals to almost **3500** reams per student per year.

Laboratories and washing/cleaning each utilise **31%** of the total water consumed on campus. While drinking water consumption is only **5%** of the total, toilets take up as much as **16%** of the total water consumed.

For every person who on an average consumes two cups of tea/coffee per day in one of the tea stalls on campus, it amounts to some **600** cups a year.

If we take our own cup even one out of two times, we save **300** paper/plastic cups a year.

If we multiply this by **1000** (no. of people who drink two cups a day), then the number becomes **300,000!** ■

SALT 'N 'PEPPER ■ DR. ARUN INAMDAR

"..And don't make any silly mistakes..remember, you don't have the option to call them 'printing mistakes' later, unlike those JEE officials!.."



SHOUTBOX

UnMahotsav ■ ANONYMOUS

You may have noticed — there's a ferocious jungle up in the hills of IIT Bombay. Like a smooth criminal, it is silent, efficient and completely invisible. As the plains and flatlands of the campus grow barren with every passing day, the burgeoning greenery of the hills is a refreshing sight to the discerning eye. Examples of clever camouflage abound in Nature, but my knowledge of them has been limited to wings, leaves and lizard's bodies. This jungle is Nature's greatest project in smart counterfeiting; a veritable mass of trees exists on our hills, and yet all our common eyes can see is a stretch of brown, dry earth.

The plain-dwellers may not be able to take care of their lands, but they take surprisingly good care of the green cover on the hills. Every year, there's a small, intimate gathering of people who've been visiting the hills and

diligently taking care of young saplings planted there. Yet more saplings are planted the next year, and young school children (a part of that small, intimate gathering) sing songs about the bright, ecologically secure future we're ensuring for them.

Being on the hills of IIT Bombay, this jungle cannot escape careful scientific observation. Since it has been proved that they flourish industriously on Indian soil, it is after precise implementation of the same that exotic species of saplings are chosen to be planted. Our climate, our water, our topography, is perfect for saplings like the *Australian acacia*. The cost of acquiring them is undoubtedly larger, but how is wealth better spent if not for environmental preservation? Usually, saplings require dedicated care and nurturing, like any other living species about to begin its life. But this rule is for forests which can be seen. Saplings planted in this jungle are different. Apart from the fact that nobody can see them, they also require surprisingly negligible care. They survive without constant watering, protection from wild grass and the odd herbivore. They do not require constant human intervention and maintenance for over two, even three years, before they can be expected to evolve from tender saplings to sturdy young trees. Independence at a young age is encouraged in the West, so it is no wonder that these foreign species of saplings make it on their own, without any manual help or care at all. It's all really wonderful.

Like most transparent, sincere initiatives in this country, the results are there for everybody to see. To the untrained eye, which looks at a spade and sees a spade, this jungle is like the Emperor's new clothes. It is only the uni-dimensional, unimaginative fool who feels the need to cry, "The Hill has no trees!" One only has to ask the Estate Office, which has been labouring diligently to maintain such zero-maintenance saplings and trees. And what of the songs and speeches made in the little intimate gathering mentioned previously? Is it all a practice in futility? The uni-dimensional, unimaginative fool in us need only open its eyes to the invisible jungle.

But it is never possible to keep everybody happy, and such is the case with this fruitful and forward-looking "greening the hills" initiative as well. Many self-styled environmentalists have expressed concerns over the cost of the whole exercise, the negligent post-plantation care and utter lack of consistent community initiative. There have been whispers of how the whole practice is not scientifically oriented; it is more like a public façade, with the Mayor dropping by for 'two words' and tea.

Is there any merit in these soft-spoken suspicions? The jungle remains unseen, we may never know. There is hope, murmur these dissenters that this annual exercise will less resemble the charade associated with giving away bamboo shoots as mementos, and become a fun-filled, meaningful community movement, which truly changes the way we look at our campus and its geographical ups and downs. ■

RANDOM MEANDERING

The Gutter Adventure ■ SIDDHARTH RAO DEB Kendriya Vidyalaya, IIT Bombay

Just as I flopped down on my bean bag with a book on a hot lazy summer afternoon my mother's voice rang out, "Siddhu, please get some groceries from the market."

"Forget it! I'm not moving," I said, sprawling my legs leisurely for good measure.

"I thought someone would love some ice-cream..." tempted my mother with a smile. The mention of ice-cream in the sweltering heat made my mouth water. And so, with a list of items and money in my pocket, I set out.

As I came out of my building, I spotted my friends Rohan, Srirang & Siddhanth. I ran to them, calling out "would you fellows like to go with me to the market? You'll get ice-cream and cake."

"Sure man," said Siddhanth. He seemed happy enough at the prospect of ice-cream.

"But let's explore a new route; let's see if it takes us to the market," said Rohan.

"But where is this new route you're talking about?" I asked. Instead of answering, Rohan led us to the dried bed of natural gutter near my house. During the rainy season, this gutter transforms into a raging, gushing rivulet. Right now, it was completely dry.

With sticks in our hands, we started off scraping through the rocky bed. Slipping and sliding over the smooth rocks and boulders, we clambered our way upwards in the general direction of the market. Just ahead, loomed above us a great dark structure with pipes jutting out here and there. We hesitated at first, but on realising that it was just the bridge behind a building, we moved on. Under the bridge it was pitch dark except for the light at the far end. There was a horrible smell hanging in the air. A stench of old mould and a strange staleness, like someone had left their smelly shoes here. We held our breath and stumbled out from the other end. On reaching the other side, we found that we were at the bottom of a garden that lay to the left of the Director's bungalow. From the underside, the director's bungalow with its high walls was quite intimidating.

As we walked ahead, we heard Siddhanth scream sharply. He had almost stepped on a snake thinking it was a rope.

Giving us a baleful look, the harmless rat snake slithered away. This frightened us all a bit. Coming up ahead was another bridge, better described as a dirty, reeking, noisy tunnel. The tunnel went under the main road of the campus. Silvery white cob webs, transparent in the sunlight hung all over. They stuck onto our faces and clothes like strands of sticky chewing gum. It was quite scary inside. Our voices echoed, other random sounds bounced off the musky walls. Many times we thought we heard footsteps and felt as if something was following us. Above us we could hear the vehicles roaring past. In the tunnel, it sounded like the rumbling of thunder. We felt relieved when we came out at the other end. The air had never felt so fresh and water had never tasted so sweet (you see, I was carrying a bottle of water with me).

"So where are we now?" asked Siddhanth, looking around. "I can see the Ladies Hostel to the left and some tall trees to the right. We must be in the Central area, I guess," I replied.

"Yes, that's right," said Srirang, who'd climbed up to the top of the gutter to have a better look.

"Where do you think this gutter is leading to?" I asked.

"Come on, let's move on ahead and find out," said Srirang.

"Right" we all replied and started off. In a few minutes, we reached a fork in the gutter. After much argument we decided upon the route to the left. A majority of us felt it would lead us to the market. The other (main) reason being, the route on the right was underneath the footpath and none of us much liked the idea of crawling through another dark, damp gutter.

