

SCIENCE AND ENVIRONMENT FORTNIGHTLY

AUGUST 1-15, 2009

Down To Earth

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THEY RULE OUR WORLD



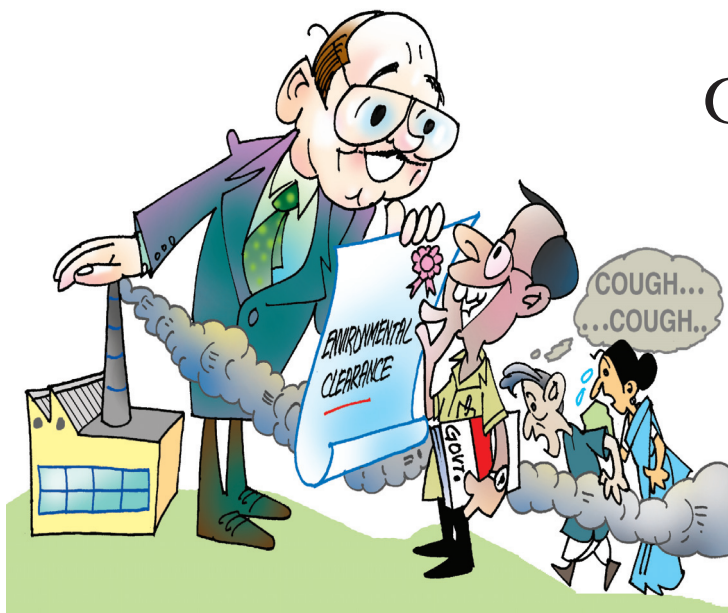
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Environmental Impact Assessment (EIA) is an important tool to inform decision-makers, regulators and stakeholders, about the possible environmental, social and economic costs of the proposed project. To be effective, it requires the active involvement of all concerned stakeholders.

There is a genuine need to develop the capacity of the state-level regulators and state level expert appraisal Committee (SEAC) to screen and scope the EIA process, to conduct transparent public consultations and to evaluate the EIA reports, especially after the new EIA notification. At the same time, there is a need among CBO, NGOs, academicians, and environment managers to review and interpret EIA report, as they are technical in nature.

Centre for Science & Environment recognises this need and has developed a hands-on five-day training programme aimed at giving practical exposure to participants on EIA with specific reference to *coal based power plant, cement, pharmaceutical, mining and others*. After the programme, the participants shall have:

1. Exposure to all aspects of EIA, from its theory to the practical – such as better understanding regarding
 - What data is required, how this data should be collected and interpreted, and significance of the data
 - Effectiveness of the assessment methods
 - What issues should be addressed in the terms of reference (TOR)
 - Tools and thumb rules available to evaluate the environmental impact of projects
2. Better understanding of the EIA process – from screening, scoping, data collection to impact assessment as well as the role of public consultation
3. Better understanding of the environmental and social impacts of the industrial and developmental projects
4. Better ability to review EIA reports and identify its strengths and weaknesses
5. Increased ability to play active role in post-EIA monitoring.

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Rain or no rain



Last fortnight a dominant image on TV screens was drought. This fortnight, vast parts of the country drowned in water. An uncertain, unpredictable and variable monsoon is still impacting us. Late rain has delayed or jeopardized sowing; or intense rain has thrown life asunder and flowed away rapidly, creating months of (future) scarcity. Regional variations are huge, too. So there is drought in otherwise moist northeast and in paddy-growing Punjab and Haryana. A different monsoon, perhaps signalling the climate-changing times ahead.

Last fortnight, I said these changes had to be heeded for the future. We must learn, fast, how to reinvigorate our water policy keeping in mind the two big changes—more variable rainfall and desperately growing water needs. What do we do then?

Let me lay out elements of the future water policy: an agenda for change.

One, we need a water-knowledge mission with a difference. This mission, using the most sophisticated water measuring devices—satellites, groundwater sensors—must be targeted at informing the people affected by water-change. It must be designed so that information generated can be distributed, quickly, to each farmer or household. The world's biggest weather forecasting system with the biggest communication footprint.

Two, a plan for water at each village, city and factory. Every village must have a map of its wells and know its water levels. What's going on in the groundwater aquifer must be public and community knowledge. Villages must also have a drainage map, displayed on its

panchayat or school hall, so that everybody is clear rain, when it comes, is treasured by being harvested. This will require big changes in the way we do things. At the moment, groundwater, which serves most of rural and urban India, is treated as a minor irrigation source. Little is invested into counting wells or, indeed, the levels and quality of well-water. It is the proverbial black-hole—extracted from, not valued.

The Central and state groundwater boards do measure depths of wells not in regular use. This method needs review. Also, this data is not public. The last I heard, computerizing groundwater data had become a horrific spend. Armed with World Bank money, the government launched a national programme to feed groundwater-levels data of each state into its new software, that a private vendor built. Out went the old system of recording data. The software did not work in some places, in others people were not trained to work it, the computers failed and finally the government and the vendor fell out over the costs of annual maintenance. Now the old data does not exist, and the new one cannot be tracked. This needs to be fixed. But this is still not good enough. In the age of variability there is no alternative to the alternative of turning each village water-literate.

Three, the village water security plan must become the basis of all future development expenditure. Substantial funds under the National Rural Employment Guarantee Scheme and rural drinking water programme need dovetailing into a five-year water security plan. Everyone likes to talk about a decentralized system for catching every drop of water. Now, we have to build it.

Four, we must work on demand, not be focused on supply. This is crucial. Currently, all government plans and proposals are mere mouthfuls about how much water we have. Most estimates are not worth the paper they are written on and miss the fact that, if indeed there is surplus, it is in the basins of the Ganga and Brahmaputra and so difficult to reach for the country, let alone those in their own backyards.

Let us be clear. Water needs to move

out of the fossilized minds of engineers, who can only think of grand structures to augment supply. Water must become everybody's business.

So, the fifth area is to rework water and waste management in our cities. Here is a real opportunity. Today, cities pull in water from further and further away. The cost of bringing water is high, distribution losses huge. The city can afford to supply to a few and not all, reinforcing a policy, and a cycle, of scarcity and augmentation. But turn the issue on its head. The issue is not supply, but distribution to all. If cities had a single agenda to ensure minimum water to all equally, it would drive policy—they would meter each point of bulk supply, charge prices based on consumption and cost for treating sewage that comes out of every household. Once the rich in our cities begin to pay the 'real' costs of their consumption, policy would work to drive down costs, make water supply and distribution more affordable. This, in turn, would make the city value its local water bodies and groundwater recharge systems, for these would cut costs and losses of piping and pumping.

Six, the agenda has to be to reuse and recycle every drop of water. Instead of spending on expensive options, say turning seawater into drinking water, we should turn every litre of sewage and industrial effluent into usable water—treated for use in agriculture or treated even more to turn it into drinking water.

Finally, water—its scarcity, its availability and use—has to be a national obsession. I suggest the Prime Minister become the first water warrior: he cuts his own water use, harvests his own water, makes his bills public and does a public water audit of his own establishment. This begins the conversation with chief ministers, in a specially convened session of the national development council on water. The agenda should be single: how do we secure India's water future. The answers should be driven and direct. We are running out of time, if not out of water. ■

—Sunita Narain

Down To Earth

AUGUST 1-15, 2009

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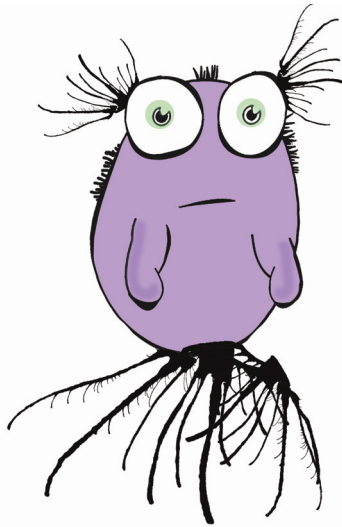
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Microscopic strings attached

Microorganisms have a complex equation with humans. From the structure of our bodies to cultural differences, the invisible beings influence our decisions about everything, from food and disease, to death and survival



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1 bed for 422 people

That's the ratio for private hospitals. For government hospitals it is worse

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India needs a policy on what to feed the malnourished

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COVER: SURYA SEN

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extra

A simple handshake may reveal a lot.



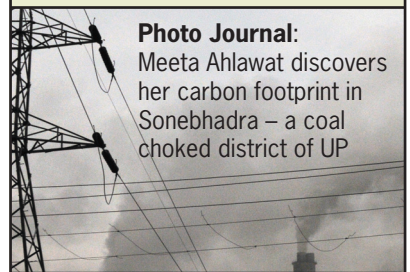
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Gossiping microbes

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Photo Journal:

Meeta Ahlawat discovers her carbon footprint in Sonebhadra – a coal choked district of UP

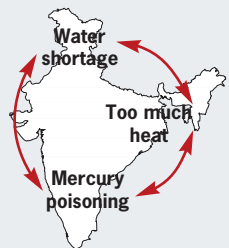


NEWS ACROSS

- Orissa targets kitchen gardens to improve nutrition levels
- Hyderabad—a city obsessed with INFRASTRUCTURE?
- Games begin in Delhi in the run-up to Commonwealth
- Mumbai looking to silence the noise

Queer things

are happening around the industrial zones of India



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59-78

Why don't officers take the bus?

I work for Delhi Transport Corporation, the company that runs the fleet of government buses in the capital. Yet my colleagues and I commute to work and back in company cars.

I agree with your view that there is no other way to manage the growing city traffic and pollution but for more and more people to use public transport ('Can we afford not to change? Can we afford the change?', July 1-15, 2009). This must be implemented in letter and spirit. Just as charity begins at home, the government transport undertaking too should take the first step and make public transport compulsory for its officers.

JASWANT MALHOTRA
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✉ We find power generated by thermal power plants inexpensive because we do not take into account the environmental cost of mining coal, its transportation, use, the air and water pollution it causes. Then there are problems caused by the waste generated in the process. Similarly, in the case of hydel power, we do not take into account the cost of highly productive land areas submerged in the reservoirs and the cost of uprooting people.

Similarly, in case of public versus private transport, we consider only the cost of fuel and maintenance. But what about the cost of fatigue caused by driving a private vehicle on congested

roads, the loss of public land including green areas for parking, the cost of health expenses due to the air pollutants

from vehicles and the consequent man hours lost.

If all these and similar factors are considered, public transport works out to be very cheap. Most people in India's metros drive their own vehicles out of compulsion. Given a choice between private vehicle and public transport, many would prefer the bus provided it is made comfortable, dignified and punctual.

ASRARUL HAQUE
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Bharat Ratna for Kurien

I recently read that farmers tied to Gujarat Cooperative Milk Marketing Federation, largest food product marketing organization in the country, plan to start a campaign for a Bharat Ratna for Verghese Kurien. I think the father of India's white revolution is the most eligible candidate for the highest civilian award of the country.

S K CHETAL
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Neighbourhood retailers

Subhiksha, the retail chain may have gone bust, but my vegetable vendor still comes to my doorstep the first thing every morning. My neighbourhood grocery store too is alive and kicking even now.

I hope Prime Minister Manmohan

Singh and his advisers recognize the dangers of allowing big players in retailing foodstuff, fresh fruits and vegetables and rethink their so-called reforms ('Time to be different', June 1-15, 2009). Several malls are also closing down or they are not able to sell floor space. The American-style malls are any way such energy guzzlers.

ASIT NEMA
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✉ I agree with you the rural employment programme, loan waivers and higher minimum support prices have got the Congress and its partners the support of the poor in the last general elections. But I would not overlook the political dimensions which led some UPA partners to victory.

Nitish Kumar's sweep in Bihar was

as much for the work done by his government as due to his refusal to let Narendra Modi campaign in the state. Similarly, Naveen Patnaik's victory in Orissa was not due so much to developmental work for the poor but his sharp break with the BJP after the communal riots they had provoked in the tribal areas. Similarly, the Congress opposition to the effort by Varun Gandhi to try and popularize a stridently anti-Muslim brand of Hindutva in Pilibhit might have won him the elections, but it lost the BJP many a constituency.

SHRI PRAKASH
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✉ To achieve inclusive growth India must focus on the rural economy and making water and electricity available to all its people. It is also high time the country's English language media shifted its focus to real India.

SURESH NANDA
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Family size



The greatest stumbling block to solving problems relating to India's food security, agricultural sustainability and the environment is its population explosion. Every year the country adds population as large as Australia's when several others have achieved zero growth.

China too is rapidly moving towards zero growth of its population by strictly enforcing the one-child-per-family norm. Being a democracy India cannot adopt coercive means to limit family size, but the same results can be achieved through a system of incentives for limiting family size and disincentives for unbridled growth of the family.

India's political leaders do not take the problem seriously. Other than making customary speeches on population day no politician even talks of tackling

the problem. Most of them consider the subject taboo.

S VENKATARAMAN
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Stop Tipaimukh dam

The people of Bangladesh are desperate to save the country's environment, agriculture and network of rivers from the Tipaimukh dam being planned by India on the Barak river in Manipur ('Downstream of India', July 1-15, 2009). I would request you to provide more scientific data and information on how the dam will devastate the lives of the people in Bangladesh, Manipur and Mizoram. Only knowledge on the impact of the dam on these areas can deter India from creating a tsunami-like catastrophe.

MUSTOFA MUNIR
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The Futanes inspire all

Thanks to Aparna Pallavi's article, my fellow farmers and I went to meet Vasant and Karuna Futane at Rawala village; we were amazed to see their work ('Rooted to earth', March 1-15, 2009). Their beautiful mud house, large sheds, the standing crops grown naturally, the gobar gas plant left such a deep impression that we have returned converted to natural farming.

On Vasant Futane's suggestion we got a copy of Masanobu Fukuoka's *One Straw Revolution*, the Bible of natural farming. We have asked his son Vinayak to mark contour trenches on our land. Karuna Futane too taught us a lot. She has done a great job by organizing village women against bootlegging to stop the illicit manufacture of country liquor.

The Futanes are an amazing family. No wonder students from all over the world come to learn from their way of life.

S SANYAL
Nagpur

CO₂ is not deadly

Carbon dioxide is not a deadly gas as described in the editorial 'Another CO₂ alition of the willing?' (June 16-30, 2009). Whatever its long-term effects on global temperatures, humans, animals



and plants thrive in far higher concentrations of CO₂ than are currently in the atmosphere (0.04 per cent), or are ever likely to be. The idea of CO₂ leaking from pipes being dangerous is far-fetched. It would instantly mix with other much more significant gases in the atmosphere.

BOB BRADNOCK
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☒ Calling CO₂ a deadly gas is a sin I constantly instruct my colleagues to avoid and try to avoid myself. Of course CO₂ can be deadly. So can oxygen and nitrogen. But try living without them.

ROBERT
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E R R A T U M

The table accompanying the article 'Uranium in food, water in Bathinda' (July 1-15, 2009) compares the tolerable limit of 5 µg (microgramme) per kg with the range of uranium found in wheat, pulses, milk and water.

5 µg per kg of body weight per day is the tolerable intake of uranium via ingestion for humans as per WHO norms. This is not comparable to the amount found in wheat, pulses, milk and water. We regret the error.

Down To Earth welcomes letters, responses and other contributions from readers. Send to Sunita Narain, Editor, *Down To Earth*, 41, Tughlakabad Institutional Area, New Delhi - 110 062.
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CAMPA funds unlocked

Rs 11,000 crore to go to states for afforestation

SUMANA NARAYANAN

THE Supreme Court has ordered that Rs 11,000 crore, collected for diversion of forestland for non-forest uses, be released to state governments. States in India have long fought the Centre to recover the money they gave to the compensatory afforestation fund. Collected over seven years, the money has been lying idle because the states and the Centre disagreed over controlling the money.

The money came under Central control, via a Supreme Court intervention in 2002, because the states had not utilized the money. The states alleged that the Centre retained far too much control in its earlier plans (see ‘Why states are against CAMPA?’ *Down To Earth*, January 15, 2006).

The apex court ordered the Rs 11,000 crore will be released in phases; Rs 1,000 crore every year for five years. Each state will get an amount proportionate to its contribution. An ad-hoc compensatory afforestation management and planning authority (CAMPA), appointed by the court in 2006, will disburse the funds.

The order came on July 10 after the Union environment ministry consulted states and formulated guidelines for using the money in March. The guidelines were revised after Jairam Ramesh took charge as the minister of state for environment in May.

The revision happened because the ministry wanted more control. The Centre will have an advisory council to monitor how states spend funds. It will also frame guidelines and arbitrate in any inter-state dispute. Ramesh will head the council.

Each state will also set up its own CAMPA and funds will be channelled through it. The state-level CAMPA will be three-tiered, with governing, steering and executive committees (see box). “If these committees get their act together, we will transfer the money, including interest (after five years) and let them

control it. Then the Central ad-hoc committee will be dissolved,” said Ansar Ahmed, member of the ad-hoc CAMPA and inspector-general of forests in the environment ministry. The government will also coordinate compensatory afforestation plans with the National Rural Employment Guarantee Scheme to boost employment.

CAG to audit

The Comptroller and Auditor General (CAG) of India will audit both the ad-hoc CAMPA at the Centre and the state-level CAMPA bodies. The Union ministry or

state governments can call for a performance audit if they feel it is warranted. “Since the money in CAMPA is public money, CAG should audit,” said Rajeev Dhavan, a supreme court advocate.

The central empowered committee (CEC) that advises the Supreme Court on forest matters has often disagreed with the ministry on how the funds should be managed.

But it accepted the latest plan. “We are content with the ministry’s guidelines on CAMPA. It conforms to most of our recommendations,” said a CEC member.