We turned left and started off. Up ahead, the gutter turned right and ran parallel to the road along our school. After five minutes we reached another tunnel. Since it was getting late and we were hungry, we started running. As we started running, my money fell out of my

pocket. "Wait for me," I called to the others, and quickly bent to pick it up. There was no reply from them. When I looked up, I could not see my friends. I stood there and listened, but I could not hear their footsteps. With my heart in my mouth, I started walking. I picked up my pace, my hands in front of me, groping the walls and feeling my way ahead. After a few scary minutes in complete darkness, I saw a little light ahead. Just then something furry brushed against my legs, I yelled and ran towards the light with everything I had. I felt the furry monster following me at my heels. Sprinting ahead, with my legs trembling, I clambered out of the tunnel into the warmth of the sunlit market place.

And they were right there - my friends, standing around, waiting - as if I was the lazy one. As soon as they were within earshot, I started blabbering about the furry monster that was trying to catch me. Just then we heard the bark of a dog. We looked around and saw a little brown puppy in the gutter barking up at us. Rohan went to it, bent into the gutter and picked up the pup. "Looks like a really dangerous monster to me", he said. We all laughed and set off towards the shops. I looked at the gutter one last time and it seemed as if a pair of red eyes were staring back at me. ■

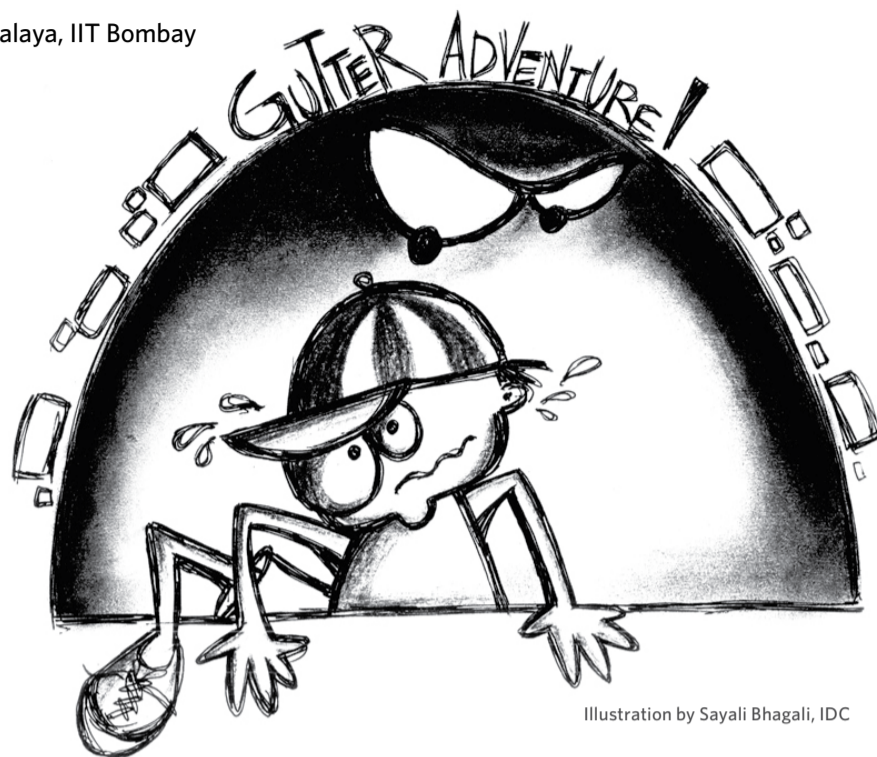


Illustration by Sayali Bhagali, IDC

POETRY

O Laburnum! ■ MALLIKA IYER Campus Resident

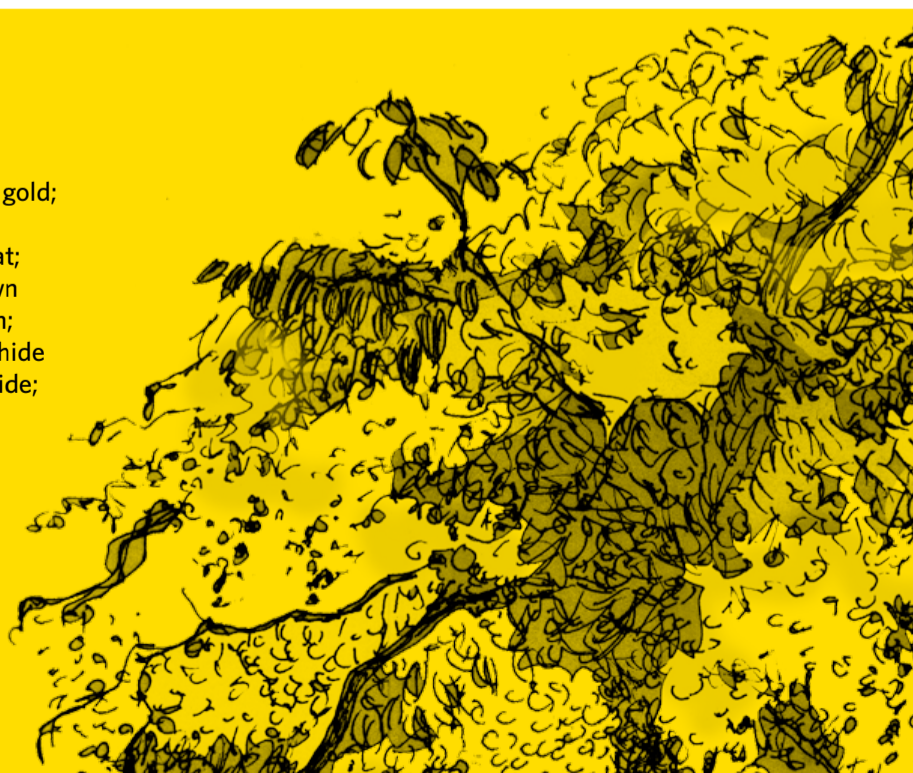


O Laburnum!

How blessed am I to behold
That resplendent beauty bathing in gold;
She adorns and lights up my street
A spectacular joyous summer's treat;
Cascade-like her petals tumble down
Lantern-like is her bejewelled crown;
The other trees, they must want to hide
Over-shadowed by the gorgeous bride;

O Laburnum!

You put a smile on my face;
You are unmatched in grace;
You arrest my frenzied pace
You compel me to stop and gaze;
I cannot but extol and praise;
To you, this humble toast I raise.



NEWS

Tee for Tree

"You Wear, We Swear!" Unbeknownst to us, the Souvenir shop run by IIT Bombay Alumni Association (IITBAA) on the 1st floor of Gulmohar building, next to Canara Bank, has had a quiet makeover. Gone are the days of the old shop with his motley assortment of wares. The shop in its new avatar has an improved quality and design aesthetic as far as products go, but more importantly, it is the eco-friendliness of the shop (no acrylics, less of plastic, minimal synthetic etc. that deserves special mention.

There is an eco-motto that drives 'Bombay76' (no marks for guessing why it is rechristened as 'Bombay76'), so gone are the polyester t-shirts, nylon bags, polythene wrappers which have been replaced with eco-friendly cotton, recycled bags, natural paper. (Make sure you visit the store to feel the folders made of, hold-your-breath, camel dung!) Last month, Bombay76 initiated a (hopefully nationwide) project of selling eco-boosting t-shirts, wherein the plan is eventually to be able to sell a million t-shirts all around the nation for Rs. 200 each. For every t-shirt they sell, the shop will donate Rs. 20 to NGOs that will plant trees all around the country. Thus, if all goes well, we may be able to donate Rs. 20,000,000 for this 'Green Cause'. The proceeds from the sale of these tees have already resulted in a tree-plantation drive in Bangalore and buying and setting up bamboo fencing for saplings in Dickenson road in Mumbai.

Saurabh Sodani, an IITB alumnus (1997-2002) and shop owner explained, "the nationwide distribution will be made possible by selling the t-shirts online, and creating a word-of-mouth effect through various online and offline communities. The cost was deliberately kept as low as possible so that many people could participate in this noble cause". As a matter of pride for the IITB community, the entire value chain of this project features students and alumni of the institute. For instance, the t-shirts were designed and produced by Toube Bas an online t-shirt company started by Sorabh and the funds generated through the sales will be allotted to deserving NGOs by NGO Post (an online NGO news and information channel started by Parul Gupta, a 1998-2003 alumnus, accessible at www.NGOPost.org). Needless to say, the IITBAA has been rendering whatever support it can to the project which has been nicknamed, "A Million Greenizens".

In the pipeline is another eco friendly innovation - banner bags. Every year, the institute organizes a plethora of events that use banners made of 'flex' material that are hoisted at major locations within the campus. These banners don't degrade; so imitating the Italian company Frietag, Bombay76 has been working with Norquest Bags to produce stylish messenger and carry bags made of such banners. Not only will the bags be cheap, they will be waterproof, and ultra-durable!

A few other interesting products include poo folders, cardboard pens, and wooden and clay mugs, books and children's toys etc.



EVENTS

Professor Ruth J. Simmons Visits IIT Bombay

Prof. Ruth J. Simmons, President, Brown University, United States, visited IIT Bombay as part of her travel to India to meet leaders in higher education, business, and government to explore and expand partnerships with several faculty members key to the University's internationalisation efforts. While at IIT Bombay, she delivered an institute lecture on "Business, Entrepreneurship, and US Higher Education".

4th International Conference on Nano Science and Technology

ICONSAT-2010 was held during February 17-20, 2010. The conference was sponsored by the Nano Mission, Department of Science and Technology (DST), Government of India. Dignitaries present on the occasion included Dr. Anil Kakodkar, Chairman Board of Governors, Indian Institute of Technology Bombay; Dr. S. Banerjee, Director, Bhabha Atomic Research Centre, Chairman, Atomic Energy Commission; Prof. D. V. Khakhar, Director, Indian Institute of Technology Bombay; Prof. M. Barma, Director, Tata Institute of Fundamental Research; Prof. A. K. Sood, Chairman, International Advisory Committee, ICONSAT-2010; and Dr. T. Ramasami, Secretary, Department of Science and Technology, Government of India

ICONSAT-2010 discussed following aspects : (i) Functional Materials (ii) Novel Synthetic Methods (iii) Hybrids (iv) Fabrication and Devices (v) Electronics, Magnetics and Photonics (vi) Technology of Medicine (vii) Materials for Energy (viii) Materials for Food and Environment. Leading researchers all over the world, in addition to Indian scientists and students involved in Nanoscience and technology attended the conference. Workshops and an exhibition of scientific equipments were also arranged during this period.

GeneRation '10

Symbiotek Biodepartment Association organised a national level inter-collegiate quiz, debate and poster competition on February 21, 2010 aimed at creating awareness among undergraduate students of current trends in modern biology, and encouraging them to consider it as a future career option. GeneRation was a one day event, which included a popular science talk, a written screening round, debate contest, poster contest followed by a final verbal quiz round. Participants also enjoyed the opportunity to enter into informal discussions with members of Symbiotek and several were enthused to pursue a masters in Biotechnology and Bioengineering at IIT Bombay. In the previous years, over 80 teams from Mumbai, Pune, Ahmednagar, Baroda and Mysore have participated in the event.

Women's Cell Celebrated International Women's Day 2010

The women's cell held a celebration programme on March 8, 2010 at the P.C. Saxena Auditorium. The programme consisted of a talk by Dr. Padma Ramakrishnan titled "Wake-up Women", a panel discussion on "Women in Science and Engineering - Careers and Challenges" and a play titled *Bimb*.

IIT Bombay Celebrated 51st Foundation Day

The Indian Institute of Technology Bombay celebrated its 51st Foundation Day, on 10th March 2010, by honouring signal contributions of its teachers as well as erstwhile students who, as alumni, have left their indelible imprint on their chosen fields. In a function organised at the P.C. Saxena Auditorium, five Distinguished Alumni Awards, one S.C. Bhattacharya Award for Excellence in Research in Pure Sciences, 2009 and one H. H. Mathur Award for Excellence in Research in Applied Sciences, 2009 were conferred to commemorate the occasion. The Chief Guest for the occasion was Professor M. Barma, Director, Tata Institute of Fundamental Research (TIFR). 2010 Distinguished Alumni Awards are:-

Dr. Nitish Thakor, (B.Tech., Electrical Engg., 1974), Professor of Biomedical Engineering, Electrical and Computer Engineering and Neurology at the Johns Hopkins University

Mr. R. Chandrashekhar, IAS, (M.Sc., Chemistry, 1974), Secretary, Department of Information Technology, Government of India

Mr. Adil Zainulbhai, (B.Tech., Mechanical Engg., 1977), Managing Director, McKinsey India

Mr. Madhu Pandit Dasa, (B.Tech., Civil Engg., 1981), ISKCON (Akshaya Patra)

Mr. Colin H. Gonsalves, (B.Tech., Civil Engg., 1975), Founder, Human Rights Law Network

In addition, the S. C. Bhattacharya Award of Excellence in Research in Pure Sciences 2009 was conferred to **Professor Dulal Panda**, Department of Bioscience & Bioengineering in recognition of his outstanding research and contributions in the area of "Cell Biology". The H. H. Mathur Award for Excellence in Research in Applied Sciences, 2009 was presented to **Professor M. C. Deo**, Department of Civil Engineering in recognition of his outstanding research contributions in the area of "Soft Computing in Ocean Engineering and Water Resources".

Synergy in Energy: IIT Bombay and Applied Materials Collaborate on Renewable Energy

IIT Bombay and Applied Materials, Inc., the world's largest supplier of equipment to semiconductor, flat panel display



▲ Prof. D. V. Khakhar, Director, IITB and Dr. Randhir Thakur, Executive Vice President & General Manager Silicon Systems

and solar photovoltaic industries, recently announced its decision to broaden the scope of their ongoing research collaboration to develop new energy-related initiatives.