DIVYA

Work allocated

To state-level CAMPA committees

- The Central ad-hoc CAMPA will disburse the money
- The governing committee of the state CAMPA will take policy decisions on what the money should be used for
- The steering committee (state) will clear the state’s proposals for fund usage
- The executive committee (state) will spend the money

States confused

States are not quite sure how the money will be disbursed. Some are under the impression that they will get back their money at one go. “The Supreme Court has ordered all money be returned to the states, and that is what the ministry is doing,” said P B Gangopadhyay, principal chief conservator of forests, Madhya Pradesh.

Karnataka is content to know that it will get its share of the fund. “There is no problem in the disbursal mechanism. We don’t mind the instalments,” said S Nagaraj, principal chief conservator of forests in Bengaluru. ■

The two-degree shift

MEF decision sparks row, business focus of Hillary visit

KUSHAL PAL SINGH YADAV

EARLY IN July, at the Major Economies Forum (MEF) meet in Italy, India signed a statement which created a major controversy back home. A few days later sparks flew during US Secretary of State Hillary Clinton's visit to India. Both sides stuck to their negotiating stands.

By signing the MEF statement India was seen to be giving in to the demands of industrialized countries (Annex I countries), the US in particular, which wanted major developing countries to take binding commitments to reduce emissions. Top climate negotiators agreed the statement was a compromise but it did safeguard the country's basic and critical positions. Besides, China, South Africa and Brazil—India's partners in UN climate negotiations—had also signed the declaration. On July 20, Environment Minister Jairam Ramesh corrected any ambiguity about India's position in a joint press conference with Clinton. Legally binding emission reduction targets will not be acceptable to India, Ramesh clarified.

Unusual business

Two of the several points in the declaration sparked controversy. One: developing countries take action so that their

emissions represent "a meaningful deviation from business as usual in the midterm"; and two: limiting global average temperature increase to 2°C above the pre-industrial levels. The latter comes with a rider of identifying "a global goal for substantially reducing global emissions by 2050". This translates to all countries, developed or developing, to make drastic emission reduction by 2050.

Short-term reduction targets for Annex I countries and the long-term global target for all countries are being discussed under two separate tracks in climate negotiations. India's, along with other developing countries', stand has always been that the Annex I countries need to deliver concrete and significant short-term reduction targets (within the next decade or so) before asking for global long-term action. The Annex I countries are historically responsible for emissions and have the highest per capita emissions.

Critics say by "recognizing" this long-term 2°C global limit India may have made a major concession and has let off developed countries. Also the "meaningful" deviation from business as usual level could be construed to mean that major developing countries have to take mandatory cuts.

Senior Indian negotiators argued MEF's is just a political statement and not binding. They said accepting the 2°C limit was a trade-off to accepting a 50 per cent global reduction target by 2050. A quantitative figure would have been worse and this compromise would not hurt India, they said. Ramesh furthered the stand during Clinton's visit.

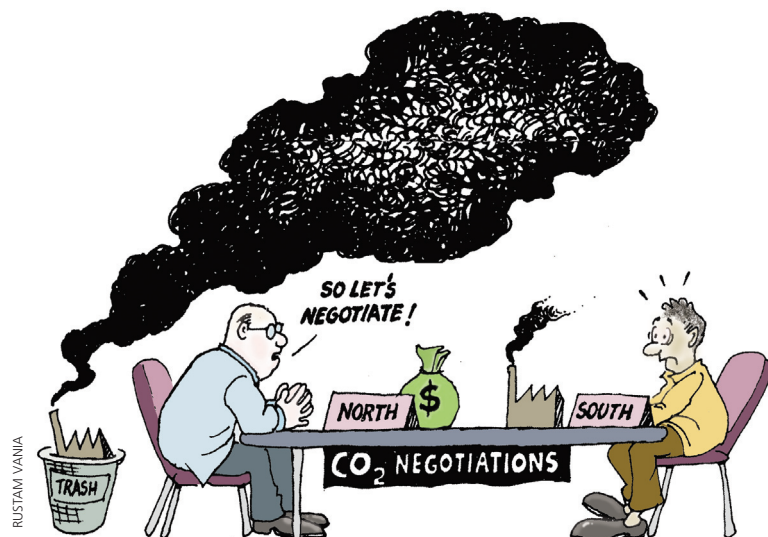
"There is no case for the pressure that we, who have among the lowest emissions per capita, face to actually reduce emissions. As if that were not enough, we also face the threat of carbon tariffs on our exports to countries such as yours," Ramesh told Clinton. He referred to the climate change bill, which the US House of Representatives recently passed. It proposes to impose tariffs on imports from countries, which do not reduce emissions by 2020.

Clinton accepted developed countries like the US need to take the lead and that "US does not, and will not, do anything that would limit India's economic progress that is necessary to lift millions more people out of poverty". But she warned "because over 80 per cent growth in future emissions will be from developing countries" and Indian emissions are likely to go up 50 per cent by 2030 it is imperative India and China also take the lead.

"Even with 8-9 per cent GDP growth every year for the next decade or two, our per capita emissions will be well below developed country averages," Ramesh said in a written statement. He also pointed to a "credibility crisis" and that the developing world looked upon the developed countries "suspiciously" as they have not fulfilled their earlier climate commitments.

Clinton's visit did not yield much. The Indian business community was the biggest focus of the visit. The US delegation seemed to be looking at business possibilities in Indian emission reduction and selling clean technology to eager business houses.

However, the US delegation did not make any financial commitments. ■



RUSTAM VANIA

VIEWFINDER



MINE BECOMES LAKE, SWALLOWS BUILDING
A residential building and a road on the shoreline of a lake in a German village, Nachterstedt, collapsed on July 19. Three people are missing. Officials said the area had received some rain, but it is more likely that opencast coal mining in the past had made the land unstable. The lake was formed after the mine closed in 1991.

▶ The governor of Egypt's port city Suez ordered the **prosecution of bird flu patients** on the charges of raising the birds and harming themselves as well as others. If children are infected, their family will be prosecuted, he said.

▶ WHO has launched clinical trials for moxidectin drug that could halve the treatment period for **river blindness**. Existing treatment for the disease, which threatens 100 million people mostly in Africa, goes on for 14 years.

▶ Benin declared a state of emergency after **heavy rains** displaced thousands of people in the country. Heavy rains also pounded Namibia, which has appealed for international food aid.

▶ China's health ministry banned the use of electric shock therapy for treating **Internet addiction**, after a study raised doubts about the therapy's efficacy. Ten

per cent of the 40 million Chinese children using the Internet are hooked to it.

▶ Russian mini-submarines studying Siberia's Baikal Lake have discovered a reserve of **gas hydrates**—possible alternative to oil and gas. Scientists said it is the largest deposit found yet.

▶ A Kuwaiti company plans to **buy up farmland** in Cambodia. Unlike the wealthy Gulf states that are acquiring land in poor countries to produce food at a low cost for their own people, the company said it would sell produce to anyone who can pay for it.

▶ Vietnam police seized a **frozen young tiger** from a taxi in the capital Hanoi. They also seized 11 kg of limb bones believed to be from two tigers. This is the third such seizure this year.

▶ Mongolia suspended licences of several foreign

companies, mostly from Canada, for violating **environmental laws**. The prime minister said he wanted countries like Japan to invest as their technologies do not harm the environment.

▶ Authorities of Killarney national park in Ireland **banned horse-drawn carts** after their owners refused to use diapers to deal with the dung fouling park roads.

▶ Ten mobile phone manufacturers of the EU, including Apple, LG, Nokia, Samsung and Sony Ericsson, agreed to make phones that can be charged using a **standard charger**. The effort, they said, is to be environment friendly.

▶ Twelve European blue chip firms formed a consortium, Desertec, to set up a giant **solar thermal power** plant in Africa's Sahara desert and transport the electricity to Europe. The US \$570 billion project would meet 15 per cent of the EU's power needs. Critics say the project is not cost effective.

▶ Venezuela's education ministry opened 1,104 classrooms to provide education to 18,000 disabled citizens. This is the first time the government doled out funds for **special education**. About 336,000 people in the country are disabled.

▶ Thirty of the **33 mummies** discovered in Peru in 2007 are those of girls, said Utah Valley University professor Haagen Klaus who has been examining the remains. The girls were most likely killed 600 years ago in the belief to bring fertility to the farmlands, Klaus said.

▶ The US Department of Agriculture received 17,000

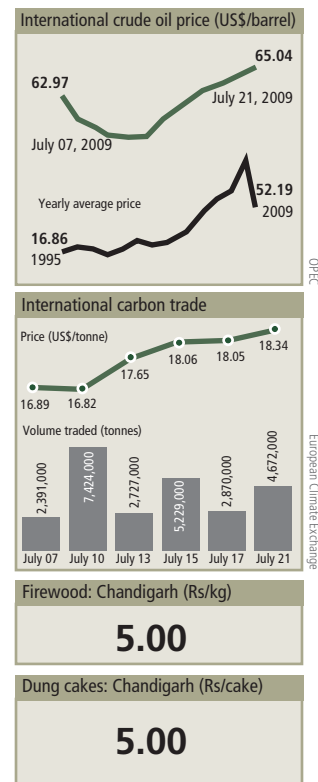
public comments rejecting a plan to conduct field trials of **genetically engineered eucalyptus** trees across seven states. Opponents said the government must carry out an environmental impact study of the plan.

▶ About 17,000 people in Canada's British Columbia province fled homes after **wildfires** engulfed the city of Kelowna on July 19.

▶ An amateur Australian astronomer discovered that a rare comet or asteroid had **crashed into Jupiter**, leaving a crater as large as Earth. NASA has confirmed it.

▶ People in Asia witnessed the **longest solar eclipse** of this century on July 22. It was visible along a 250 km-wide corridor from India to China. It lasted a maximum of 6 minutes, 39 seconds over the Pacific, said NASA.

HEAT EXCHANGE





UK Energy and Climate Change Secretary Ed Miliband

GREENHOUSE GAS EMISSIONS

UK plans to go low-carbon

The UK government unveiled a plan to make the country a low carbon emitter. The plan, announced by energy and climate change secretary Ed Miliband, details how the country will meet its domestic climate targets, set out under the climate change act, to cut emissions by at least 34 per cent by 2020 on 1990 levels. The goals include supporting 1.5 million houses to produce their own energy and deriving 40 per cent of the country's total electricity from low carbon sources like the renewables and nuclear. Carbon capture and storage technology will be used in coal-fired power plants. Miliband said this will help reduce gas imports by 50 per cent. To achieve the target, the government pledged US \$740 million for renewable and clean energy technologies. It also published the low carbon transport plan detailing how to reduce emissions from transport by up to 14 per cent by 2020.

GENERIC DRUGS

Kenyan patients challenge law

Three Kenyan HIV/AIDS patients pleaded with the country's Constitutional Court to declare the anti-counterfeiting act, 2008 illegal. The act could deny them access to generic medicines and thus rob them of their right to life, they said. The act is aimed at cracking down fake batteries, cosmetics and drugs flooding into the country. But health activists say the way the act defines counterfeit drugs is vague; it could include generic drugs and interfere in their import and sale. This will affect the patients who usually depend on generic drugs as those are up to 90 per cent cheaper than their bran-

ded counterparts. "Generic drugs are a legitimate copy of their brand-name original. They are not counterfeits," the patients said. The act has drawn the attention of health activists from across Africa because it is being used as a model for similar anti-counterfeiting bills in Uganda, Tanzania and other African nations that are flooded with counterfeit goods and also have a high number of HIV/AIDS patients who rely on generic drugs.

INDUSTRIAL ESPIONAGE

Rio Tinto bribed us, says China

China accused Australian mining giant Rio Tinto of bribing virtually every one of China's big steel makers to get access to confidential industry data. The allegations, published in China's state-owned newspaper, *China Daily*, came to light in early July when the authorities detained four Rio Tinto employees, including an Australian, on suspicion of industrial espionage, stealing state secrets and harming the nation's economic interests and security. The news report said Rio Tinto employees had bribed executives from 16 Chinese steel companies to gain access to government documents to obtain secret information on China's position on iron ore prices. Rio Tinto, the world's third largest mining company, clarified that the company follows strict ethical codes that forbid bribery and that allegations against its officials are unfounded.

RAINWATER HARVESTING

It's now legal in Colorado

Legislators of the US state of Colorado voted to amend a 19th century law and legalize rainwater harvesting. But not

for all. The amended law allows only those who have private wells or do not receive municipality water to harvest rooftop rainwater. Advocates of rainwater harvesting say given these restrictions most urban dwellers in Colorado cannot harvest rainwater. Under the previous law, rainwater belonged to those who bought the rights to waterbodies and hence could not be harvested (see 'Privatized rainwater', *Down To Earth*, April 1-15, 2009).

PESTICIDES

Bayer to stop endosulfan

Bayer AG, the world's largest producer of endosulfan, pledged to stop producing the pesticide from 2010 onwards. As per letters exchanged between the company, headquartered in Germany, and the Coalition Against Bayer Dangers, a network monitoring Bayer for 25 years now, the company said it would "progressively replace the products" that the World Health Organization classifies as extremely and highly hazardous pesticide. Sixty-two countries, including 27 in the EU, have already banned the pesticide.

Earlier on July 7, activists held demonstrations in 16 countries under the campaign Pants to Poverty, where they exchanged their pants for a free organic pair to show how the pesticide harms farmers who supply cotton to make clothing. Endosulfan is a neurotoxin. It also disrupts the endocrine system and can result in birth defects.



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WATER RESOURCES

Turkmen creates lake in desert

Turkmenistan has embarked on a grandiose plan: digging a lake, dubbed Golden Age Lake, in the heart of the Karakum desert. Engineers have started pumping water from a network of canals that irrigate cotton fields across the country to fill the natural Karashor depression in Karakum.



At the opening ceremony, President Gurbanguli Berdimukhamedov said “the lake would make the desert bloom”. Turkmen leaders said the lake would stimulate biodiversity and attract migratory birds to the country that is 80 per cent desert. Once completed, the lake, spread over 200,000 hectares, is supposed to hold 130 trillion litres of water. Filling it could take 15 years and cost up to US \$4.5 billion. Critics say the plan is destined to fail. They point out that much of the water pumped into the searing desert will evaporate. Insecticide and fertilizer-contaminated run-off water from cotton fields will render the lake water toxic, they said.

INDUSTRIAL POLLUTION

Gold fouls Tanzanian river

Tanzania has banned the use of water from the Tigithe river saying the river may have been contaminated with sulphuric acid used by Canadian company Barrick Gold in its gold mine in Tarime district. The announcement came two days after Tanzanian officials began investigating allegations that the mine’s tailings dam, where wastewater from the mine is stored, is leaking sulphuric acid into the Tigithe. Thousands of people in northwestern Tanzania depend on the river. Local residents complained that

since early June, 18 people and 270 heads of cattle have died after drinking water from the Tigithe. Human rights activists have called on the government to close down the gold mine until a full analysis of the water has been done. Meanwhile, the villagers find themselves without water; the government has not provided them with a safe alternative.

HAZARDOUS WASTE

Brazil fumes over UK’s rubbish

Authorities in Brazil were left fuming after they discovered 1,400 tonnes of toxic waste, illegally imported from the UK, is docked at three ports since early this year. The 89 shipping containers, under the label of recyclable plastic, included toilet seats, used syringes, old TV sets and computers. President of the Brazilian environment agency, Ibama, said Brazil is not the world’s dump and requested the UK to take back the trash. The UK has agreed. Brasilia has, meanwhile, slapped a fine of US \$419,000 on the three Brazilian companies that imported the shipment. Ibama has also

said the incident has violated the UN-administered Basel Convention that came into force in 1992 and bans shipment of toxic waste from industrialized countries.

MINING

Pay for your dirty act, USEPA

The US Environmental Protection Agency (EPA) is preparing new rules that would bind mining companies to pay for environmental clean-up, even if they file for bankruptcy. The announcement follows a federal court ruling in February that had asked the agency to close loopholes that allow companies to pass the clean-up expenses to taxpayers. To start with, the agency is developing rules for industries that mine hardrock minerals such as copper, gold, iron and uranium. The agency’s announcement came a day before the Senate heard proposed changes to a 137-year-old hardrock mining law. The US government plans to revise the 1872 mining law to bolster environmental restrictions.

ACIDTEST



Mercury in air, water

A tenth of India's power needs met by poisoning 500,000 people

SAVVY SOUMYA MISRA *Sonebhadra*

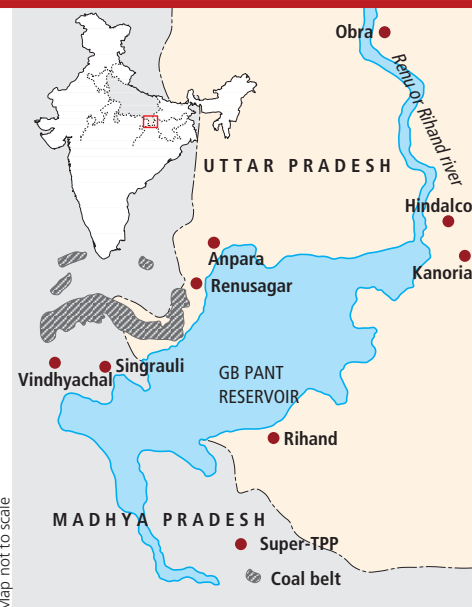
CHEAP coal and easy availability of water may have spurred rapid industrial growth in Sonebhadra district of Uttar Pradesh. But the nine coal-fired power plants, clustered along the Renu river, are poisoning the air and water in the district with mercury, a neurotoxin.

A recent study by research scientists with the non-profit People's Science Institute in Dehradun found mercury levels in the air near these power plants ranged from 94 ng/m³ to 1,291 ng/m³. This is far above the (yet-to-be-notified) permissible limit for the toxin proposed by the Central Pollution Control

Board—15ng/m³. The toxin is in the fly-ash (residue from burnt coal) that escapes into the air through the chimneys or gets discharged as effluent into the Renu, a tributary of the Sone river, said lead researcher Anil Gautam. The study was conducted between February and April this year.