As part of this collaboration, Applied Materials will donate three process chambers to IIT Bombay for depositing thin films on solar cells using physical vapor deposition (PVD) and chemical vapour deposition (CVD) technologies. Applied Materials will also work with IITB research teams to set up a wet chemistry laboratory for developing new materials. These materials will be used for a variety of renewable energy-focused applications, including the fabrication of next-generation solar cells.

As a symbolic representation of its commitment towards clean technology and a sustainable future, Applied Materials will also donate a solar panel system to IITB. The panels will be connected to energy-efficient LEDs that will light the institute's main avenue.

Solar cells are used to convert sunlight directly into electricity. Arrays of these cells hold significant promise for a country like India, which is blessed with many sunny days. India's Jawaharlal Nehru National Solar Mission (JNNSM) launched by the Prime Minister in January, 2010 emphasises the need for renewable solar energy for India, and targets a 20,000MW of solar power generation by the year 2022.

Jairam Ramesh visits IIT Bombay

IIT Bombay alumnus Jairam Ramesh, Union Minister of Environment and Forests, Govt. of India, is a key figure



in articulating India's stand on climate change. He was on the campus on March 13, to speak at a conference on Environment, Energy and Climate Change Education and Research. The conference was part of an initiative by the IITs to show their concern over the rising climate issues.

He spoke at length on a variety of issues. For instance, he mentioned that a dedicated satellite would be launched with the support of Indian Space Research Organisation (ISRO) by 2012 to monitor India's greenhouse gas emission, "The objective is to study the impact of climate change and the fallout of greenhouse gas emissions on the environment, by monitoring it through satellite technology," the Minister said. Another satellite for protection and development of the forest cover in India would be ready by 2013.

He also said that a National Green Tribunal is to be established soon to ensure quick and effective disposal of cases relating to environmental issues. The Ministry of Environment and Forest has also proposed to set up the National Environment Protection Authority (NEPA) on the lines of Environmental Protection Authority of USA. Their main objective would be to strengthen the regulatory framework and to improve environmental governance in the country.

Finally, he also mentioned that despite the government taking several measures to keep river Ganga clean and

pollution free, the task of cleaning is unlikely to begin in the next five years unless there is awareness on part of the common man. He went on to say that, "we can't assure that river Ganga will be cleaned in five years. The government has spent over Rs 900 crore in the last 20 years for keeping the river clean, but today only 1/3rd of the sewage that is generated across the 2,500 km stretch of Ganga is treated. The remaining 2/3rd is led into the river without being treated" The big task would be to ensure adequate sewage treatment capacity across 3,00,000 towns and cities of India. The Centre plans to save all the river bodies by making it 'nirmal' (clean) and 'aviral' (free flowing), Ramesh said.

INSTITUTE COLLOQUIUM

Dr. Indira Samarasekera, President and Vice-Chancellor, University of Alberta, Edmonton, Canada, delivered an institute colloquium on "Forging a New Way Forward: The Role of Universities in the 21st Century" on February 11, 2010.

Prof. G. N. Devy, Writer and Cultural Activist, Chairperson, Technical Advisory Group, Government of India, delivered an institute colloquium on "A Nomad Called Thief: Social Stereotypes and Violence in India" on March 12, 2010.

Dr. Amitava Raychaudhuri, Director, Harish Chandra Research Institute, Allahabad, delivered an institute colloquium on "A low energy probe of Nature's building blocks: Neutrino Novelties" on March 18, 2010.

Prof. A. K. Sood, Department of Physics, Indian Institute of Science, Bangalore, delivered an institute colloquium on "Graphene and Nanotubes: The Rising Stars of Nanotechnology" on April 9, 2010.

AWARDS

IITB bags awards at MIT event

IIT Bombay bagged five out of the twenty awards announced at TR35 the MIT event recognising young innovators (below age of 35) in India. (Three of them are from SINE companies). These innovators will be considered for the global awards to be announced by MIT later in the year.

Ashish Bhat, EE, SINE, one of the founders of the Mumbai-based IdeaForge Technology, has developed the world's smallest and lightest autonomous unmanned aerial vehicle (UAV), called Carbon.

Mayank Shrivastava, Centre for Nanoelectronics has provided a clear physical insight into the high voltage/current and electrostatic discharge (ESD) failure mechanism of drain extended devices (DeMOS). His work is being used for engineering the existing DeMOS devices. The modified DeMOS devices are highly reliable under ESD conditions in addition to exhibiting an excellent mixed signal performance. These devices can be used in a wide range of applications like radio frequency power amplifiers, line drivers for interfaces, USB, and buck converters.

Vishal Gupta, Seclore Technology, SINE Alumnus has developed the innovative Seclore FileSecure and Seclore InfoSource, the two noted products in the field of information rights management (IRM) and secure outsourcing. The information security management solutions provide persistent end-to-end information protection for secure outsourcing and document usage control.

Shashikant Suryanarayanan, ME Faculty, SINE- Sedemac Co. led the development of India's first steer-by-wire vehicle. A Mahindra Scorpio was retro-fitted with a steer-by-wire system wherein each of the front wheels are steered independent of each other. This allows for compensation of the coupling effect between different motions of the vehicle leading to improved vehicle handling.

Bhushan Jagyasi, Ph.D. from IITB and currently at Tata Consultancy Services Innovation Labs has developed mKRISHI, a mobile-based agro advisory system piloted for potato farmers in Bichaula village of Aligarh district in Uttar Pradesh.

Prof. Manoj Mishra, Department of Chemistry, has been honoured with INDIA-U.S. Professorship Award in Physics by the Indo-U.S. Science and Technology Forum (IUSSTF) and the American Physical Society (APS).

Prof. Subimal Ghosh, Department of Civil Engineering, has been awarded the prestigious Boyscast Fellowship 2009-10 by the Department of Science and Technology under the Ministry of Science & Technology.

Prof. S. A. Khaparde, Department of Electrical Engineering, was awarded the "DSK Energy Award 2009" by the Institution of Engineers (India)'s Pune local centre. The award is for outstanding contribution in the Energy Sector, and cites Prof. Khaparde's several contributions in this area. The award was presented on February 8, 2010.

Prof. Azizuddin Khan, Department of Humanities and Social Sciences, has been selected for the Bilateral Exchange Fellowship Programme 2010-2011 of Indian National Science Academy (INSA), New Delhi. He will be working in the area of Cognitive Neuropsychology at the Leibniz Research Centre for Working Environment and Human Factors (IfADo), University of Dortmund, Germany. He has also been selected for ESRC-ICSSR India-UK Scholar Exchanges, 2009. The programme is for three months from February 2010-May 2010. As a visiting scientist, he will be working closely with scientists from University of Reading, University of Oxford and University College, London.

Prof. M.S.C. Bose and **Prof. R.P. Vedula**, Department of Mechanical Engineering, have been awarded Prof. A Jaganmohan Award for Professional Development. The award has been instituted by Dr. Shivaram Murthy, the brother of Prof. Jaganmohan. The award is for excellence in teaching.

Prof. V. K. Singh, Department of Chemistry, has been selected for the prestigious J.C. Bose Fellowship of the Department of Science and Technology, Government of India.

Prof. Rabi Bastia, Department of Earth Sciences, has been awarded the Doctor of Science in Petroleum by the Indian School of Mines, Dhanbad.

Mr. Anubhav S. Kaviratna, Research Scholar, Department of Biosciences and Bioengineering, has received the National College of Chest Physicians (India) Young Scientist Award at NAPCON 2009, held in November 2009 at Calicut, Kerala for his research on the "Effect of meconium on Curosurf and DPPC". He is working in the area of respiratory nanomedicine with Prof. Rinti Banerjee, Department of Biosciences and Bioengineering.

NEWS

Green Towers - A Glance at the Sustainable Future

The green alternatives to modern-day buildings and lifestyles have emerged during the past two decades – popularly called *Green Buildings* and *Green Lifestyles*. These buildings are constructed using materials like bricks and pre-cast structures made from fly ash, inert portions of solid and hazardous wastes and from pulverized construction debris. Fake wood, wall panels and insulation boards are manufactured using waste biomass, agricultural wastes, wasted woods, and plastics recovered from garbage.

Paints made only from non-toxic organic dyes and pigments, using water as a solvent are encouraged. Their architecture affords the capacity to harvest solar radiation for lighting, cooking and water heating. They also have natural ventilation and lighting systems. In the newer context, it is going to be essentially important to answer how best municipalities can deliver and manage domestic urban environmental services in a sustainable manner. The answer lies in using treatment systems, materials, and

management techniques that possess the three characters namely: affordability, acceptability, and manageability.

Recently, the Government of Maharashtra appointed the 'High Rise Building (HRB) Committee', which also has Prof. Shyam Asolekar from the CESE Department as one of its members, to study proposals of high rise buildings in MCGM (Municipal Corporation of Greater Mumbai) territory. The committee recommended the suitability of design features to the Commissioner of Mumbai. HRBs with more than a 21-storey construction or taller than 70m come under Development Control Rules for Mumbai. The committee has been empowered to alter and modify various structural and environmental service-related features or to reject proposals submitted for taller HRBs. Some proposals (HRBs of heights ranging from 150 to 300m) have already been approved by the HRB Committee. Several green provisions were made mandatory so as to minimize the environmental footprints of buildings and improve safety aspects.

A formal commitment to environmental aspects is submitted by the building developer to MCGM in the format of an 'environmental plan', sanctioned by the Committee after discussions, site visits and deliberations. Environmental features are made mandatory by the HRB Committee and dozens of upcoming projects have already begun constructing tall towers based on the requirements stipulated by the HRB committee.

The experience in Mumbai of newly planned HRBs is positive and suggestive of initiating such activities all over the country. In summation, if the community decides to prevail upon all the odds posed by urban congestion, high density habitats and diminishing environmental and infrastructure services; the only solution can be through courageous 'out of box' thinking. Solutions that emphasise decentralised management of urban environmental services and the alternatives employing "green" materials and technologies for building construction and management will have to be preferred over the 'business as usual' attitude which has been wasteful and unsustainable.

APPOINTMENTS



PROF. U.A. ATHAVANKAR has been appointed an Emeritus Fellow in the Industrial Design Centre.

DR. SAMRAT GANGULY has joined as Adjunct Associate Professor in the Department of Computer Science & Engineering.



PROF. A.G. RAO has been appointed as an Emeritus Fellow in the Industrial Design Centre.



SHRI P.G. RAMESH has been appointed Deputy Registrar in the Accounts Section.



SHRI G.K. BHORKADE has been appointed Deputy Registrar in the Material Management Division.



SHRI K. LAKSHMINARAYANAN has joined as Officer on Special Duty in the Office of the Dean (IPS).



LT. COL. JAINENDRA KUMAR has joined as Chief Security Officer in the Security Section.



PROF. AMITABH SANYAL, Department of Computer Science and Engineering, has been appointed the Head of the Department.

RETIREMENTS



PROF. (MS.) REHANA GHADIALLY retired after 36 years of service. She worked in the Institute as Professor, Department of Humanities and Social Sciences.



MS. ASHA N. ADARKAR has retired after 37 years of service. She worked in the Institute as Senior Superintendent, Accounts Section.



DR. (MS.) PRAGATI MUKHOPADHYAY will be retiring after 28 years of service. She worked in the institute as Principal Research Scientist, C.R.N.T.S.



SHRI THOMAS JOHN C. will be retiring after 39 years of service. He worked in the institute as Senior Technical Superintendent, Department of Physics.



SHRI PARGAT SINGH KATAHAURA will be retiring after 33 years of service. He worked in the institute as Senior Assistant Engineer, Electrical Maintenance Division.



SHRI BABRUWAHAN V. CHEBLE will be retiring after 35 years of service. He worked in the institute as Superintendent, Central Stores.



SHRI ASHOK N. RESHIM will be retiring after 30 years of service. He worked in the institute as Senior Horticulture Assistant, Estate Office.



SHRI SURYAKANT D. MAHAGAONKAR will be retiring after 38 years of service. He worked in the institute as Peon (SG), Department of Aerospace Engineering.