"A boost in coal production and use of coal with higher mercury content are the main reasons for increase in toxin levels in the air and water," said Ramesh Tripathy, Gautam's co-researcher. The effluents from these plants have killed all aquatic life in the river, he added.

Besides brain damage, mercury causes skin allergies, kidney and lung



Map not to scale

diseases and cancer. But its effect on the health of over five lakh people living near the power plants has not been studied in the last decade. Lucknow's Indian Institute of Toxicology Research gave some indications in 1998-99. It found that mercury in the hair and blood samples of people living close to the thermal plants was 300 times higher than in people living 300 km away in Patna. Their IQ levels were also below average, said Brahmajeet Singh of non-profit Vanvasi Seva Ashram.

Power matters, not pollution

The thermal plants in Sonebhadra together generate 14,150 MW of electricity (10 per cent of total power generated in India). The emissions from the plants are far above the figures projected 20 years ago by a consultancy firm asked to assess the carrying capacity of the region. Five more thermal plants are in the offing. They will increase the power

Residents of Tharpathar say Hindalco's drain water killed 100 heads of cattle



MEETA AHLAWAT / CSE

15 ng/m³ is the limit proposed by CPCB

Air monitoring station	Location	Mercury levels (ng/m ³)
Bari Dala	Close to Obra TPP	94-398
Murdhawa	Close to Hindalco	168-743
Kubari Anpara	5 km west of Anpara TPP	173-331
Lojhara	Close to Renu and Anpara TPP	337-1,291

generation capacity of the region to 24,350 MW.

A visit near the state-owned Obra thermal plant in Chopan block showed flyash from the plant is directly discharged into the river. The precipitators in the chimneys that filter the flyash are also out of order, increasing toxins in the air, said Tripathy.

The response of D N Bajpai, the chief general manager of the Obra plant, was "why bother about pollution as long as you get electricity". Bajpai, however, added things would be set right in the next three years.

The Renu river, passing by the Obra plant, has a thick silt of grey settled along the banks. The Rihand reservoir downstream is equally polluted which means flyash is directly dumped into the river or leaches into it from the flyash ponds, said Brahmajet Singh. The study also found high levels of mercury in industrial effluents. The wastewater in the Dongiya drain that flows by the Kanoria Chemicals (caustic soda manufacturing unit), for instance, had 15.3 µg/l mercury against the permissible limit of 10µg/litre. The drain discharges effluents directly into the Renu river.

Mercury is in the flyash

- 210,000 tonne coal is burnt per day by the 9 thermal power plants (TPP)
- 30- 40 per cent of the coal is emitted as flyash
- 0.2-0.4 ppm is the mercury content in the flyash

Drinking water a problem

The pollution is affecting the people nearby. Villagers of Tharpathar, located behind Hindalco plant owned by the Birla Group in Renukoot, said 100 heads of cattle have died in the past two years after drinking wastewater from the aluminium plant. The wastewater flows through a drain into Renu river.

Ram Subhag, 35-year-old labourer, said his family of five have sores all over their skin. Many children in the village could be seen with skin sores and spots. They fetch drinking water from downstream where the river is a little less polluted; they cannot drink the groundwater as it has flourides. ■

Tiger that ate snakes

Food shortage may have forced diet change

J BASU *Kolkata*

ON JULY 17, Sunderbans forest officials posted in Netidhopani came across a dead tiger near their field office. A post mortem revealed the tiger had eaten two cobras, one of them was a king cobra. Tigers are not known to prey on snakes; wildlife experts speculate the tiger may have eaten them because of food shortage caused by cyclone Aila that struck two months ago.

"In my 28 years of experience in Sunderbans, I have never seen or heard of a tiger eating snakes. Non-availability of regular food may have driven the tiger to kill the snakes," said Pranabesh Sanyal, former director of the Sunderbans tiger reserve. Anurag Danda, coordinator of WWF's Sunderbans programme agreed with Sanyal. "A day after Aila, my team and I counted 11 deer floating in the Dattar river," said Danda. He said he visited two of the 54 wildlife inhabited islands in the Sunderbans and did not see any wild animal. Gopal Mondal of Chotomollakhali island said four deer had surfaced near the island. "We could save only one," he said.

Forest department officials denied Aila had damaged wildlife. Field director of the Sunderbans tiger reserve,

The tiger had eaten two cobras



ANURAG DANDA

CURE FROM CUBA:

Two Cuban epidemiologists arrived in Sri Lanka to help the government combat a dengue epidemic.



Cuba has been controlling dengue with *Bacillus Thuringiensis israelensis* bacteria that kills the larvae of the mosquitoes that spread dengue. The epidemiologists will help set up a framework to control mosquito breeding before the government imports the bacteria from Cuba. Over 180 deaths and 18,000 cases of infection have been reported in the country this year. It is a sharp increase from 2008 when 85 people died of dengue fever.



RAINS KILL 61:

Karachi received a record 245 mm rain on the night of July 18, breaking the previous record of 205 mm in 1977.

The monsoon rains claimed 61 lives and injured many over the next two days. The city was plunged into darkness. Power cuts lasting almost 72 hours led to street clashes between people and law enforcers. The overall monsoon rains, however, would be 30 per cent lower than normal, a senior met official said.

Subrat Mukherjee, said it is unusual for tigers to eat snakes but this could not be taken as conclusive indicator of prey shortage. "The tiger was old and the cause of death was infections. Old age and ill- health may be the reason why it ate snakes," said Mukherjee.

Wildlife experts said the forest department shouldn't be dismissive. "Who knows what happened to wildlife on that fateful day? There was no monitoring so there is no proof if animals got killed and floated away," said Mrinal Chatterjee, a Sunderbans wildlife expert. Biswajit Roychowdhury, member of the state wildlife board, said the surging river water might have penetrated the islands and affected wildlife. A detailed study including that of the prey base needs to be undertaken immediately, Roychowdhury said. ■

Too close

Port Blair bench allows resort that may endanger Jarawas

SUMANA NARAYANAN

THE Calcutta High Court has cleared the construction of a holiday resort near the forest area reserved for the threatened Jarawa tribe in South Andamans.

The Andaman administration had appealed against building the resort saying it was within the five-kilometre buffer zone of the reserve and would endanger the tribe—only 300-odd members survive. But the Port Blair bench of the high court upheld the claim of the Chennai-based hospitality group, Barefoot Resorts. The company claimed the buffer zone was never notified by the administration and that it was being targeted unnecessarily.

Administration officials said the court decision would pave the way for other tourism ventures near the 700 sq km reserve. “How are we to protect the indigenous community if hotels are allowed right next to the reserve?” asked S K P Sodhi, secretary tribal affairs in the Andaman administration.

The company spokesperson countered Sodhi. “The aerial distance between the resort and the tribal habitat is 3.2 km; by road it is longer,” he said while adding there are other establishments near tribal reserves in the islands.

Barefoot Resorts had acquired the land for the hotel in Collinpur from villagers. The administration stayed the construction of the resort in October 2007. A single judge bench of the high court had ruled in favour of the company against which the administration filed an appeal before the division bench.

Pramod Kumar, PhD student working on Jarawa grammar at JNU said the Jarawas have been interacting with the settlers near the reserve for about a decade. “But tourists close to the reserve could pose a problem. Right now alcohol is not an issue but that may change with tourists,” Kumar said.

A UK-based non-profit, Survival International, meanwhile, issued a press release condemning Barefoot Resorts for endangering the Jarawas. The hospitality group retaliated by questioning



Only 300-odd members survive

the non-profit's ethics in using photographs of Jarawas to encourage donations and asked if prior informed consent of the Jarawas was taken before publishing the photographs. ■

Vedanta's steel plan

Mining giant Vedanta is all set to diversify into steel business. Sesa Goa Ltd in which Vedanta has the controlling share, has begun negotiations with Japanese and European companies to set up a steel plant in India. Sesa Goa, an iron ore producer, recently acquired VS Dempo and Co Ltd (another iron ore mining company in Goa) and has the capacity to produce 50 million tonnes iron ore. Anil Agarwal, chairman, Vedanta Resources, said the ore could easily feed a 10-million-tonne steel plant.

Muddied water floods North Goa

Unplanned mining blamed for turning monsoon rains into sludge

MAYABHUSHAN NAGVENKAR Panaji

HEAVY monsoon rains mixed with silt from the mines in North Goa damaged about 100 homes in Bicholim taluka on June 6 and 7. No one died. Survivors said they barely managed to escape in time and lost all their belongings.

In the mining belt, silt from the pits dug to extract iron ore is stacked in the open. During rains the silt turns into sludge that damages farmland and houses. This happened on the night of June 6 in Varchawada, Poirra and Manaswada residential areas of Bicholim, the taluka worst affected by mining. Poirra was hit by sludge from

the Advalpal iron ore mine owned by Sesa Goa Ltd—the retaining wall that held the silt back from the mining pit, caved in under pressure.

Rupesh Naik, resident of Varchawada said he had to flee his home like his neighbour Lavu. But villagers were unwilling to blame the company. Activist Ramesh Gauns said villagers rarely complain as mining companies control the economy of the area. Deputy collector D H Kenaudekar said those responsible would have to pay for the damage. Sesa Goa's environment officer Upendra Joshi said he was not aware of the incident as the Advalpal mine was a recent acquisition. ■

Lavu Naik's home at Bicholim was flooded with sludge from the Sesa Goa mine



MAYABHUSHAN NAGVENKAR



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We all must act
together if our planet is to
survive the ravages of climate change.
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civil society and the media must make a united effort to ensure
that we leave behind a greener planet for our future generations.

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plantation ● Regreening worked-out mines ● Water reuse through 100% sewage and effluent treatment.

TATA STEEL

Free trade will bind India

30 agreements to be signed; they violate public interest say activists

GAURI KASHYAP

THE seventh round of free trade negotiations between India and EU held at Brussels in mid-July ended in a deadlock after the negotiators disagreed on the modalities of the agreement. Fresh talks will be held in November to thrash out details of the free trade agreement (FTA) to ease movement of goods and open up retail, services and insurance sectors in India to foreign investment.

Civil society groups including international humanitarian organization, Medecins Sans Frontieres (MSF), warned the proposed agreement would endanger India's food security and make generic drugs very costly.

Some of the details of the EU-India draft agreement were leaked to the press earlier this year and appeared on a website. Article 9.3 in the draft agreement with EU would compel India to extend patents monopoly, currently for 20 years, by another five years. This would delay entry of less expensive generic drugs in the market, MSF said. The draft agreement also provides for what is called data exclusivity right that works like a patent monopoly. This would

make even generic drugs expensive, the activists said. Indian generic drug manufacturers who have brought down cost of several drugs like the ones for HIV/AIDS and tuberculosis will be affected. Such provisions go beyond what is mandated by the World Trade Organization and Trade Related Intellectual Property Rights, they added.

Shalini Bhutani of non-profit GRAIN said the agreement would harm farmers. The draft agreement says any new seed or genetically modified plant variety can be patented. This would prevent farmers from using seeds from these plants for commercial crops or sharing them with others. "Such an agreement implies signing away India's food security," Bhutani said. Biotech companies will profit at the cost of farmers she added.

Besides the FTA with EU, India is also negotiating bilateral trade agreements with Japan, South Korea and south-east Asian (ASEAN) countries. About 30 FTAs are under negotiation right now.

Experts from Thailand warned India against an FTA with Japan. "Japan has always used Thailand as a dump for its toxic waste. A Thai-Japan FTA has now made the practice legal and bind-



ILLUSTRATIONS: DMVA

ing. There is no way Thailand can stop Japan from dumping waste," said Jiraporn Limpananont and Kannikar Kijtiwatchakul, academics affiliated to FTA Watch, a non-profit.

Intellectual property rights expert, Gopa Kumar said there should be no FTAs with developed nations as India is not in a position to compete with them.

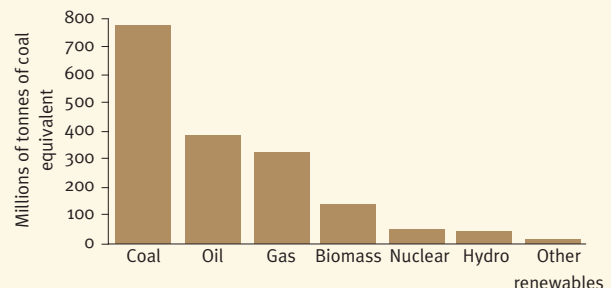
Joint secretary commerce Dinesh Sharma said the EU-India agreement details could not be disclosed till it is finalized. On the Indo-Japan FTA, Sharma said he was not aware of clauses relating to waste dumping. ■

Dirty advance

Financial institutions push coal-fired power plants, not renewable energy, says US study

- **88 coal-fired power plants received funds from World Bank** and other international public financial institutions in the past 15 years
- **US \$137 billion has been spent on constructing/expanding the plants since 1994**, the year the United Nations Framework on Climate Change came into force
- **Most of these plants are in Indonesia, the Philippines, China, Vietnam and India**
- **These 88 power plants can generate 791 million tonnes of CO₂ a year**, more than three-quarters of the current emissions from coal-fired power plants in the EU
- **These plants can cause 6,000 to 10,700 deaths**, mostly from cardiopulmonary diseases and cancer, every year.
- The World Bank classifies 40 per cent of its energy lending as low carbon. But under this definition, it covers new super-thermal coal-fired power plants that are among the biggest emitters of CO₂
- **Between 2000 and 2006, global coal use grew by 4.9 per cent a year.** Renewable energy grew at 3.1 per cent
- Export credit agencies invest US \$310 million a year on renewable energy against US \$1.5 billion on coal-fired plants the past 15 years

The world's energy use by fuel, 2000–2006



Source: *Foreclosing the Future Coal, Climate and Public International Finance*, a study by US-based non-profit Environmental Defense Fund. The study was released in April 2009

New IT industry body proposed

FOSSCOM to oppose NASSCOM

ARCHITA BHATTA

COMPANIES and civil society groups supporting open source software standard in e-governance are planning to form a separate pressure group. They have proposed to form FOSSCOM to oppose the IT industry body NASSCOM that has been lobbying with the government to adopt proprietary software standards.

Free and open source software (FOSS) codes can be accessed by any software professional and modified free of cost unlike proprietary software for which a licensing fee has to be paid to the company holding the software code. The Department of Information and Technology's (DIT) draft policy on e-governance seeks to enforce FOSS (see 'Open Policy', *Down To Earth*, May 31, 2008).

But companies like Microsoft and Infosys have been pushing for proprietary software in e-governance through NASSCOM. On June 17, a meeting of the DIT apex committee was held where NASSCOM opposed the draft policy. Its

CMZ dropped

The committee set up to review the Coastal Management Zone (CMZ) notification has recommended the proposed law be allowed to lapse. The panel chaired by scientist M S Swaminathan suggested the Coastal Regulation Zone (CRZ) notification of 1991 be strengthened instead. Any proposed legislation should take into account the problem of climate change induced sea level rise and growing pressure on coastal resources, the committee said. The report was submitted on July 17, five days before the CMZ notification was to lapse. Fishing communities have been protesting the notification from the very outset saying any development work along the coast will cut off their access to the sea.

spokesperson refused to comment on the issue.

FOSS supporters say adopting proprietary standards as demanded by NASSCOM and the Manufacturers Association of Information Technology (MAIT) would make storing national data such as land records, expensive. People would end up paying for using the proprietary software, they said. Proprietary standards would also lead to loss of business opportunity for several small-scale IT companies that have adopted FOSS to save costs, said Jaijit Bhattacharya of Knowledge Commons, India, a non-profit. He said FOSSCOM would be an alternative platform that will represent small-scale businesses.

FOSS has the support of companies like IBM, Red Hat and Sun Microsystems. Red Hat shot off a letter to NASSCOM saying multiple proprietary standards in the same domain will bring e-governance to a standstill. ■

ACCORDING TO REPORT

NEARLY EXTINCT: Rhino poaching is expected to hit a 15-year high in 2009. As many as 12 rhinos are killed every month for their horns by poachers in South Africa and Zimbabwe as against three in 2000-2005, said a joint report released by WWF, the International Union for the Conservation of Nature and Traffic. Poachers are pushing rhinos towards extinction in Asia and Africa, the report said.

SETTING AN EXAMPLE: Brazil has successfully treated its people living with HIV/AIDS, US researchers said. Brazil fought the epidemic by persuading pharma companies to lower drug prices. Generic companies were asked to develop low-cost alternatives for poor countries.

Fertilizer subsidy fuelling food shortage

82 per cent Indian farmers want bio-fertilizers says study

RAVLEEN KAUR

EXCESSIVE use of synthetic fertilizers in India is reducing soil fertility and affecting food production, said a joint study by non-profit Greenpeace and West Bengal's Visva Bharati university. The study was released on June 30.

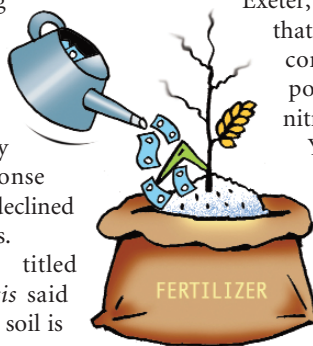
Data quoted by the study said in the 1960s there was a 25-kg increase in grain production with each kilogramme increase in the use of fertilizers. In the early 1990s this yield response decreased to 17 kg; it declined to 8 kg in the late 1990s.

The report titled *Subsidising Food Crisis* said micro-nutrients in the soil is lost with overuse of common nitrogen fertilizers like urea that accounts for 82 per cent of the total fertilizers used in India. Eighty-two per cent of the farmers surveyed in seven large agricultural states in the country said they were ready to use bio-fertilizers if they are easily available and subsidi-

dized. The fertilizer subsidy as of now is Rs 1,20,000 crore as against Rs 60 crore in 1976-77.