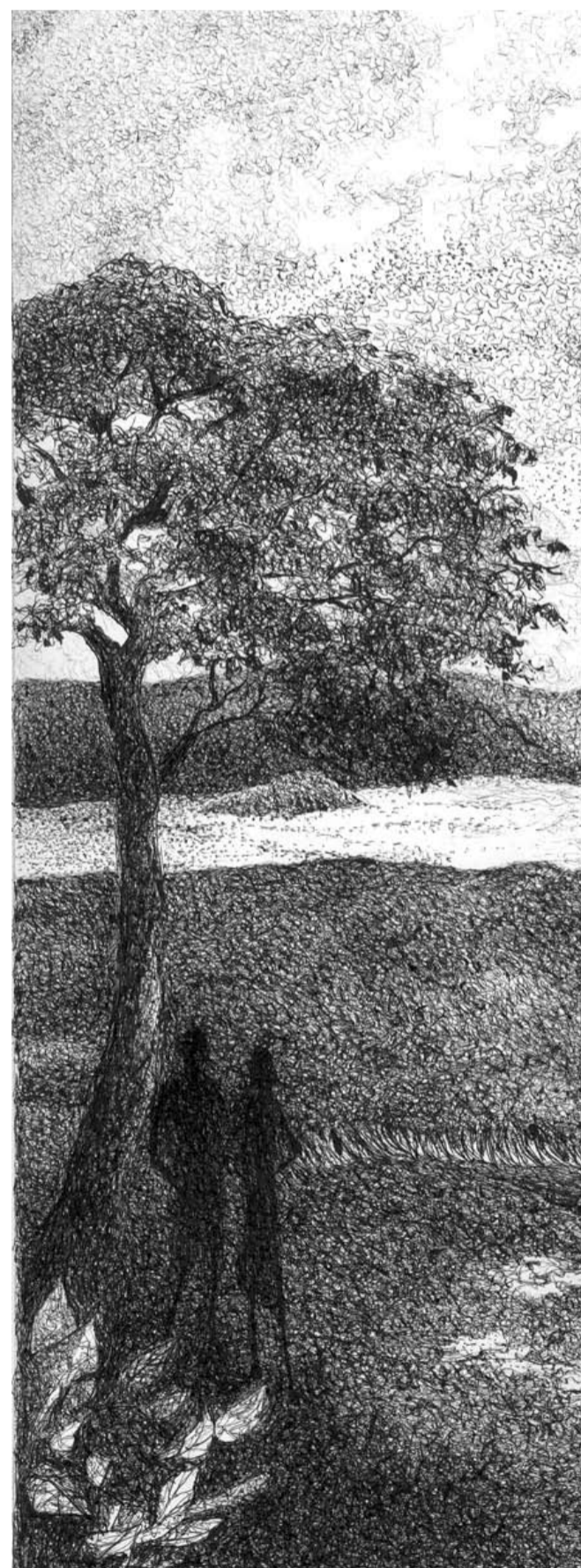


Illustration by Prof. Raja Mohanty, IDC

NEWS

Soneri Bagh: IIT Bombay's very own Enchanted Forest

Who does not know and love Winnie-the-Pooh? Very few people know that inspiration for the Hundred Acre Woods came from a real forest. A.A. Milne had used Ashford forest for inspiration to create the Hundred Acre Wood and many of the enchanted spots where Winnie-the-Pooh and Christopher Robin found their adventures are tucked away in East Sussex, about an hour's drive from London.

Why this sudden interest in Pooh, you might ask. Well, to use it as an analogy for Soneri Bagh, our very own enchanted forest. Although very few of us know the place by name, it is the stretch of land sandwiched along H8, Guest House and Powai Lake and probably the last of the truly 'wild corners surviving within the Powai campus. IIT Bombay has a few natural vegetated patches but Soneri Bagh is the most diverse, in terms of both flora and fauna. It is particularly rich in birdlife and also in terms of its biodiversity. However, easy and unfettered access to the area has led to trapping of wild birds and indiscriminate dumping of waste, and in general is ruining the area of its natural wealth.

Every year in December each Silver Jubilee Batch takes on a "Legacy Project" to leave a lasting legacy of that batch for IIT. Last year (December 2009) the Class of 1984 donated Rs. 2 crores to the Institute for their Legacy Project. A portion of this fund will go to the conservation of the Soneri Bagh area. The goal is to preserve this natural habitat as an eco-system in its present form. The project will involve putting up signage about the birds, plants, etc in this area, improving the trail, etc. In areas which have been degraded due to construction activity, planting of saplings has also been planned, keeping in mind their compatibility with the native flora and fauna.

The implementation team from the class of 1984 includes Mahesh Patil, KK Iyer, Suneet Chitale, Sukumar Thanawala, Ajay Phatak, Sharat Chandran and Shirish Wagholde.



Christopher Milne recruited Pooh to help in a campaign for the survival of Ashdown Forest, which was then being threatened by the proposed ravages of a major exploration by British Petroleum. It was intolerable for Christopher that such wild, wooded English countryside, once the hunting ground of Kings, should come under the threat of so-called 'progress and development.' Happily, the 100

Acre Wood was saved for posterity. Today, Ashdown Forest is much the same today as when Ernest Shepard first sketched it over seventy years ago.

One hopes that the Legacy project of the Class of 84 has a similar salutary effect on Soneri Bagh, and it retains its natural, untrammelled beauty for many years to come.

THE WAY WE WERE

Selva and his Pets

■ SATISH JOSHI Alumnus, B.Tech. (1978), Electrical Engineering

Selva in particular, and the other NWSF occupants of his time have had some of the strangest pets that I know of.

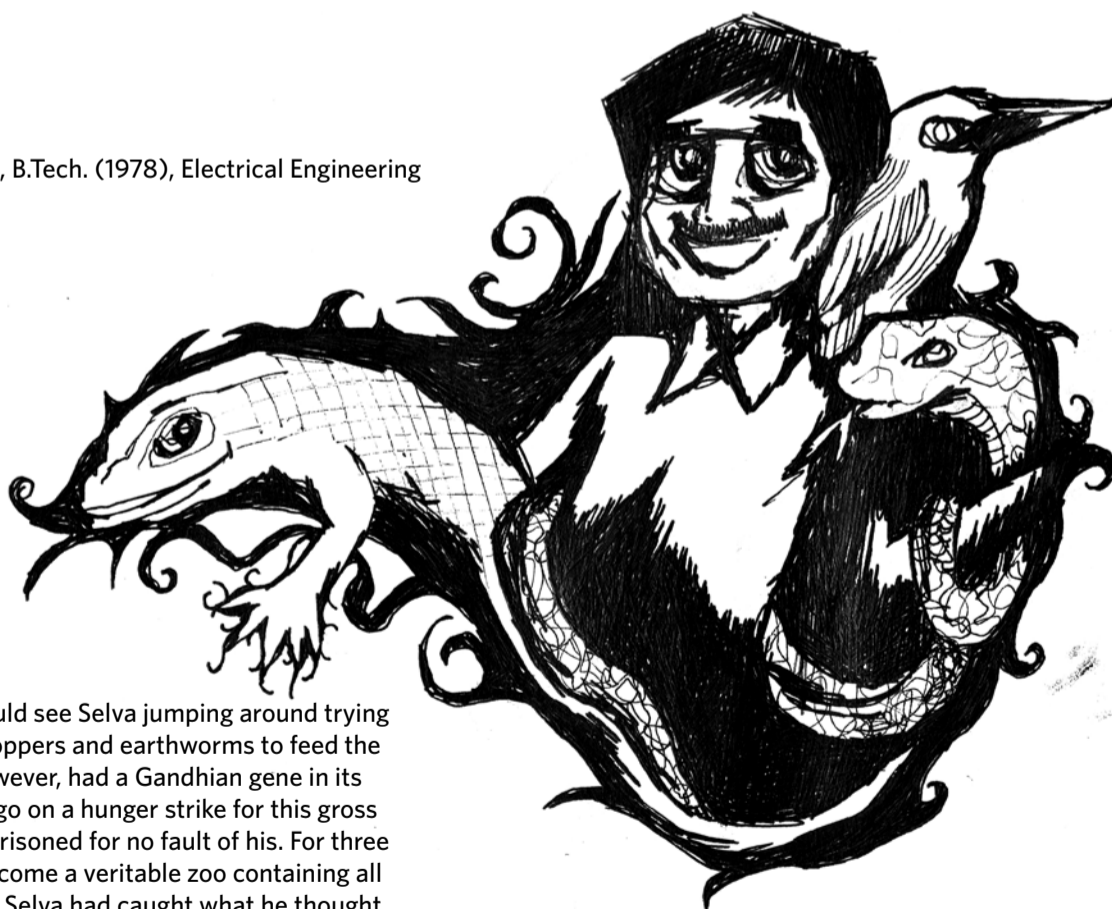
One of them was called Gharpure (named after a real H4 guy called Gharpure for a reason you will know soon). This was a monitor lizard caught by Selva near Vihar Lake behind H4. Monitor lizards are dangerous carnivores - too small to eat a human but aggressive enough to hurt one in the process of trying to do so. How he caught it, only he knows. He spent one whole afternoon converting his chair into a cage for Gharpure by hammering a grill he stole from the Mechanical Engineering workshop around the legs of the chair. That evening Gharpure was proudly on display as the newest pet of NWSF. Next morning Gharpure was gone. It had broken through the grill with its claws and teeth during the night.