"If India withdraws subsidies from synthetic fertilizers in a phased manner over five years, it will save Rs 12,000 billion," said co-researcher for the study, Reyes Tirado at the Greenpeace Research Centre in the University of Exeter, UK. She said if 40 per cent of that saving is invested in vermicomposting units it would be possible to shift to organic nitrogen fertilization.

Yudhvir Singh, president of the Bharatiya Kisan Union said fertilizer subsidy should be given directly to the farmers who should decide what fertilizers to use. The fertilizer industry too does not want subsidies on synthetic fertilizers though for different reasons. "If our production cost is Rs 100 a kg, we have to sell at Rs 20. The balance payment comes from the government very late and we end up losing," said Satish Chandar, head of Fertilizer Association of India. ■



Doctors without degrees

Can practise Indian systems of medicine in Kerala

D SUMOD Kochi

A DECISION of the Kerala government to register practitioners of Indian systems of medicine even if they do not have academic qualification has sparked protests across the state. The order issued in June specified just one eligibility criterion—age. The practitioners in north Kerala should be at least 42 years old while those in central and south Kerala should be 21 years old with minimum five years experience. An estimated 50,000 persons will get recognition through this order.



Ayurveda, yunani, siddha and homeopathy (AYUSH) doctors dubbed the order “a licence for quacks”. “With this order, anyone in Kerala can start treating anyone for any ailment,” said V G Udayakumar, of the Kerala chapter of Ayurveda Medical Association.

The Central Council of Indian Medicine, the statutory body that governs practice of traditional systems of medicine in India, has asked the Kerala government to immediately withdraw the order saying it violates the Indian Medicine Central Council (IMCC) Act, 1970. The Kerala Traditional Medical Practitioners Federation, however, support the order. “The agitation against the order is backed by pharma

companies,” alleged Shaji Vaidyan, general secretary of the federation. “We make our own medicines while the qualified practitioners depend on pharmaceutical companies,” he said.

AYUSH doctors said the government is not tackling the real problem—the absence of a unified law. The Travancore-Kochi Medical Practitioners Bill, 1953, says only qualified ayurveda doctors can practise. But this law is applicable only to south and central Kerala districts, not Malabar. The IMCC Act mandates educational qualification but says existing local laws, if any, will prevail over central law. ■

Desperate for rains

Mumbai municipality to induce rains; activists call it a sham

NIDHI JAMWAL, RAJIL MENON Mumbai

TORRENTIAL rains pounded Mumbai in the last week of June, but failed to help the city tide over the severe water shortage. The Municipal Corporation of Greater Mumbai is now making frantic efforts to ease the crisis. On July 15, its standing committee decided to induce artificial rains through cloud seeding.

As per plan, cloud seeding will be carried out in two phases. In the first phase starting end of July, silver iodide will be burnt in the open air so that its smoke rises to the clouds and induces rain. If this fails to yield sufficient rainfall, then the second phase will be launched in August-September. An aircraft will fly to the height of the cloud and seed it with the silver iodide fumes. “For the first phase lasting a week, we have hired a Mumbai-based expert Shantilal N Meckoni. It will cost us Rs 15 lakh,” said Anil Diggikar, additional commissioner (projects) of the municipality.

In 1992, Meckoni conducted a similar experiment. Though its results are still contested, Diggikar claimed the experiment had triggered 25 mm to 100 mm rainfall. “Cloud seeding from air-

TENDER BIAS: Hyderabad-based Aurobindo Pharma Ltd has sued the South African government for showing bias towards local pharma companies while awarding contracts worth US \$400-million to supply anti-retroviral drugs for a UN spon-



sored HIV/AIDS programme. The company is currently the world's largest producer of anti-retroviral AIDS drugs but lost the tender despite quoting prices 30 per cent lower than the rival companies. Sixty per cent of the contract, awarded last year, went to South Africa-based firms. Aurobindo Pharma Ltd took over a year to prepare its case.

craft is expensive and will cost Rs 8 crore. We have hired a Bangalore-based private aviation company,” he said.

But Mumbai received a fair share of rainfall this monsoon. Then why the scramble? Greater Mumbai receives water from six lakes—Bhatsa, Modak Sagar, Tansa, Vihar, Tulsi and Upper Vaitarna—whose catchment areas are in the adjoining Thane district. Scanty rainfall in Thane this season has forced the corporation to look for alternatives. “At the current level, Bhatsa’s water will last for 50 days. Rest of the lakes can supply water for 30 days,” said Diggikar. The water shortage forced the corporation to declare a 20 per cent cut in June; this was raised to 30 per cent in the first week of July.

Civic activists termed the exercise a futile effort and wastage of public money. “We have been campaigning for the corporation to adopt measures like recycling and reusing wastewater and plugging leakages. But the corporation has failed to do anything,” said James John, member of a Mumbai-based non-profit, Action for Good Governance and Networking in India. Harvested rainwater can be used for cleaning, flushing and washing cars. But these are not a priority for the corporation, which is trying to pacify citizens with cloud seeding,” said John. The civic body is also planning to set up a desalination plant in the next two years as a long-term measure to tackle water shortage. ■

Relocation by half measure

Farmers shifted from tiger reserve two years ago denied irrigation

APARNA PALLAVI *Chandrapur, Maharashtra*

In 2007, 140 families were relocated from Botezari and Kolsa villages inside the Tadoba-Andhari tiger reserve in Maharashtra. The families, mostly subsistence farmers, were given a new address 70 km away—Bhagwanpur village, Chandrapur district.

Two years on these villagers are starving. They have not been able to grow crops though each family was given a little more than two hectares as part of the rehabilitation package (see ‘Tadoba tiger reserve: An unsafe haven’, *Down To Earth*, May 15, 2008). Reason: the authorities failed to provide irrigation. The villagers repeatedly pleaded for a water tank to irrigate their fields. They were ignored.

Demand for a tank proves costly

Worse followed. When some villagers returned to the forest to collect bamboo and *tendu* leaves that they could sell and earn a few rupees, they were arrested. Twenty-four families set off for Botezari on May 20. “We reached our village in the reserve at 8 pm and rested the night. We were cooking our meal the next morning when the police came and arrested 16 of us,” said Saraswati Kannake, former sarpanch. The day before the villagers had told the collector that they would return to the forest even if it meant risking arrest as their demand for water tank was not met.

Villagers have not been able to grow a single crop since they shifted to their new address in 2007

The villagers were charged with trespassing, felling trees, conspiracy and interfering with government work. Park director Sheshrao Patil said the villagers felled 60 to 70 trees. “All we did was collect a few branches for fuel,” said



16 villagers were arrested when they entered the reserve to collect *tendu* leaves

Kannake who was given bail on personal bond in early July along with 10 others. The remaining five were released a few days later. Lawyer Pravarja Mahajan of non-profit Human Rights and Law Network said the charges against them are severe. She is helping them fight the case. While the villagers were in jail, their families in Bhagwanpur were starving. Eighteen-year-old Lalita Pendam and her younger sister Nirasha were living on a few handful of rice borrowed from neighbours. Manda Madawi and her four-year-old daughter did not even get that.

Officials pass the buck

The villagers said they were not able to grow any crop the year they shifted as the allotted land was not levelled. In 2008, their crop failed due to drought and lack of irrigation facilities. Each family lost Rs 15,000-Rs 20,000. Since November last year, the village is surviving by selling mats made of bamboo from the forests, said Dilip Nannawre. Each family earns Rs 50 to 60 a day.

Asked why the villagers could not be provided a water tank, district collector Pradeep Kalbhori said it was the job of conservator forests North Circle. The

conservator Ramjee Yadav said: “Relocation is over. Development work has to be done by the revenue department.” Kalbhori later said surveys were carried out to identify land for the water tank, but offered no explanation why a site could not be decided even after four surveys; a fifth survey is in the offing.

The villagers were given some help under the National Rural Employment Guarantee Scheme (NREGS), but it was discontinued in October 2008. Kalbhori said the villagers are unwilling to work. Villagers denied this. “Last year all field *bunds* were made with NREGS funds. We never got timely or full payments,” said Bhujang Madawi. A day after the arrest, the administration gave work under NREGS but for a few days, said Sarang Dabhekar of Gurudev Seva Mandal, a non-profit.

“All we want is a water tank. Why can’t they give it to us?” asked 76-year-old Pandurang Surpam. The villagers said they have no choice but to return to Botezari. “The water tank there is still in good condition. If we had cultivated our old farms this year, there would have been enough to eat,” said Vishnu Shankar Gadmade. Their return may lead to another round of arrests. ■

Tough nut to crack

Feed malnutrition with policy

SUMANA NARAYANAN

India has eight million malnourished children. Yet the country has no policy on what food should be given to treat malnutrition. Lack of policy has led international development agencies to adopt varied approaches like giving highly nutritious ready-to-use food. Such measures have often led to confusion and stand-offs with the government. UNICEF, for example, imported and distributed packaged food in Madhya Pradesh and Bihar last year, without permission from the Ministry of Women and Child Development. The ministry revealed this information in response to a right to information application filed in June this year.

UNICEF had distributed Plumpy'Nut, categorized as a ready-to-use therapeutic food (RUTF). WHO considers it nutritious. RUTFs have been used in several African countries and yielded positive

results among the severely malnourished population there. But imported RUTFs are not acceptable in India, a ministry official said. "We told UNICEF they should ship out any such consignments left," said Shreeranjana, joint secretary in the ministry, and in-charge of the food and nutrition board.

UNICEF defended distribution of Plumpy'Nut on the ground that the state authorities had requested for RUTFs, citing emergencies. "We have documents to prove Bihar asked us to procure RUTFs. Floods last year led to an emergency," a UNICEF spokesperson said. Sachin Jain of the Right to Food campaign's Madhya Pradesh chapter said UNICEF had distributed Plumpy'Nut in one block of Khandwa district but there was no emergency as such. Plumpy'Nut is an expensive option.

There is a clear definition of emergencies in the Constitution and the situation in the two states did not fit that

definition, said Shreeranjana. "They should have at least kept the nodal ministry—us—in the loop."

In the absence of a policy, organizations like UNICEF follow WHO guidelines. "If the government does not have any regulation, shouldn't we just give the severely acute malnourished children food that is accepted even by WHO?" asked a member of an international agency. She did not want to be named.

Arun Gupta of the International Baby Food Action Network, Asia, said WHO had issued guidelines on RUTFs without investigating their effect on children. "Instead of using locally available food, these agencies are bent on bringing patented, imported foods that cost more," he added.

Cipla, an Indian company, has developed an indigenous RUTF, which is an affordable version of Plumpy'Nut. But the company exports it to Africa because there is no demand in India, said Amar Lulla, the company's CEO.

Local v global

Jain said India is just a "market" for the international agencies. "They cite hygiene as a problem with local solutions." The agencies expand their market by indiscriminately giving packaged foods to even those who suffer from milder forms of malnutrition.

A doctor at All Institute of Medical Sciences (AIIMS) in Delhi said although there are anecdotal evidences of locally made therapeutic foods being effective, there have been no scientific studies. "Severe acute malnourished children are in dire need of high energy foods that pack all essential nutrients. It does not matter if it is imported or locally produced as long as it works," said Umesh Kapil, head of the nutrition department at AIIMS.

Biraj Patnaik, principal advisor to India's right to food campaign, agreed. "RUTFs are not bad but the country needs a protocol for using these. The government has to act." In fact, paediatricians had given recommendations on guidelines in 2006 but the health ministry has not done any work yet. When asked about the child development ministry's stand on policy, Shreeranjana said policies on therapeutic foods were not in the child development ministry's domain. "Policy on RUTFs is the health ministry's concern." ■



Policy on severe acute malnutrition must focus on providing locally made food and not allow imported, packaged food

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Contract killers

In garbage dumps on the eastern outskirts of Delhi, RAVLEEN KAUR unearths an extortion racket that runs on a lapsed contract

This is not what I had in mind when I signed up for journalism. I had dreams of becoming a war correspondent and cover conflicts in, say, Afghanistan. But here I was, trudging through garbage, looking for a story. From the smoke of a garbage dump, I can tell what's burning. This was probably my 41st visit to a garbage dump. My colleagues call me the *kooda* reporter.

They have never met Sandeep Kumar, 13. He operates just beyond Delhi's eastern outskirts, in the mushrooming township of Vasundhara in Uttar Pradesh's Ghaziabad district. I was introduced to him by Santu, formerly a ragpicker who now works as a recycler for the non-profit Chintan in Delhi.

Santu opened the conversation with a question to Sandeep and about 50 other ragpickers, mostly teenagers, sitting on tattered plastic sheets. "How is Chand Pahalwan?" he asked. He comes once in a while and issues lame warnings, answered Asghar Ali. "He can do what he wants. Now I won't pay him," Sandeep chipped.

Monthly exaction

Chand Pahalwan is a contractor. Till about six months ago, he extorted money from ragpickers. In February this year, an FIR was lodged against his company and the Uttar Pradesh Special Task Force arrested four of Chand's men on charges of extortion.

"Last year, a company called Ashraf Enterprises came here and said that the Ghaziabad Municipal Corporation gave them rights over the garbage. Chand Pahalwan owned the company. He said we have to have an identity card to work in this area and charged us Rs 400 for renewing it every month," said Rajesh Ravidas, who came here from Sheikhpura district in Bihar about four years ago.

Santu told me Chintan had filed the complaint. So I called its director Bharati Chaturvedi. "We had com-



Ragpickers meeting in Bhopura, Ghaziabad

MEETIA AHIWANI / CSE

plained to the senior superintendent of police in December but it was not of much use. The new superintendent whom we met in February was more forthcoming," Bharati said.

In February itself, she received a call from Surya Nagar Police Chowki in Ghaziabad and the officer showed her a letter from the city municipal corpora-

tion. Ashraf Enterprises did have a contract for waste worth Rs 7.6 lakh for Vasundhara. The contractor could buy scrap from ragpickers at 25 per cent above the price others buy. If the ragpickers still did not sell it to him, he had the right to charge Rs 400 per month.

The letter bore the signature of City Health Officer K K Tyagi. "The municipi-



28 May, 9:20am

Two contractors stop by Abdul Karim, a ragpicker in Govindpuram in Ghaziabad, to collect money from him



28 May, 9:21am

Contractors ask for money. Abdul Karim refuses to pay



28 May, 9:22am

The contractors threaten Abdul Karim with dire consequences if he doesn't pay. They get physical, a crowd gathers

pal commissioner denied having issued it. Tyagi was pulled up and the letter rescinded," said Bharati. The rescinded letter also bore Tyagi's signature.

Santu said Ashraf Enterprises had filed a case against him, his brother Dhanraj and Prakash Shukla, Chintan's grassroots worker, in the Allahabad High Court. "They said we are causing them damage by the FIR and that we are the extortionists," said Santu. "Since then, Chand Pahalwan has been threatening us," he added.

Shukla took me through a lesson in economics. "Five thousand rickshaws cross Seemapuri everyday (most ragpickers working in Vasundhara in Delhi localities of Dilshad Garden or Seemapuri). Even Rs 400 from each adds up to Rs 20 lakh per month." He showed how the contractors earned enough even after accounting for bribes to the police and the corporation—without doing any actual work.

Contract rescinded, did you say?

Ghaziabad has 15,000 ragpickers. "More than a thousand who stay in the Sihani Chungi area pay up to Rs 600 a month for collecting garbage," said Sohrab, who has come from Kolkata.

Shukla took us to Sihani Chungi, about an hour's drive from Bhopura on the Delhi-Ghaziabad border. It had rained the previous evening and most people were busy fixing their roofs, which comprised torn bed sheets retrieved from garbage.

A Chintan volunteer went about calling everybody to collect in Bheem's garbage segregation yard. A bench was procured for us and soft drinks ordered. "The fee for picking garbage has gone up, from Rs 200 to Rs 600," said Buddhu Ali, who collects garbage from Rajnagar locality. He showed us the identity card that we heard about in Bhopura. The cards had Municipal Corporation of Ghaziabad written over it along with the names and contact numbers of contractors but hardly the photograph of the ragpicker to whom it was issued.

Sonu Tyagi has a contract worth Rs 2,75,000 a month with the municipal corporation in Kavinagar and Vijaynagar. "Sonu Tyagi's men abuse us. The other day, a friend of mine came back home bleeding from the mouth. Are you sure the corporation has cancelled the contract?" asked Bheem.

At this point, someone said that Sonu Tyagi had threatened one Abdul Karim. They pointed me to Karim, who was crouching in the corner of the tent improvised for the meeting. "When did

Contractors extort to recover money they paid the corporation and the bribes they continue to pay

they come to you?" I asked. Buddha translated the question in Bangla. He said that he was to go to Tyagi's office in the evening to pay him. By this time I was determined to verify how threatening these contractors could get. I requested Karim to wait for a day to pay Tyagi. He readily agreed.

Reality check

The next day, my photographer and I reached Govindpuram, where Abdul Karim segregated garbage. After waiting for about 20 minutes on the other side of the road we saw two men on a motorbike stopped next to Karim and demanded money from him. But they hardly turned out to be the musclemen I had anticipated. As per our arrangement, Karim refused to pay. The rider caught on to Karim's collar by which time a crowd had gathered.

We walked up to the motorcyclists. They said their names were Shashikant Tyagi and Asif Qureshi, contractors for Kavinagar and Vijaynagar zones. But, didn't Bheem tell me a Sonu Tyagi was the contractor of these two areas?

"We want to put our own labour here. These men have been working here for long and we don't want to take away their livelihoods. Therefore we have to charge them. If they sell us the scrap, we will not charge them anything," said Tyagi. He gave the break-up of the Rs 400 that he charged the ragpickers: uniform worth Rs 110, life insurance at a premium of Rs 240 per year and an i-card, the cost of which is Rs 50.

We turned to Karim and he denied getting any of the benefits. "They have never asked me to sell my garbage to them. They just come here to take money," said Karim.

"They never sell to us," Qureshi argued. "We tried putting our own labour but these people, all outsiders, scare them away. We have paid a huge amount to the corporation. How else will we recover that? We have a contract with the corporation," he added. I showed them the letter given by the Surya Nagar police. Tyagi claimed till they received a letter they wouldn't stop operating in the areas.