The reason it was called Gharpure? In Marathi, the Monitor Lizard is called a Ghorpad and for Selva's Malaysian ears that sounded too close to give up the opportunity to call it Gharpure. (According to some other opinions they even looked the same and had similar sharp claws, but that is something some folks like Gharpure didn't quite see eye-to-eye with.)

Then, there was a time, we all went to Naneghat and Selva caught a snake. Actually, the snake was peacefully going about its business when Selva stepped on it and tripped. The snake did not have much of a complaint about it but Selva had one. For this brazen act of impolite behaviour, the snake was imprisoned in a bottle and brought to NWSF.

Next morning you could see Selva jumping around trying to catch flies, grasshoppers and earthworms to feed the snake. The snake, however, had a Gandhian gene in its DNA and decided to go on a hunger strike for this gross injustice of being imprisoned for no fault of his. For three days our wing had become a veritable zoo containing all manners of creatures Selva had caught what he thought the snake would find tempting, but to no avail. Finally, Selva decided to let it go and released it in the jungle behind H4 (perhaps half hoping he will bite the Dhobi).

And then after Selva's fame (about his pets) had spread far and wide, a Kingfisher (yes, a real live one) came seeking shelter in Selva's arms. Its wing was injured and it wasn't flying very fluently. The next whole week you would find Selva crooning to the Kingfisher, nursing it back to health. He even negotiated a deal with a fisherwoman



from Y-Point to come and deliver a fish (small just about as long as his index finger) to H4 every morning. The fisherwoman didn't find the deal particularly lucrative and didn't come on the 5th day. Promptly, the Kingfisher decided he had taken undue advantage of Selva's hospitality and vanished the next morning.

This anecdote is a sneak preview from the forthcoming book, Madhouse: True stories from the inmates of Hostel 4, IIT Bombay. ■



POETRY

On the Powai Lake

■ A. BIRD



Be the rising or the setting sun
birds seem to be having fun

A cormorant sun bathes
while a shrike tries new shades

A stilt with legs thin
looks in the shallow for fin

As the ibiss's glide in a vee
quacking, whistling ducks wonder,
"how many are we?"

The kingfisher seems all blue, but dives
in a split second;
it makes fish run for their lives

Hérons, purple and grey,
use their wingspans
to impress the lady clan

Terns fly, turn, fly and turn
wonder why they are avoiding a sun burn

While the koel coos and the cow moos
a school of parrots is set loose

Hawks sit brooding, catch prey swooping
wonder where they got their schooling

There are crocodiles I hear
should we fear?
Oh yes! if we or it comes near

eagles soar, scan the panorama
"Is there a new drama?"

Engines cut and uproar, axes go
'hack, hack'
the lake wonders who is this quack

Folks come, sit, talk and see
do they ever wonder,
"Is the lake part of us, or are we?"

THE WAY WE ARE

Ants in Pants

■ SNEHA KHEDKAR Kendriya Vidyalaya, IIT Bombay

I was eight years old. Why me? I thought, as I cycled
furiously from the Guest House to my house, with my
legs itching and hurting like crazy.

I had been playing tag when abruptly I felt sharp twinges
at my feet, as if something was crawling and biting me all
over. Distracted from my play, I looked to the ground to
find that I was standing on an anthill. Too late, I thought,
as I felt thousands of ants climbing higher onto my legs.
I came off the anthill swiftly enough, but the damage
was still being done. I stamped my feet on the ground
vigorously. Ants had already bitten me upto my thighs.
I saw red marks that hurt like someone had crushed my
legs under a truck. I started screaming and my sister
asked me to go home and wash my legs.

Couldn't I have seen where I was standing? I wondered,
just when I reached home. I hoped my mother would be
there. I stormed towards the bathroom as soon as my
mother opened the door. Puzzled, she followed me. I took
some water and poured it down my legs. Sobbing, I told
her what had happened. I expected her to lecture me on
how I was careless or something like that, but she didn't.
Instead, she rushed to the kitchen and brought two trays
of ice cubes. She poured them into a bucket and opened
the tap. Then she told me to stand in the bucket of ice
cold water.

As soon as the freezing water started to soothe my legs, I
figured I couldn't see properly. I heard my mother gasp. I
rushed to a mirror and saw my reflection. My whole face
was swollen with only tiny slits for eyes. Soon, I realised
that I was feeling very cold. My mother checked my
temperature. I had a fever. I was horrified. To add to it, I
realised I couldn't breathe properly. I tried to take deep
breaths, but couldn't.

By then, my mother had phoned my father. We went to
the hospital and the doctor examined me and told us that
I had insect-bite allergy because of which my wind pipe
had swollen up. I was kept under observation for over
two hours. When I felt better and could breathe quite
steadily, we all came back home.

But it wasn't over yet. I felt nauseous. My father tried
to cheer me up but was unsuccessful. As soon as we



Illustration by Sayali Bhagali, IDC

I looked to the ground to find that I was standing on an anthill. Too late, I thought, as I felt thousands of ants climbing higher onto my legs. I came off the anthill swiftly enough, but the damage was still being done. I stamped my feet on the ground vigorously.

reached home, I vomited from the side effects of the medicines given at the hospital. It was almost a week before the itching on my legs stopped.

When people think about animals in IIT, they only think of animals like dogs, snakes, monkeys, crocodiles, leopards, etc. They tend to neglect tiny creatures like ants. But then they don't know that these tiny creatures can become the reason for someone to land up in the hospital.