Seeing the crowd, a policeman on a motorcycle stopped by. I asked him about violence with the ragpickers. Nobody had complained to him, he said. "These are all illegal Bangladeshi immigrants who are not allowed to work here," said Devendra Yadav as he rode off abusing the illegal migrants.

Namesakes

It wasn't long before we received a call from Qureshi asking us to come to his office. Tyagi and Qureshi were at their cordial best. Tyagi said his real name is Shakeel Ahmed. (Later, a corporation officer told me the contractor operated under the name of Sonu Tyagi.) The original contractor was Shashikant Tyagi, who died. "He was my friend. We run the business in his name," said Sonu Tyagi aka Shakeel Ahmed aka Shashikant Tyagi.

"We are tired of this *theka* but we have to at least recover the money we paid the corporation. So many people need to be kept happy. We do bribe but on a very small scale. Ashraf Enterprises' monthly bribes are fixed at Rs 10,000 to the counsellor, Rs 25,000 to the police and about Rs 50,000 to transporters," said Tyagi. "The contract says we should buy the material at 25 per cent extra rates. Even if we buy at 30 per cent extra rates, these Bangladeshis will not sell it to us because they have taken huge loans from other scrap dealers and owe them the scrap now," said Qureshi.

Despite repeated insistence, the duo refused to show us a copy of the contract.

Soft drinks and sweets were ordered as Tyagi told us that it was his birthday that day.

"We do not mind you writing about it but please don't play up our names. Anyway, we haven't hidden anything from you," he said ending on a note that he was ready for any kind of *sewa-paani* (service).

From the horse's mouth

I went to meet K K Tyagi, the city health officer. "It is happening everywhere. Chintan also charged money from people. When the organization saw the contractors were earning more, they complained. Since they have people who can speak English and influence the higher authorities, they got what they wanted," he said, signing a blank receipt book which his assistant kept in front of him.

I asked for a copy of the contract. After spending three hours in his office, we were given to understand that the contract was in some file somewhere between the two floors of the building. Nobody knew where exactly.

"The work might not be noted in the files but it is happening very well," he said.

He did give us a very important figure though: the five contracts are worth more than Rs 19 lakh for two years.

We showed the same letter that he had issued, saying the contract had been rescinded. "There is nothing in written now but this is how things are. The ragpickers are earning much more than they profess. The contractors have paid a heavy amount to the corporation so they have to earn it some way. If they don't collect money from the ragpickers, how else will they earn," he said.

I shouldn't have expected much anyway. ■



MEETA AHLAWAT / CSE

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Not enough beds

Even in private hospitals; central India is worse off

NIDHI JAMWAL *Mumbai*

For 829 people in central India, Madhya Pradesh, Chhattisgarh and Jharkhand, there is just one bed in private hospitals. This is the worst hospital bed-to-person ratio in India, revealed a first-time survey of private healthcare facilities in the country. All over India the bed-to-people ratio is 1: 422. Government hospitals' existing record is worse—one bed for 2,239 people. WHO recommends a minimum of three beds per 1,000 people.

The survey that focused on the number of beds, affordability and hospital accessibility, found the following:

- 35 per cent patients in private hospitals belonged to lower income groups who earn less than Rs 10,000 a month
- 85 per cent of these patients do not have any insurance cover

- 42 per cent patients visit private facilities from nearby rural areas.

"The private sector dominates healthcare services in India," said Utkarsh Shah, senior consultant at Hosmac India Pvt Ltd, the company that surveyed 30 hospitals in 10 states.

The low bed-patient ratio reflects poor healthcare in India, but the survey does not give the full picture, said Padma Deosthali of the Centre for Enquiry into Health and Allied Themes (CEHAT), a non-profit in Mumbai. "Health is more than just hospitals. It includes primary health services, preventive measures and community health. People are forced to avail of private facilities because public healthcare is in the doldrums," Deosthali said.

Vivek Desai, managing director of Hosmac India, said the public sector should be strengthened so that the poor

could be treated there. "For the middle class and the rich, medical insurance should be the norm. The cost of healthcare will only go up," he said.

"Patients in Mumbai come from the suburbs and villages. Public hospitals are not able to handle the patient load. Their condition is terrible. I have seen patients sleeping on the floor of J J Hospital, the largest in Mumbai. Although private hospitals are expensive, patients know they will be taken care of well," said Ansila Triagler of Holy Family Hospital and Medical Research Centre in Mumbai.

But the quality of healthcare in the private sector is also a growing concern. There isn't enough manpower, said Desai. "Seven years ago, a cardiac hospital was inaugurated in Surat. The hospital could not find a person to do angioplasty the first three months," he said.

Think central India

A 2002 study by CEHAT had found 44 per cent of the households in a municipal ward in Andheri East, Mumbai, were forced to go to private hospitals because there was no government hospital in their area. Most people there said they would shift to a government hospital if it is set up in their ward.

Cities like Mumbai don't need more hospitals and should now act as referral centres, the Hosmac report said. Investment in private healthcare, said Desai, does not depend on need or demand but finances. That explains why Mumbai has so many super speciality hospitals, whereas Nagpur in eastern Maharashtra has none.

The first step to check the bed-patient ratio must be to stop random hospital locations. Before a hospital is set up, factors such as disease profile, demography, patient migration trends and competition from existing healthcare units must be considered, said Jagruti Bhatia of non-profit HOPES in Mumbai. Deosthali's solution is a law that ensures a patient is not denied healthcare even if he or she cannot pay. Triagler stressed on preventive and community health: "Basic medical help should be provided at home or near one's home. Clean water supply, hygiene and sanitation are imperative."

A more immediate approach, said the Hosmac survey, would be to think of central India first. ■

In private hospitals in India, there is only 1 bed for 422 persons; in government hospitals, the ratio is 1: 2,239



Makeshift arrangement for a bed at a government hospital in Delhi

MEETA AHAWAT / CSE

Who are you?

Microorganisms explain more about us and our world than we ever imagined.

SUMANA NARAYANAN courses through rodent brain, feline gut, and the human stomach

This is not something you are likely to see in a Tom and Jerry animation.

Imagine a cat readying itself to pounce on a mouse. The mouse notes the feline but does not budge. It grooms itself and looks away. Soon, it is cat food.

Now imagine further. The cat's owner is a pregnant woman. It is possible that her unborn child would become a schizophrenic.

The parasite *Toxoplasma gondii* was looking for a definitive host (primary host where a parasite matures and in many cases reproduces sexually). Lodged inside the rodent's brain, the microbe manipulated the mouse to release dopamine, a

mood regulator that gives rise to extreme emotions: euphoria, depression. Its central nervous system doped on dopamine, the mouse's survival instincts were lulled. Thereafter, life seemed pleasant, the cat friendly.

T. gondii survived.

(Once inside the cat, the microorganisms made their way to the stomach, reproduced sexually and escaped via the cat's faeces. Mice that eat the faeces continue to play their part in the *T. gondii* story. The microbe needs a cat to make whole its life cycle; the cat is its definitive host. As for intermediates, the microbe does not mind animals other than mice. About one in three humans carry *T. gondii* in his or her head.)

Back to our story: the pregnant woman takes out the cat litter, wanders into the kitchen and bites into an apple—without washing her hands. The parasites reach her brain via the bloodstream. The dopamine spell follows, changing the woman's personality. It makes her feel guilty and duty-conscious. The microbe then makes its way to the foetus through the placenta, leaving it vulnerable to a mental disorder someday.

Most schizophrenics are known to have high levels of antibodies against *T. gondii* in their blood. At the same time, some studies noted that individuals infected by *T. gondii* were bound to exhibit psychiatric symptoms such as depression, anxiety and disorientation, characteristic of schizophrenia.

E F Torrey studies schizophrenia at the Stanley Medical Research Institute in





HEATHER SEBASTIAN

Toxoplasma gondii

Age: Prehistoric

Address: Rodent brain

Goal: Make cat eat rodent

Weapon of choice: Dope

Bethesda, USA. He decided to investigate a possible connection. He and his team treated infected and oddly behaving rats with anti-psychotic drugs used to suppress schizophrenia. The drugs blocked the tachyzoite formation (an asexual stage where the microbe divides and increases its number). As the microbes died, their influence on the rat brain also decreased. Dopamine levels went down subsequently and the rats were not as foolhardy.

What we have at hand is a microbe capable of messing up a rat's brain, completing its life-cycle in a cat, entering a human body, deciding the fate of an unborn child, and propelling researchers to experiment with oddly-behaving rats.

It is only wise pregnant women are told to avoid cats.

Microbe evolution

Life on earth began with microbes. As multicellular organisms evolved, their relationship with the unicellular ones became complex. Natural selection forced them to co-evolve. Several microbes made houses inside multicellular organisms.

This is how a primitive *T. gondii* must have found its way into a mouse: the microbes reaching the mouse's brain would have survived. Infected mice would have made easy

prey for cats and gradually the parasite managed to adapt and reproduce successfully inside the cat's body. The ones that reached other parts of the mouse's body, obviously, could not make it.

But things were not to remain as simple as a cat-mouse game. Humans entered the picture.

To colonize humans, the microbes made some lifestyle changes. They had to match the host's way of life, which was not going to be easy. They were up against one of the most complex and evolved life forms.

Early humans were nomadic—they hunted prey, gathered nuts and fruits, and collected seafood. To understand the nature of the human-microbe relationship at this stage, scientists studied a handful of such tribes left in the world, such as the Bushmen of Africa's Kalahari desert. People in these tribes wander in small, isolated groups; their contact with people from other groups is rare.

If the microbes wanted to survive off such people, they, too, would have had to follow suit, inferred anthropologists. Since the microbes were isolated along with the people, it made no sense to overcome the host's immune system, turn virulent (the relative ability of a pathogen to cause disease) and kill the host that provided it with very few chances of moving on to another one.

There were the impatient ones that did turn virulent, leading to unfavourable consequences for them. After rapidly infecting and killing the entire group, they ran out of hosts, and disappeared themselves. The solution was harmonious co-existence. They engaged in low-intensity warfare, causing mild infections that kept coming back. Those days, killing the host was not wise.

The revolution in food security for people, agriculture, changed drastically the equation with microbes. Farming brought human groups closer. Captive food production meant people had free time on their hands. Communities grew bigger, populations denser.

A 2007 DNA study at the University of Utah, USA, confirmed the pace of human evolution increased after agriculture became widespread. It was time the microbes changed their lifestyle; they became more infectious. As the interactions between people increased, so did the degree of microbial virulence.

Half of Europe was annihilated by the Black Death in the fourteenth century. People were packed like sardines in cities with poor hygiene making conditions ideal for the bubonic plague microbe.

Every community also attracted its own set of migrants. The migrants brought new microbes with them and the community, in turn, gave its own to them. It was a unique barter system—one in which the microorganisms got to travel the globe and diversify.

Agriculture increased the demand for two things: land for farming and livestock for draught, meat and by-products like milk and leather.

More and more forests were cleared for land. This changed how people related to forest and wildlife. Wild animals carried another range of microbes. The destruction of their natural habitats increased the number of human-wildlife interactions. This, in turn, provided the microbes with ample opportunities for switching hosts.

The Ebola virus first struck humans in Zaire after the rainforests were destroyed, in the 1970s.

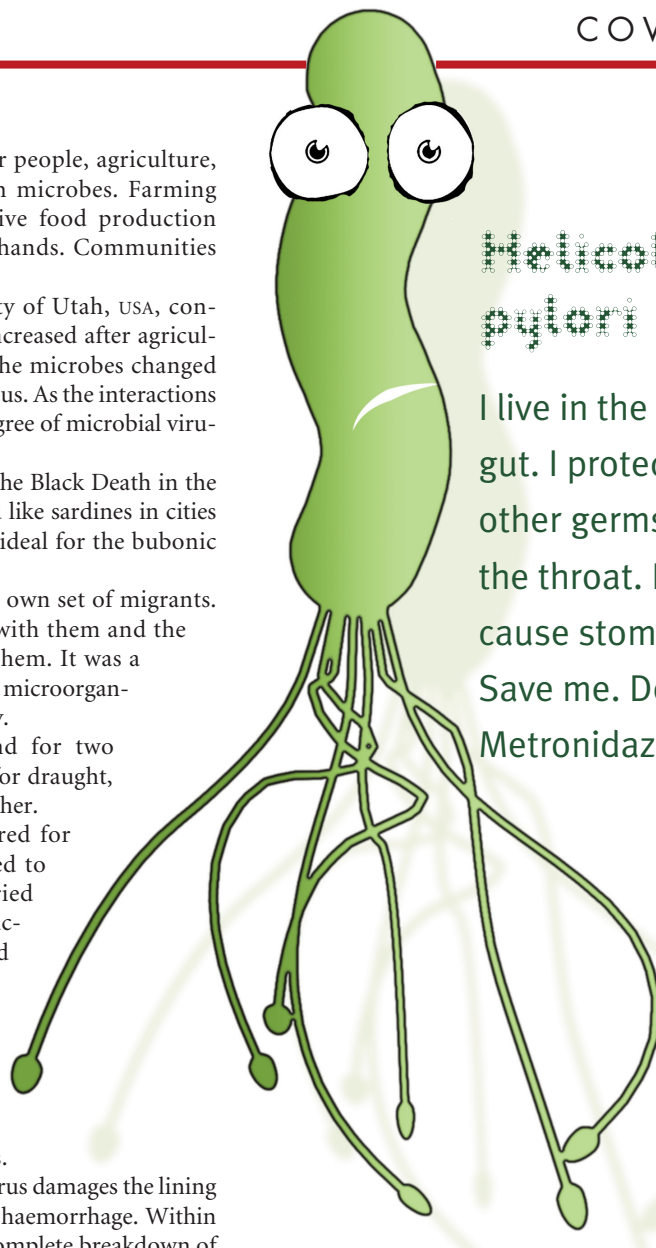
Transmitted through body fluids, this virus damages the lining of the blood vessels and causes internal haemorrhage. Within three weeks the person succumbs to a complete breakdown of body tissues. The natural cycle of the virus is still a mystery; monkeys and bats were thought to be carriers but scientists are unsure. The disease has no cure.

The Human Immuno Deficiency Virus (HIV) is believed to have made the jump from wild monkeys to humans. The monkeys were carrying the Simian Immuno Virus that mutated into the HIV, say some researchers.

Domestication of animals into livestock expanded the microbial horizon further. Of the 1,415 pathogens infecting humans, about 863—more than 60 per cent—were originally animal pathogens.

Some of the common diseases contracted by humans from animals (zoonotic) are hitting headlines every year now. This year it was the swine flu—declared a global pandemic of the highest level by WHO. The virus from pig farms in Mexico travelled the globe. Mad cow disease, avian influenza and SARS (severe acute respiratory syndrome, caused by the coronavirus, an important pathogen of mammals and birds) haven't quite been forgotten yet.

It was believed the cholera bacterium (*Vibrio cholerae*) has one host only: *Homo sapiens*. Now, studies show it is a zoonotic disease. The evidence springs from coastal areas



*Helicobacter
pylori*

I live in the walls of your gut. I protect you from other germs and cancer of the throat. Doctors say I cause stomach cancer. Save me. Don't take Metronidazole. It kills me.

SURYA SENI

where outbreaks are preceded by zooplankton blooms, indicating zooplanktons like krill act as initial carriers of the bacterium. This year it infected 60,000 people and killed 3,100 in an outbreak in Zimbabwe.

From mildly infectious agents to highly virulent germs, microbes have travelled a long way to secure a home in an organism whose world population remains unrivalled; about 134 million people are born every year. And they have succeeded. A peek into the everyday life of the bacterium *Helicobacter pylori* indicates the reason. Scientists have tracked the ways of this microbe for several years now. The medical world has rarely found a person who has lived an entire life without getting infected by this microbe.

The journey within

H pylori is a species common to the human stomach. It can be passed on from the saliva of an infected to a healthy person in cases where food is shared or acquired when one consumes water or food containing contaminated human faeces. The germ colonizes the human stomach and induces chronic gastritis, a long-lasting inflammation of the stomach. More often

than not, the inflammation is low level, and half the carriers do not feel any discomfort.

Two per cent to 20 per cent of people infected by the bacterium develop gastric ulcers which might end in cancer. This makes the microbe a major risk factor for gastric cancer. In 1994, the World Health Organization declared *H pylori* a carcinogen. The medical establishment in the West decided to eradicate it from the human gut. There are signs of their success. *H pylori* is disappearing. But that does not necessarily promise our species gastric bliss. Cases of acid reflux disease and oesophageal cancer are increasing dramatically.

The bacterium has beneficial effects on the human body, said microbiologist Martin Blaser in 1996. It produces alkaline chemicals to neutralize stomach acids, protecting against acid reflux disease, explained Blaser, who works at the New York School of Medicine in the US. He is best known for his work with this spiral-shaped bacterium and how it relates to the human gut. Acid reflux is not an insignificant problem; it can trigger asthma (90 per cent of acid reflux patients have it) and

60 per cent of the oesophageal cancers.

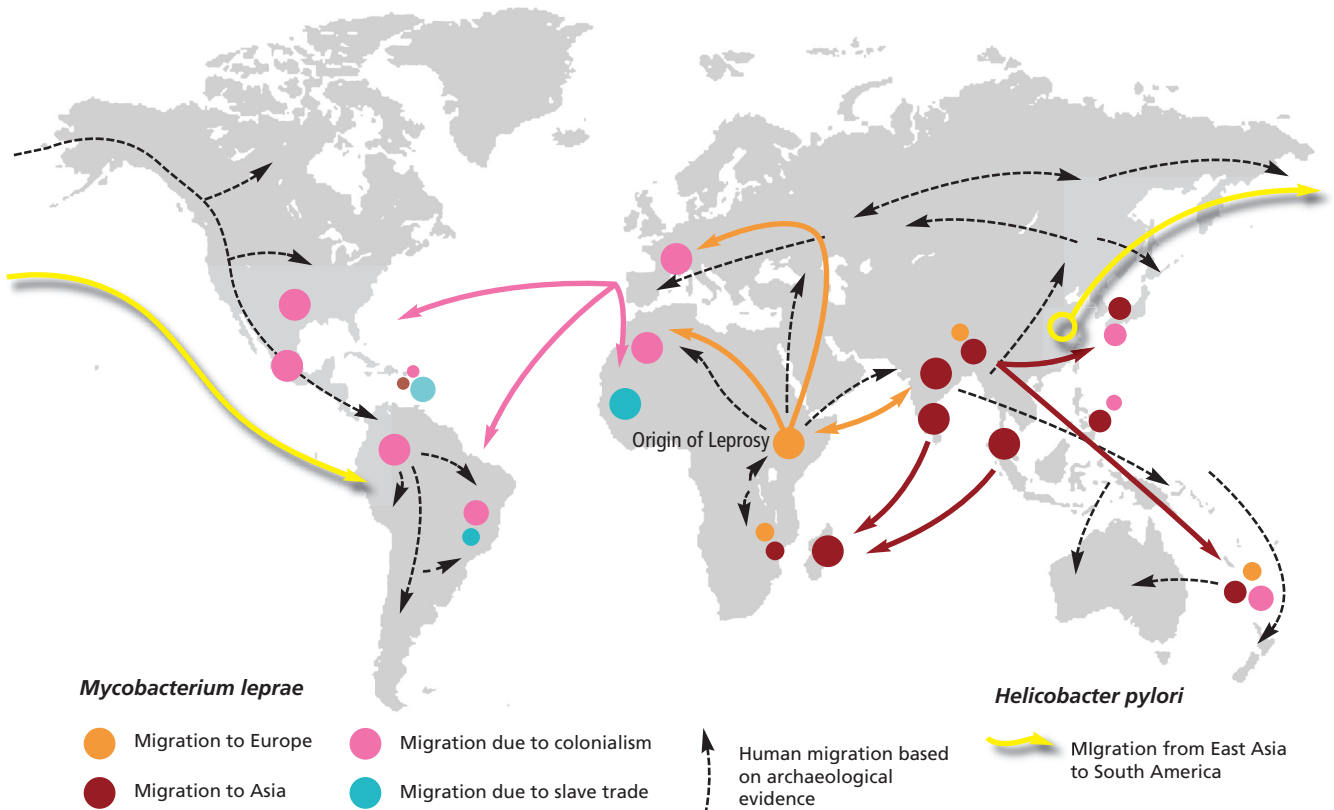
The choice then is between a 60 per cent chance of oesophageal cancer versus less than 20 per cent chance of gastric ulcers. Besides, *H pylori* has a wider role as an essential part of human gastric physiology: it regulates the hormones that control hunger pangs. Namely, ghrelin, which increases appetite, and leptin, which signals the presence of fat to the brain. If leptin malfunctions, one would not know when to stop eating.

The question, though, is: why would the microbe cross the threshold and start helping the host?

Altruism, redefined

Thousands of years ago, when *H pylori* infected people, it would have encountered the body's immune system. Unprepared, the human body would have succumbed to fatal infections initially. This would have resulted in wide-scale deaths—of people and the microbe. Over the years, though, the bacterium would have developed strains that struck truce

Human transport: the means for microbes to travel the world



DNA strands comprise a series of four units (nucleotides). During replication, a stray mutation may cause a unit to replace another. Each individual has many of these single nucleotide polymorphisms (SNPs), as they are called, and this helps create a unique DNA sequence. Hence the SNPs can be used as markers to trace a species' evolution.

The map traces the routes of two microbial species: *Helicobacter pylori*

and *Mycobacterium leprae*. The routes corroborate the archaeological evidence of human migration. The SNPs in the DNA of *M leprae*—the leprosy-causing bacterium—showed three strains taking four routes to spread across the world. The findings proved leprosy did not arise in India, as was believed. Of the two common strains of *H pylori*—East Asian and European—the East Asian strain was found in indigenous Venezuelans.

with the immune system. It found safety and shelter in the stomach's mucosa (the organ's inner lining of tissues covered in a thick, sticky fluid called mucus), and returned the favour by preventing the acid reflux disease. But why? Was it altruism? Are microorganisms capable of the kind of altruism that requires expending energy for helping the host? Scientists think not.

Here's the answer they found: the chemicals the microbe produces serve two functions. One, they help the host survive; two, they prevent other pathogens from lodging in the digestive system. This is how *H pylori* tries to monopolize the microbial space available inside the digestive system, furthering the survival of its progeny.

Even among the most beneficial of germs are renegade individuals. They rebel against the existing order. They refuse to perform the beneficial functions. They concentrate their energy on reproduction; their number increases. The day they get the upper hand, the host develops a gastric ulcer. This explains why *H pylori* causes a mild infection in several people and, at the same time, an ulcerous infection in quite a few.

But *H pylori* is not the only microbe that strategizes to own microbial space within the gut. Therefore, try as it might, it cannot always succeed in its game of monopoly.

It's a jungle in there

Nature has billions of microbes and thousands of them inhabit the human gut. The digestive tract is a theatre of intense microbial drama. There is competition within a microbe species as well as between species. Then there is the immune system to watch.

At one moment *H pylori* is in majority, the next it loses to stronger species. And yet a fine balance is maintained—otherwise stomach infections would be an everyday affair. Even cholera epidemics do not happen everyday. What is it that tells the microbes that a truce with the host's immune system is better than virulence? What is it that ensures the host's immune system is always on the alert—from the virulent as well as the non-virulent species?

Natural selection.

Survivor

The host immune system is constantly evolving. It restricts gut microbes within the gut, preventing them from infecting other body parts. More often than not, the rebels within the system are squashed. Over the years, natural selection has favoured the evolution of helpful microbes. Take, for example, species of the *Eubacterium* and *Bifibacterium* groups. They help in the digestion of plant-based foods.

Natural selection also makes sure each strain keeps evolving to carry out the same function in different ways. This is to keep the community going even when the weak bacteria are destroyed by other pathogens, including by viruses that eat bacteria (bacteriophages).

The math adds up to what is called homeostasis: maintaining a stable metabolism by making minute adjustments to the internal environment. Natural selection makes sure homeostasis prevails—amidst constant ups and downs brought on by competition, changes in the environment, changes in the host's diet, changes in the immune system and pathogen attacks that come and go. They live. We live.



FLORIAN CALMER

Jungle code

The human gut. Theatre of a microbial war of attrition for gut domination. But, in the end, the gastric universe maintains a fine balance: homeostasis

Gastric chemistry is one part of the relationship people have with microbes. Scientists are constantly uncovering some fact or the other that emphasizes the role of microbes in human lives.

Stomach microbes, for example, also decide whether or not one will turn out to be fat.

Far-reaching effects

Jeffrey Gordon is a molecular biologist who studies obesity at the Washington University School of Medicine in the US. His research might turn on its head our understanding of obesity. In an experiment in 2006, Gordon introduced microbes from the stomach contents of a fat mouse into a sterile, germ-free rodent; it caused the sterile rodent to rapidly put on weight. When microbes from a lean mouse were introduced into another sterile mouse, it did not gain weight. This is just one of the ways microbes have an impact on human lives.

The human body wears an external suit of millions of microbes. As we change our clothes, our invisible attire of skin

microbes changes too. Different fibres—cotton, wool—mean a different set of bacteria. Some skin areas maintain a core microbial population that does not vary over time, like the ears, the nostrils and the creases on either side of the nose. In between the toes alone, there could be as many as 10 million microbes in a square centimetre.

Kevin Lafferty, a marine ecologist with the US Geological Survey goes so far as to suggest that these single-celled creatures may very well be controlling the cultural differences between people. Because cultures arise from the average personality of a community and individual personalities are affected by microbes. In medieval Europe, people who acted strange were accused of being werewolves and sentenced to death. Perhaps they had a spot of *T gondii* or microbes that cause dopamine-induced behavioural changes.

Irritation caused by sexually transmitted diseases, like gonorrhoea, may be responsible for increase in the desire for sex, it has been suggested.

To understand human behaviour, scientists are increasingly looking under the microscope.

We are the microbes we carry

Using genetic analysis, researchers are now busy creating a comprehensive inventory of microbes that come with humans. They are gathering the information under the Human Microbiome Project, an offshoot of the Human Genome Project that mapped the human DNA.

When the human genome map was created, scientists found we have about 20,000 functioning genes, putting us roughly in the same category as worms. Then they realized they had forgotten the trillions of microbes in and on us.

The new exercise can be defined as a 'them-plus-us genome project', one that makes it evident that humans cannot understand themselves fully if they do not know microorganisms that make them who they are. By textbook definition, of course, that implies humans are *Homo sapiens* belonging to the tribe of hominines from a family of hominids in the kingdom of animals.

But is that enough? Could it be people reading this magazine are doing so at the behest of a microbe in their brain?

The bigger picture

Coughing, sneezing and nasal discharge are ways of ridding the body of unwanted matter, it is believed. But maybe not. Maybe these are ways of ensuring the microbe spreads far and wide. A common cold virus can never be lost for good. It is the ability of this virus to manipulate its identity genetically and fool the host's immune system every time it attacks. Researchers across the globe have been trying to overcome this. HIV operates in similar ways.

Both viruses contain an RNA strand instead of DNA; genetic manipulation becomes easier with RNA, scientists say. An HIV positive person can die of a common cold that is a minor inconvenience for an uninfected person.

With science learning about microbes everyday, the idea of human agency will undergo corrections. It will lead to re-examination of the motives of our action. It will also change the way we look at microbes. From seeing them as germs that infect us, we might come to a deeper appreciation of the intrepid microscopic travellers around us, inside us. ■

Fat Boy Takes It All

Want to lose some flab? If you are looking for some quick weight loss, the 'Fat Boy Takes It All' is the best option for you. Contact info: I am found in the guts of thin people





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HEALTH

The Wnt pathway

Scientists zeroed in on the gene responsible for multiple sclerosis, a disease in which the body's immune system attacks the protective sheath around nerve cells to the extent of interfering with nerve communications. A gene called Tcf4 was found to activate biochemical reactions (the Wnt pathway) that delayed the sheath's repair, said the study in the July 1 issue of *Genes and development*. A prolonged delay made the body incapable of growing the sheath back, leading to progressive deterioration of the nerves.

EVOLUTION

Dubious ancestry



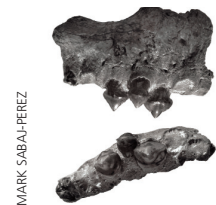
N CHERIL KIM

Even as the recent sequencing of the chimpanzee genome brought to light that humans and chimps are 96 per cent genetically identical, a team studied 63 physical characteristics common to hominids and concluded humans descended from orangutans. Humans were found to share 28 characteristics with orangutans and only two with chimps. The study, viewed sceptically by biologists, is in the June issue of the *Journal of Biogeography*.

PALAEONTOLOGY

Gap bridged

Researchers studied the jawbone of a fossilized fish that



MARK SABAJA-PEÑEZ

was found in the Argentinian waters. It bridges the gap between the flesh-eating piranha and its herbivorous kin, the pacu, both found in South American rivers. Piranhas have a single row of sharp-edged teeth. The pacu has two rows of square-shaped teeth. The fossil fish, *Megapiranha paranensis*, was found to have a single row of sharp teeth arranged in a zig-zag manner, making it the intermediate between the pacu and the piranhas, said the study in the June issue of the *Journal of Vertebrate Palaeontology*.

MARINE SCIENCES

Strong fidelity

A study reiterates the importance of conserving corals; they tend to grow closer home. A team sampled DNA from coral reefs in the Indian Ocean and found that most of the corals in the same reef were kins. This is despite the fact that they lay their eggs in the moving water and the young coral could very well take root elsewhere. The study is out in the May issue of *Evolutionary Applications*.

ENDOCRINOLOGY

Hormonal binge

Ghrelin, a hormone released by the stomach to stimulate hunger, is also the one that induces alcohol addiction, discovered a team. The scientists treated mice with ghrelin



and found it increased their alcohol consumption. When the hormone's action was suppressed, they no longer craved drink. The study, reported in the June 29 issue of the *Proceedings of the National Academy of Sciences*, holds hope for the invention of new ghrelin-suppressing drugs to bring relief to alcohol addicts.

MICROBIOLOGY

Genetic subtleties

Not all strains of the cholera-causing bacteria, *Vibrio cholerae*, are pathogenic. Researchers now have a method to distinguish between the various strains. The team used specific repetitive DNA segments in the genome. They marked short DNA fragments of a strain with dyes and compared it with other strains. As each bacterial strain differs in size and pattern of the repeats, it was easy to distinguish them. The study was released in the June issue of *Applied and Environmental Microbiology*.



DIVYA

ENTOMOLOGY

Anti-aging switch

Aging honeybees can become younger by switching their social role. A team forced a group of forager bees, the oldest, to revert to nursing tasks of younger bees in the hive. The foragers adapted to the new role efficiently. Presented in the July 1 annual meeting of

The Society of Experimental Biology, the study may help find anti-aging solutions.

ANIMAL BEHAVIOUR

Fishing tactics



RYAN SOMMA

A tentacled snake has a way of luring its prey right into its mouth, said a study reported in the June 18 issue of the *Proceedings of the National Academy of Sciences*. The snake, recognizable by its pair of tentacles, is found in the Southeast Asian waters. While hunting, it contorts its body in a J-shape with the head turned towards the body. In this position it creates a ripple in the waters and waits motionless. As the fish senses the disturbance, it runs from the region of threat. But all it really does is run away from the snake's body and into its mouth—something the snake has predicted already.

ECOLOGY

Collateral damage

Zoologists assessed 48 birds, 14 reptiles, six mammals and one amphibian native to the mangrove forests of Asia and Australia. They found 40 per cent in danger of extinction. The vertebrates have evolved special organs to adapt to life in mangrove forests. Due to coastal development, pollution and rising sea levels, the world is losing its mangroves by two per cent every year. At this rate the study, in the July issue of *BioScience*, said mangroves will disappear in 100 years. So will its fauna.

HEALTH SCIENCES: *alternative medicine*

The how, why of music therapy

Blood flow, respiration and heartbeat mimic the rhythm of the music

LAVANYA RAMAIAH

THE Indian film industry spends crores of rupees to make a musical. It has always believed that music can make the heart dance to its beats. These days doctors are taking this approach seriously. Take Rajesh Parthsarthy, for example. He is a general practitioner. He is learning Hindustani classical music because he thinks it will add value to his practice. His patients might soon have to get used to a medical prescription enlisting songs instead of names of pills.

Music has for long been recognized as therapeutic. Slow music is known to relax the cardiovascular system. A new study shows that alternating between fast and slow music can be potentially more effective. Luciano Bernardi of the department of internal medicine at University of Pavia, Italy, found that heartbeat, blood flow and respiration mimic the rhythm and beat of the music being played.

Bernardi's team made 24 people, musicians and non-musicians, listen to music tracks. While they listened to the music, their heartbeat, blood flow and breathing were monitored. Each one's

body responded to the tempo of the tracks. For instance, a musical piece with a progressive rise in volume (crescendo) elicited a corresponding rise in heartbeat and blood pressure. Changes were not so drastic for tracks with a uniform tempo. There was a drop in the heartbeat, blood pressure and dilation of blood vessels in the silent pause randomly interjected between music tracks.

Of all the music the listeners heard, the opera pieces established a stronger correlation with them, said the study published on June 30 in *Circulation*.

The researchers explained the physiological changes as a result of the activation of the subconscious that controls most of the involuntary actions, like respiration, blood flow, heartbeat, contraction and expansion of blood vessels. "Not only emotions can create cardio-

Cardiovascular changes affect emotions. The right kind of music can set a cardiovascular rhythm that can calm or excite a person

vascular changes. This study suggests the opposite might be possible; cardiovascular changes may affect emotions," said Bernardi. In other words, the right kind of music can set the right cardiovascular rhythm that could either make you calm or anxious. This could be good news for bradycardia and flutter patients who have irregular heart beats.

The study also found that music has the same effect on everyone, irrespective of individual choices and musical training.

Another study on premature babies showed music helps reduce pain from medical procedures like injections, and encourages oral feeding. Researchers from University of Alberta in Canada published the review in the May issue of *Archives of Disease in Childhood*.

Select the right track

Quite a few people in the medical world are coming around to accept that music can cure. K K Agarwal, a senior cardiologist at Delhi's Moolchand Hospital, runs an eight-day music therapy. "Different combinations of music have to be used to treat different conditions. To a patient with a heart ailment and a weight problem, I would suggest a combination that would excite and later calm him or her," he said. To make it more effective, said Parthsarthy, music needs to be customized for different disorders.

Not everyone is going tra-la-la. The study was limited to 24 young Caucasians and to popular classical music. One cannot take observations based on such a small sample seriously, said Aashish Contractor, head of the department of preventive cardiology and rehabilitation at Mumbai's Asian Heart Institute. Abhik Majumdar, a music scholar believes music has therapeutic values, but warns against generalizations like *raag* Malkauns is good for the heart.