Though I have had many other experiences with animals in the campus, this is the most memorable experience I have ever had. Even today, I am really afraid of insects, especially ants. Ants have and will always haunt me. ■

THE UPSIDE OF DOWN

An Ominous Dream

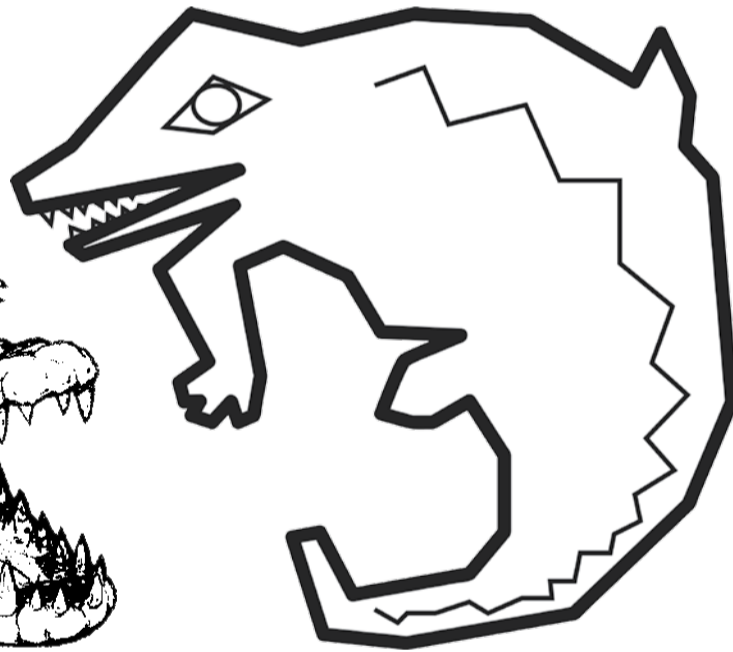
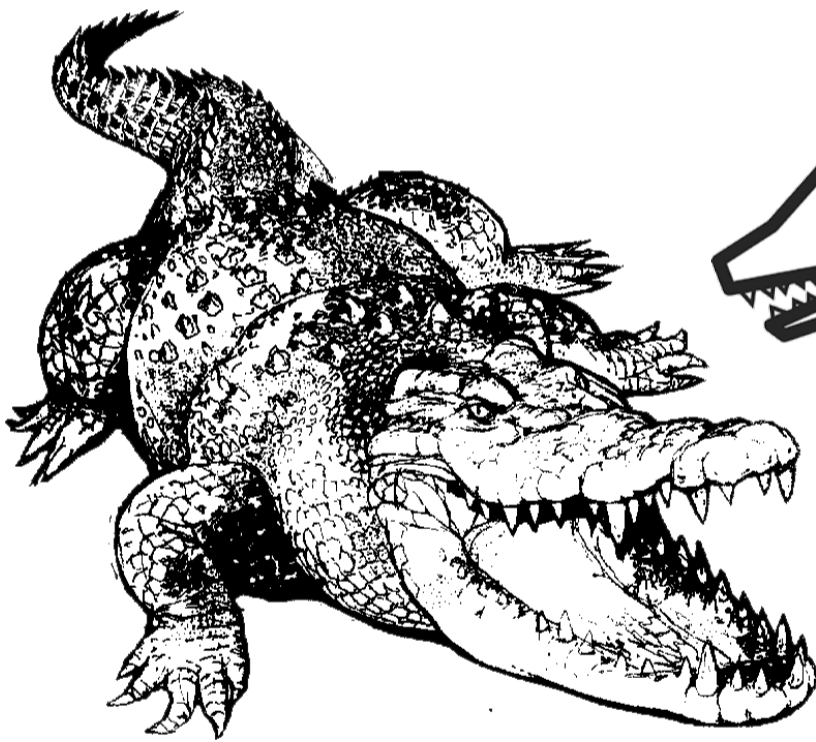
■ SWEETIE AHLUWALIA



I had an ominous dream a week ago. I dreamt that IIT had actually turned into a crocodile that had the entire campus community living on its back. And then the crocodile felt like having its back scratched and asked a colleague to do so.

So the colleague took a stick and went 'Scritch Scritch' and the crocodile said 'No not there. The itch is a little to the left.' And so the fellow croc went 'Scritch Scritch' more to the left.

Then it went more to the right and so on till the entire campus was going helter-skelter and then I woke up and realized that it was simply a nightmare, heaved a sigh of relief and went back to sleep.



This is the beginning of a script that I am working on, where there is an ominous dream and then the audience is left off the hook and heaves a sigh of relief AND THEN the real monster makes an entry...

...The JCB's are here!



Somebody pinch me. Tell me it is just a bad dream.



PHOTO-ESSAY

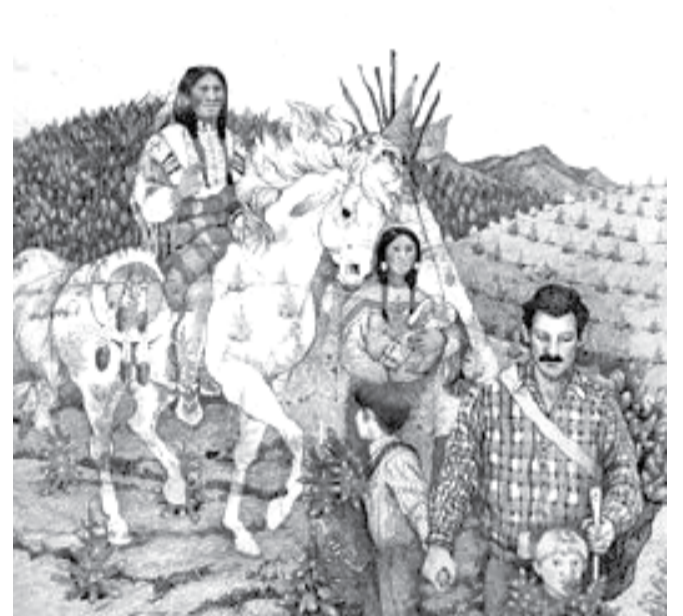
■ From **BROTHER EAGLE, SISTER SKY** A Message from Chief Seattle (From a picture book by Susan Jeffers. We downloaded it from www.arvindguptatoys.com)



How can you buy the sky? Chief Seattle began. How can you own the rain and the wind? My mother told me, Every part of this earth is sacred to our people. Every pine needle. Every sandy shore. Every mist in the dark woods.

Every meadow and humming insect. All are holy in the memory of our people. My father said to me, I know the sap that courses through the trees as I know the blood that flows in my veins. We are part of the earth and it is

part of us. The perfumed flowers are our sisters. The bear, the deer, the great eagle, these are our brothers. The rocky crests, the meadows, the ponies — all belong to the same family.



Send in your articles, photographs, etchings, poetry, or anything else you would want portrayed in the magazine to pro@iitb.ac.in.



This we know: All things are connected like the blood that unites us. We did not weave the web of life, We are merely a strand in it. Whatever we do to the web, we do to ourselves. Nearly 150 years ago Chief Seattle, a respected and peaceful leader of one of the Northwest Indian Nations, delivered a compelling message to the government in Washington, D.C. who wanted to buy his people's land.

He believed that all life on earth, and the Earth itself, is sacred, and that man's heedless abuse of nature will lead to his own destruction. It is a powerful plea for conservation to which every child and every adult will respond.

MAILING ADDRESS