Music therapy is also costly. The eight-day therapy at Moolchand hospital costs Rs 10,000. This makes it more of a lifestyle statement for the rich and the busy. ■



MEERA AHLAWAT / CSE

GEOLOGY: *delta dynamics*

Delta blues

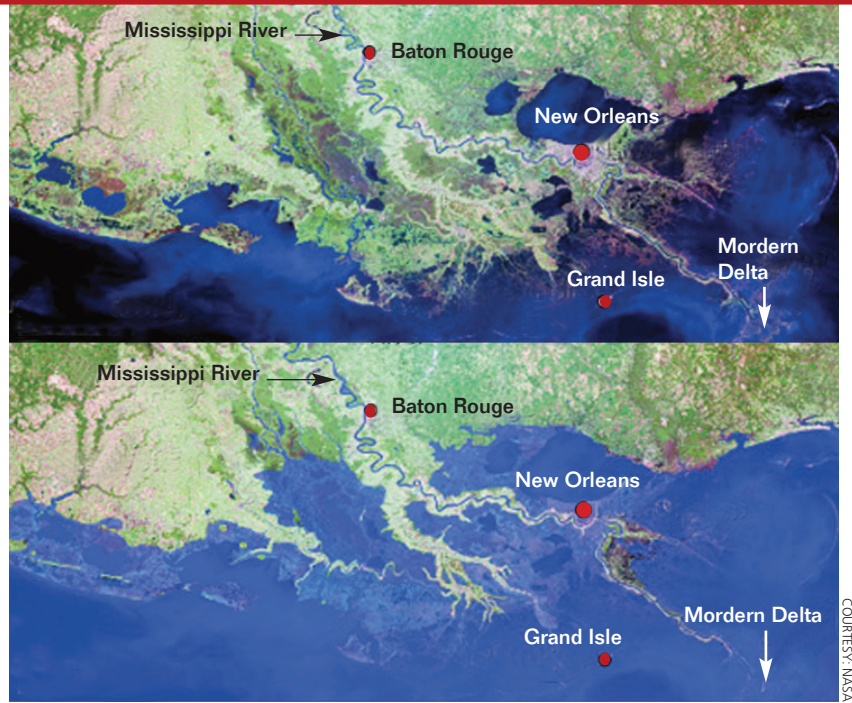
Trapped sediment and rising sea will sink New Orleans

TIAASA ADHYA

THE Mississippi delta in the US is going under the sea. Twenty-five per cent of the wetlands associated with it have been lost to the ocean. Between 1976 and 2006 the river deposited 205 million tonnes of silt every year, when 230 million tonnes were needed to maintain the delta. Steadily rising sea levels are only eroding it further.

Geologists Michael Blum and Harry Roberts of the Louisiana State University in the US analyzed data on rates of sediment deposition in the Mississippi delta for the past 12,000 years. They found that due to an overwhelming surge of meltwater from the last ice age the oceans had filled up fast. This led the Mississippi delta plain to retreat inland. It was only after the rise in sea level had slowed down considerably that the delta grew seaward again.

But this time there might be no going back. Human tinkering such as building embankments, dredging channels and cutting canals through marsh-



Modified satellite images: delta as it appears today (top), and will appear in 2100

es, has decreased the sediment depositing capacity of the river by 50 per cent. The drainage basin of the roughly 3,782-kilometre-long river includes about 40,000 dams and embankments built over the past century.

At this rate an additional 10,000-13,500 sq km of the wetlands buffering New Orleans would be submerged by 2100, said the team. And since the sea level is rising at least three times faster than during the time when the delta-plain developed, even if sediment loads

are restored, drowning is inevitable. The study was published online in *Nature Geoscience* on June 28.

The Sunderbans delta in India is facing a similar problem. “The growth of the delta has stopped since 1995. It has, in fact, started receding,” said Pranabes Sanyal of the oceanographic studies centre in Jadavpur University, Kolkata. R K Barman of the Calcutta Port Trust Officers’ Association said adequate silt is not coming down to feed the delta as it gets accumulated at the port. ■

MICROBIOLOGY: *H1N1 virus*

What comes after phase six?

Swine flu declared pandemic, can be even deadlier

THREE months after it struck, WHO declared swine flu a global pandemic of the highest level: phase six. Known as the 2009 A (H1N1) virus, it took down 89,921 people across 85 countries in six continents. The death count was 382. Yet it could not match the lethality of the Spanish flu virus that affected one-third of the world’s population when it struck in 1918. American researchers explained why. The swine flu virus cannot bind well to the human respiratory tract receptors, hence is inefficient at transmission.

A team led by Taronna R Maines

from the National Center for Immunization and Respiratory Diseases under the Centers for Disease Control and Prevention in USA, studied the activity of the virus in ferrets and mice. They introduced three 2009 A (H1N1) virus strains into healthy ferrets. A day later more healthy ferrets were placed in their cages for direct contact and in adjacent cages

The swine flu virus can't bind well to respiratory tract receptors in humans

with perforated walls that allowed respiratory droplets. They found the virus spread more rapidly via direct contact.

The results were then compared with the seasonal H1N1 viral infection in ferrets. Respiratory transmission was more effective in the seasonal flu virus. Tests on mice showed that compared to the common influenza virus, the swine flu virus adapted quickly to the host.

Through various tests the researchers confirmed that the binding affinity of the swine flu virus to receptors in the human respiratory tract was lower than that of the seasonal flu virus; only the binding pattern was similar. Hence during airborne transmission the chances of the virus infecting individuals decreased. But a single gene mutation can make the virus bind better to receptors, warned authors of the study published on July 2 in *Science Express*. ■

HEALTH SCIENCES: *diabetes prediction*

Get a 3-6 years head start

An early warning system in the making to prevent diabetes

ROHINI RANGARAJAN

WITH over 45 million diabetics in the country, India is called the diabetes capital of the world. Doctors advise eating healthy and exercising for an hour daily to keep obesity at bay—a major risk factor. But that may or may not work, especially for people in the high-risk category. What the country needs is an early warning system.

Adam Tabak and other researchers at the department of epidemiology and public health, University College London, UK, say it might just be possible to tell if a person will have diabetes three to six years later—his blood sugar levels will be rising fast.

Tabak took help from the Whitehall II study, initiated in the UK in 1988 (see: *A tradition*). Under the study, over 10,000 people underwent a glucose tolerance test between 1991 and 1994. Blood samples were collected after a night of fasting and two hours after breakfast. Right after a meal the blood sugar level is high and insulin is released to direct sugar to the muscles to be broken down for energy. Two hours after a meal normal sugar levels are restored.

Tabak's team repeated the tests on 9,000 participants of the Whitehall II study between 1997 and 1999 and from 2002 to 2004. In the intervening periods, the people were made to fill out questionnaires, to know their diabetes status. When the results were compared,



the team found 505 diabetics. They found that from 13 years to three years before the final diagnosis, in 2004, there was a gradual increase in fasting sugar levels for both diabetics and non-diabetics. But the increase was very high for diabetics, both for fasting

and post-eating sugar levels.

Insulin sensitivity also decreased much faster in diabetics. Fasting sugar levels in diabetics rose from 98.5 mg/decilitre 13 years

before final diagnosis to 104.2 mg/dl three years earlier to 133.2 mg/dl in 2004. In case of non-diabetics the increase in fasting sugar was from 94.68 mg/dl to 95.58 mg/dl during the 13 years of the study.

Three to six years before one turns diabetic is the unstable period. The authors of the study said research is on to identify the symptoms for this period. Until that can be done regular follow-ups is a must. "Indians have a high insulin resistance. So they become prone to diabetes (in their 30s) almost 10 years before people in the West," said Anjana Bhan, endocrinologist at the Max Super-Speciality Hospital, Delhi. "This study tells us that preventive health check-ups should start earlier in our country, perhaps when people are in their 20s."

The paper was published in the June 8 issue of *Lancet*. ■

TECHNOLOGY: *DNA fingerprinting*

Faecal signs

Tiger faeces give an estimate of its population

SUMANA NARAYANAN

RESEARCHERS from Bengaluru extracted DNA from tigers' faeces to estimate their population. Not only did it turn out to be as accurate as the camera trap method, it also provided information on the animal's genetic diversity.

Faeces were collected in Bandipur National Park in Karnataka and analyzed for DNA. The population estimate was 62 tigers. This was compared with earlier estimates made using camera traps. The two were identical, indicating that the faecal DNA method was as accurate as camera traps.

For the faecal method, one needs to identify markers on the DNA strand. These markers are unique to each tiger. Since tigers have a low genetic diversity five markers in the DNA strand of one tiger were enough for Bandipur, said the team. "The chances of making a mistake with five markers are once in 200 times, which is okay given the tiger population is definitely less than 100," said Uma



DIVYA

Ramakrishnan, one of the authors.

In case of the camera trap methodology, there are possibilities of camera thefts and difficulty in capturing inaccessible terrains. Moreover, it is used for animals which can be counted using distinguishing marks; stripe patterns are unique to each tiger. This is where genetic sampling gets an edge over camera traps, said the study published in the June 17 issue of *Biological Conservation*. It can be used for species which don't have distinguishing marks between individuals. This method is also cheaper than using camera traps—Rs 11,095 per animal identified through camera versus Rs 7,413 for DNA analyses.

Before camera traps, the standard method followed by wildlife researchers was counting pugmarks. The 2008 census using this method found 80 tigers in Bandipur. ■

A TRADITION

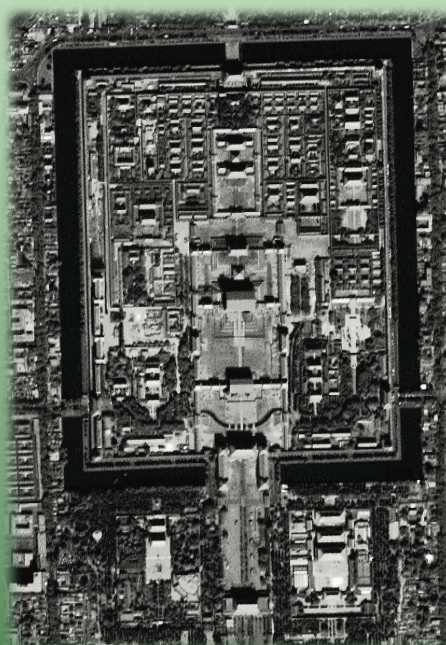
The 1967 Whitehall study on British civil servants revealed low-income employees had more cases of cardiovascular diseases, contrary to the belief that heart diseases were rich men's ailment. The Whitehall II study to measure risk factors began in 1988 on 10,300 people aged 35-55 years. The study is on.

We read the earth from Space



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PLANT SCIENCES: *breeding*

The asexual drive

Scientists make a sexually reproducing plant go asexual

ROHINI RANGARAJAN

ASEXUAL reproduction does have certain advantages over sexual reproduction when it comes to plants. It is faster, easier and requires less energy. Production is higher too. Seeds produced asexually are clones of the mother plant and have exactly the same traits. This takes away the need for constant cross-breeding needed to retain the desired traits. But asexual reproduction is rare in plants, and attempts at inducing it in crop plants have been unsuccessful till date.

Isabelle d'Erfurth at the French National Institute for Agricultural Research in Versailles in



France and colleagues modified *Arabidopsis thaliana*, a flowering plant that reproduces sexually, to produce asexual seeds. A member of the mustard family, *A. thaliana* has a well documented genome. So it was easy for the team to stop meiosis—cell division that produces the egg and sperm cells. This made the team hopeful of transferring the technique to crop plants like wheat and corn.

Egg and sperm cells have half the chromosome number (haploid) of the vegetative cells (diploid), thanks to meiosis. The difference between asexually and sexually produced plants lies in three steps that define meiosis. Block

these steps and the plant will still look the same, replete with egg and sperm cells. The only difference will be in the chromosome number. In an asexually produced plant even the egg and sperm cells will be diploid.

In 2005, the researchers blocked the first two steps in meiosis in a plant, which turned out to be infertile. This time they found a gene which helped them block the last step. The resultant plant was fertile. When two such genetically identical plants were crossed, it was equivalent to asexual reproduction, said the study, published in the June 9 issue of *PloS Biology*. But the chromosome number kept doubling as further generations were crossed.

Akshay Talukdar, division of genetics, Indian Agricultural Research Institute, Delhi, said, "Since the chromosome number in *Arabidopsis* is doubling with every generation, the plant may not be fertile after a certain point." Indeed the French team found that after three generations, when its chromosome number became eight, the plant produced hardly any seeds. ■

BIOLOGY: *allergy*

Breathe easy

It might be possible to cure allergy, not just suppress it

RESEARCHERS are nowadays taking a different approach to treating allergies. They are focusing on the interplay between the body's immunity and the development of an allergy. A drug can at the most suppress allergy every time it happens but delving deeper into what causes it might help get rid of the affliction forever.

An allergy is caused when the body reacts to a foreign substance. Although this is usually not more than coughs, rashes or fever, there are times it can get out of control. This leads to an anaphylactic shock, characterized by a sudden dip in blood pressure and acute difficulty in breathing. Commonly used things like peanuts and penicillin can trigger the reaction. Scientists have traced anaphylactic shock to a protein called interleukin-33 (IL-33).

Earlier studies have found IL-33 to regulate immunity by increasing the

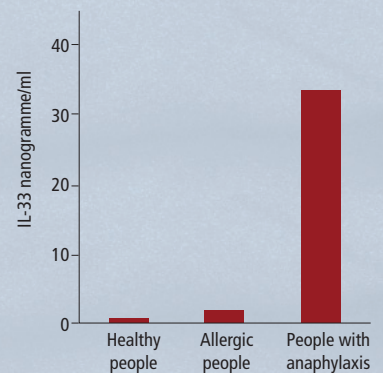
levels of antibodies. Peter Pushparaj, at the division of immunology, infection and inflammation, University of Glasgow, Scotland, and other researchers took tissue samples of patients suffering from anaphylactic shock and of healthy people. They found very high levels of IL-33 in skin samples of people with allergy-induced rashes; the protein was absent in healthy skin.

The authors say they still can't say whether the allergy-induced shock stimulates IL-33 production, or IL-33 itself causes the allergic reaction which leads to the shock.

The study was published in the June 16 issue of the *Proceedings of the National Academy of Sciences*.

"Now that we know the role of IL-33, we can block either its production, or its receptors," said Narinder Kumar Mehra, head of the department of transplant immunology and immunogenet-

GOT A CLUE: IL-33
The protein level rises with allergy



ANGIMIRH BASU / CSE

ics, All India Institute of Medical Sciences, Delhi. "Researching into how a disease develops because of the body's immune system will make it easier to target a drug, and treat anaphylactic shock." ■

PHYSICAL SCIENCES: *optical transistor*

Get the speed

A dye molecule shows how light can transfer information

KABIR SHARMA

THE world of today cannot do without transistors. Used to switch and amplify signals in the integrated circuits, they are essential for any electronic device to work efficiently. As of now silicon is the principal component of a transistor. Its electrons, which have conducting properties, allow for fast transmission of information. It could still be faster but for the loss of energy, say researchers. This is where light can step in as a conductor, with a speed of 299,792,458 metres per second.

Optical transistors, where photons—packets of light—are used, have been an area of immense interest and research for a while now. Photons have no charge and do not interfere with each other as the signal is being sent. Electrons, on the other hand, are negatively charged and repel each other which might lead to loss of energy and disruption of signals.

But so far there was no way to control interaction between photons. Jaesuk Hwang and his team from the Laboratory of Physical Chemistry, Zurich, Switzerland, have shown that a molecule of organic dye can control the transmission of information by photons.

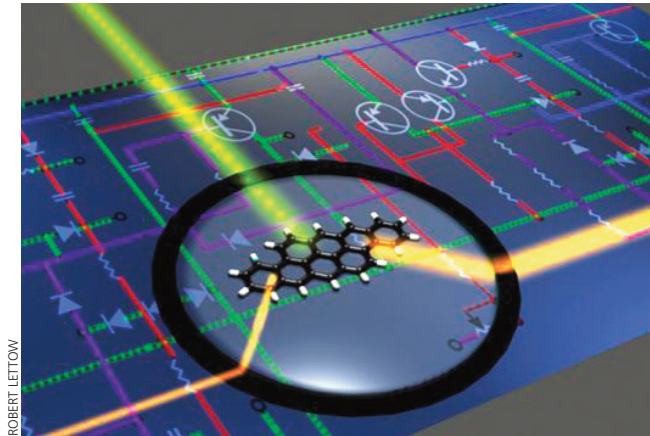
The researchers exposed the molecule to a beam of light that energized it. In the excited form, the dye molecule let the photons move forward carrying information. Since the dye molecule's electrons were already at a higher energy level, the molecule did not absorb the energy of the information-carrying photons and let them pass. Had the dye molecule not been exposed to the energizing beam of light, it would have merely absorbed the photons carrying information and reflected them right back.

There are drawbacks. The dye molecule needs to be modified before it can be used and that takes up too much energy, reducing the efficiency of the process. More research is needed to

ensure that the dye molecule remains in the excited state without repeated inputs of energy. It will be some time before the optical transistor can be perfected to make technology for transmission of information over long distances. But the experiment does prove that photons can be controlled.

“The present device might not have

any application as it is only a feasibility demonstration,” said Michel Orrit, professor of molecular physics at the University of Leiden, Netherlands. “Progress in the fields of nanophotonics and plasmonics has been breathtaking. Ten years from now we might be working wonders.” The study has been published in the July 2 issue of *Nature*. ■



An artist's impression of a photonic circuit with molecular building blocks

LIFE SCIENCES: *cancer*

Menadione v microtubule

The vitamin sabotages cancer cells' infrastructure for division

BIPLAB DAS

VITAMIN K3 or menadione, as it is chemically known, shows property of an anti-cancer agent. Its mechanism of action was as yet unexplored. Researchers from University of Calcutta used the vitamin in cultures of human cervical and oral epithelial cancer cells to know its role.

The vitamin arrested the growth of both the types of cancer cells by collapsing the cells' infrastructure needed for division. The team found a substantial reduction in the density of the microtubules in cancer cells. So they inferred menadione's anti-cancer property lies in its ability to bind to and disable protein tubulin that forms microtubules. Microtubules are crucial for cell divi-

sion. To confirm its find, the team isolated tubulin from goat brain tissue and exposed it to menadione. The vitamin interacted with tubulin.

“Cells treated with menadione remained depleted of microtubules for at least 24 hours after the compound was removed from the cultures,” said lead researcher Gopal Chakrabarti from the department of biotechnology and B C Guha Centre for Genetic Engineering and Biotechnology, Calcutta university. The study was published online in the June 15 issue of *Biochemistry*.

Vitamin K3 is produced in the body to aid in clotting. But it is in low quantities and harmless. When used as a drug its effect will depend upon its concentration. The researchers are yet to assess its impact on healthy cells.

Plumbagin, a yellow pigment found in the root of the herb chitrak (*Plumbago zeylanica*) was found to check cancer cell growth in a similar manner by a previous study (see *Down To Earth*, Root Therapy, September 1-15, 2008). ■

Researchers are yet to study the impact of the vitamin on healthy cells

ENTOMOLOGY: *pest resurgence*

America bugged

Hotels, motels and even homes in the US are infested by bed bugs

ARCHITA BHATTA

FIFTY YEARS ago the United States promised itself a good night's sleep. It eradicated bed bugs from all states. The bugs are back now. Business centres with many hotels are badly infested. Last time the National Pest Management Association, a non-profit with members from the pesticide industry, counted the bed bug population in 2005, it found they had multiplied five-fold since 1999.

The US Environment Protection Agency was so alarmed that in April this year it organized a National Bed Bug Summit in Virginia. Entomologists and industry representatives from several countries compared notes on the elusive, nocturnal insect the size of a sesame seed. Turned out increased travel, reduced pesticide use and pesticide-resistant strains of bed bugs are helping it spread. People often acquire bugs at hotels, motels or at bed-and-breakfasts, and bring them home in their luggage. Attracted by warmth and high carbon dioxide levels, bed bugs (*Cimex lectularius*) feed on the blood of their host, usually humans and other warm blooded animals.

Resurgence of bed bug populations has been reported in the UK, Germany, Spain, Australia and Canada as well. India has, however, dodged the trend. Bed bugs were a big problem in India until the 1970s. But now, entomologists say, they are a problem of the past. "This could be for two reasons. The jute mattresses used earlier were a favourable habitat for bed bugs. They have been replaced by synthetic mattresses," said Pardeep Kumar Chuneja, entomologist at Punjab Agricultural University. The second reason is widespread use of DDT in the malaria control programme. The pesticide has been linked with cancer.

Among those present at the summit, Michael Potter, entomologist at University of Kentucky in the UK, attributed the rise in bed bug infestation to less effective pesticides. He said the solution to the problem is to let the pest

control industry go to war. But that would mean lifting the ban on pesticides.

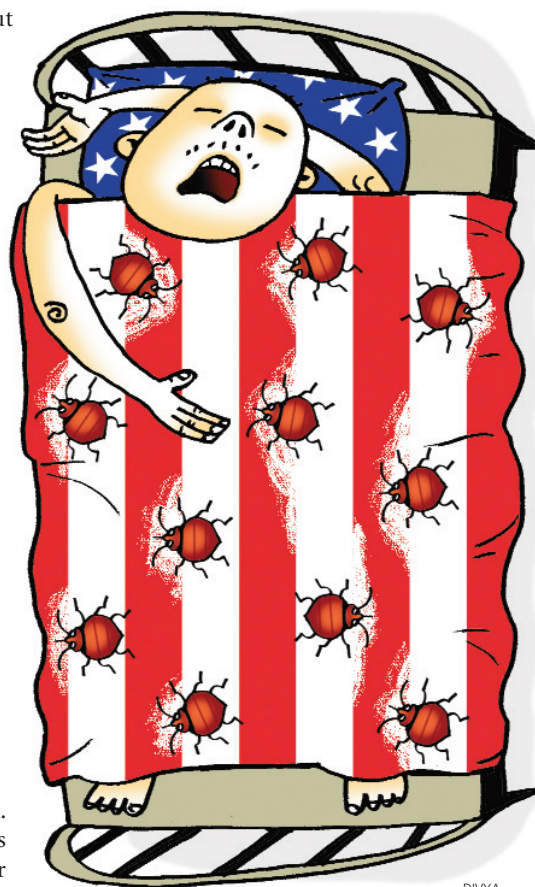
Some are working on safer alternatives. Entomologists at Ohio State University and Wittenberg University have used chemicals secreted by the insects against the insects. These chemicals called alarm pheromones are secreted when insects are disturbed or excited. These were used with a combination of desiccants to kill the bed bugs.

When a synthetic version of the alarm pheromones were tested the bugs moved away from the centre of application. Desiccants, placed in areas bugs moved out to, absorbed the water in their bodies, killing them.

The researchers used a combination of two alarm pheromones, (E)-2-hexenal and (E)-2-octenal, and two desiccants, diatomaceous earth and silica gel. At least half the young bed bugs were dead in 10 days, and 60 per cent of adult female bed bugs died within 40 days.

The researchers claim bed bugs would not become resistant to this method of control as they do to pesticides. "The bed bugs could become sensitized to the pheromones, but usually this type of resistance is not passed to the next generation," said Joshua Benoit, the lead author of the paper on the method published in the May issue of *Journal of Medical Entomology*. The idea struck him after he watched bed bugs respond to alarm pheromones in another study.

In India the bed bug population is declining. Probable reasons are use of DDT and synthetic mattresses



DIVYA

But Benoit is reluctant to suggest the use of desiccant dust with alarm pheromones until more experiments. "Larger scale studies are needed to test if this method can be used in full-scale control," he said.

Benoit, an expert on bed bugs in Ohio University, said the bugs have become obscure in India probably due to pesticide use. But could increase in temperature also be a reason behind the fall in the number of bed bugs in India? "Temperature has been used to kill bed bugs, but this is a continual exposure to temperatures around 40°C. Slight temperature increases would not kill many bed bugs," Benoit pointed out.

With increasing international travel, the bed bug resurgence can hit India and then Benoit's method of controlling the insect may come handy. ■



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CONTACT: Kiran Pandey, Coordinator, Environment Resource Unit, CSE,
Email: kiran@cseindia.org

Centre for Science and Environment, 41, Tughlakabad Institutional Area, New Delhi – 110062,
Ph: 91-11-29955124,29956110 (Ext. 287); Fax: 91-11-29955879

PROFILE OF PARTICIPANT

Name: _____ Age: _____

Designation: _____

Organisation's name: _____

Brief description of present responsibilities
(2-3 lines):

Office Address: _____

Phone(s): Office: _____

Home: _____ Fax: _____

Official Website: _____

Contact email: _____

WORK EXPERIENCE

Period: _____

Position: _____

Organisation: _____

What does the participant expect to learn?

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Forest officials kept eyes tightly shut

When it was found there were no tigers in the Panna Tiger Reserve, P K SEN was called to join the government special investigation team. Former head of Project Tiger, he told SUMANA NARAYANAN the department's focus was tourism. Excerpts

On the special investigation team

The ministry of environment asked us to look into the problem. Besides me, there was Qamar Qureshi of the Wildlife Institute of India (WII), Chaturbhuj Behera, deputy director of the Wildlife Crime Control Bureau, and S P Yadav of the National Tiger Conservation Authority (NTCA). Our mandate was to ascertain the reason for tigers disappearing and to see if the park staff were involved. The report is with the ministry now; the NTCA will publish it soon.

On the report

We looked at information from various sources—the forest department, NTCA, non-profits, the Central Empowered Committee of the Supreme Court and researchers from WII. Our finding is that tigers were lost to poaching. There was no evidence of other causes such as disease outbreak or ecological disasters.

On the management of the park

This was my second report on Panna. I

had earlier (in 2008) visited the tiger reserve with Ravi Singh of WWF. Many anti-poaching initiatives had been taken over the past decade by several field directors. There was increased patrolling on foot and on vehicle. There were rehabilitation efforts targeted at the Pardhi and Baheliya communities that are known to live off poaching. But the crucial problem with these initiatives was that no monitoring and evaluation were done. So the efficacy of the measures was not known. What then is the point of these measures?

On his earlier report

The newspapers have commented that I lauded the department back then and now I'm criticizing it. That's not true. The last time we said field directors there have taken many measures and that is a good thing, but their evaluation and monitoring should be done. In fact we stated specifically that in the summer (of 2008) a team of scientists should be asked to evaluate the park.

On tampering with the signs

We had also found several pugmarks which should have indicated a sizeable population. We were suspicious though because many of these pugmarks had rounded off toes—indicating human tampering. Also there were quite a few pugmarks in scrub areas. Tigers generally avoid scrub forests. We realized that the park staff were creating pugmarks with casts.

On the park management's attitude

Studies had found a decline in tiger numbers and a skewed sex ratio between 2001 and 2006. It changed from one male for every three females to one female for every three males. So the females were disappearing. This is something that was seen in Sariska as well. The population density had dipped from 6-7 tigers per 100 sq km to just 3-3.5 tigers per 100 sq km.

The forest department preferred to ignore the signs. The number of tiger sightings and pugmarks were declining,

“We found several pugmarks had the toes rounded off. We realized the park staff were creating pugmarks with casts”



PHOTOGRAPHS: MEETA AHLAWAT / CSE

but the state did nothing. The state received and ignored many warning letters. NTCA, WII, researchers like Raghu Chundawat and the CEC had repeatedly told the forest department that there was a problem. These were based on either research or field visits.

The CEC had visited the park at the behest of the Supreme Court in 2004 and 2005. They found that trees had been cut needlessly in many areas, especially in Doodhwa gorge and by the roads. The gorge is where tigresses with cubs were frequently sighted because it is an excellent habitat for them. It offers shelter, food and water in abundance. The park officials were clearing the trees for the tourists, for easy sighting of tigers. The focus was not wildlife protection but tourism.

The department's reaction to all these reports and comments was to suspend Chundawat's research permit and vehemently deny the problem. They started monitoring the population only in December 2008, when only one tiger was left. (This is not including the two that were translocated; one from Kanha and the other from Bandhavgarh.)

On who is to blame

In our report we have said that the people at the top are to blame. This has infuriated them. Why? Because the normal reaction is to blame the field staff, transfer or suspend a few of them and everyone is happy. But what can the field staff do? Why were the PCCF (principal chief conservator of forests), additional PCCF (wildlife) and CWW (chief wildlife warden) not doing anything? They were doing something alright; they were busy writing letters to all those who had said there is a problem. They were busy denying the problem without verifying the field situation even though they had visited the park several times. Their visits were about drinking and eating *desi* chicken.

On what is needed

The field staff don't have proper training in anti-poaching measures. The forest guards have no facilities, no access to medical help. If they aren't given any incentives, why would they work? Also the park staff are not capable of carrying out censuses properly. This has to change. For how long can you expect WII to do the work? ■



Body ache? Try green dosa

A creeper found in south India is an answer to several common ailments, says SUMANA NARAYANAN

Around September each year, when the northeast monsoon usually started, bags of wet plant material would make their way to our home in Chennai. Every other week my grandmother would collect this plant called mudakkatraan from our untended garden in the village and my father would transport it overnight by train. The bags were much awaited as it meant the green dosa season had begun.

At home, the leaves would be crushed into a gooey paste and mixed with the batter to make green dosas. It was a delicacy, but in most part of Tamil Nadu, the plant is eaten for its medicinal value—it eases joint pains. The entire creeper is pulled out and the leaves plucked for use. The creeper is so com-

mon that no one bothers to cultivate it. It grows along roadsides and in untended gardens, like my grandmother's.

Nowadays, the plant is available in powdered form in ayurvedic stores. The powder can also be made at home by sun-drying the leaves and grinding them and can be stored in the refrigerator. Since it does not dissolve in water, the most palatable method of eating it is to swallow a teaspoon of the powder and wash it down with a glass of water. My mother, in fact, is much better now and does not suffer from joint pains like she did earlier.

The creeper, considered a noxious weed in some countries, is found across the tropics. In Sanskrit the plant is called Indiravalli. It belongs to the soap-berry family or Sapindaceae. This family includes plants like lychee and maple.

Besides joint pain, mudakkatraan (*Cardiospermum halicababum*) also has other medici-

nal uses: the leaf and root are laxatives; they increase the appetite and heal boils and sores. The rasam is used to ease constipation and gas.

Instead of adding the leaves to a recipe a poultice can be made to bring down inflammation and knee joint pain. To make the poultice mudakkatraan leaves sautéed in castor oil are bound in a piece of cloth.

The dosas are a good remedy for body ache. ■

A LA CARTE

Ingredients

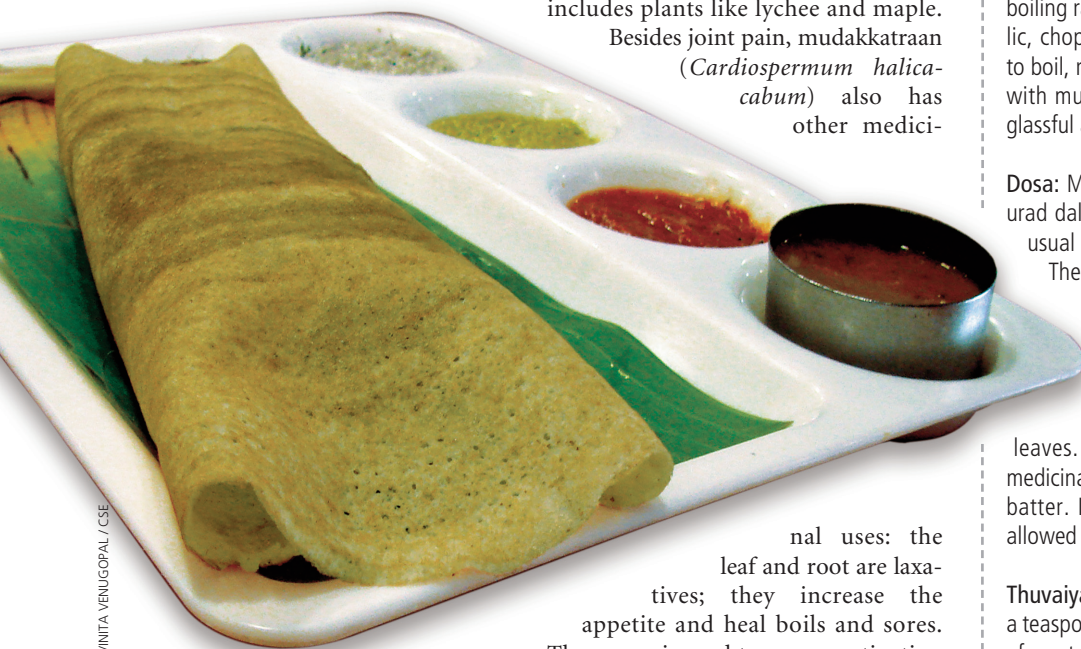
- ▶ Urad dal (black lentil)
- ▶ Channa dal (split chickpea)
- ▶ Mudakkatraan leaves
- ▶ Tamarind
- ▶ Methi seeds (fenugreek), cumin, asafoetida, mustard, salt, pepper, red chillies, garlic and oil

Rasam: Wash a handful of mudakkatraan leaves. Add the leaves to half-litre tamarind water, with a teaspoon of salt and boil till it loses the smell of raw tamarind. Grind a few red chillies into a paste along with a dash of pepper and jeera (all to taste) and a pinch of asafoetida. Add the paste to the boiling rasam. Add eight cloves of garlic, chopped. When the rasam comes to boil, remove from flame and season with mustard seeds. Drink up to one glassful at a time.

Dosa: Make the dosa batter with less urad dal—one third of the usual. The usual ratio of rice to urad dal is 4:1.

The amount of urad dal is reduced to make the mudakkatraan paste sticky. Soak a teaspoonful of methi seeds in water and grind it to a paste adding mudakkatraan leaves. This adds to the taste and medicinal property. Mix with the dosa batter. It should be eaten fresh, not allowed to ferment.

Thuvaiyal (a kind of chutney): In half a teaspoon of oil, roast half a teaspoon of mustard seeds, about four red chillies, a tablespoon each of chana dal, urad dal and a pinch of asafoetida. Sauté about a cup of leaves in the same pan, without adding more oil. Grind all to a smooth paste with tamarind and salt to taste. Can be eaten with rice or as a side dish for idli, dosa or curd rice



VINITA VENUGOPAL / CSE

The leaf and root of mudakkatraan increase appetite, heal boils and sores; try the rasam to ease constipation



ICICI Centre for Child Health and Nutrition

Job Opportunities

The ICICI Centre for Child Health and Nutrition (ICCHN) is a non-profit, grant making and research group focused on improving the health and nutrition status of poor women and children in India. ICCHN operates from Pune, has supported action research projects across the country and works principally in collaboration with NGOs, state and local governments to facilitate systemic change in public health systems. The Centre has a multidisciplinary team comprising sociologists, anthropologists, social workers and rural managers and is now eager to recruit for the following positions.

Senior Programme Associates

Expected to play a leadership role for the development of strategies for scaled change in child health and nutrition. Work involves defining and evolving strategic areas of focus essential for ICCHN to achieve its mission. Ensuring quality of analysis and partnerships, project development, project review and support, related research and documentation, and publication within the areas identified will be important components. Building teams and mentoring team members will be an equally significant responsibility.

Interested candidates must have a PhD in a relevant discipline such as Sociology, Social Anthropology, Economics, Development Studies, Social Work, Rural Management, Public Health and Health Administration. Experience is desirable.

Senior Research Associates

Expected to play a leadership role in developing the research programme for ICCHN including building of teams, development of partnerships with academic and research institutions as well as NGOs. Work involves ensuring quality of research questions and methods, data collection and analysis as well as publication of papers. Organising the dissemination of research findings in ways that facilitate policy and practice change would be an equally important responsibility.

Interested candidates must have a PhD in a relevant discipline such as Sociology, Social Anthropology, Economics, Development Studies, Social Work, Rural Management, Public Health and Health Administration. Training and experience in research is a prerequisite.

Positions are based at Pune, involve extensive travel, work interdisciplinary teams and management of several projects/initiatives. Candidates should be articulate in English language and should have outstanding analysis and documentation skills. Remuneration is upto Rs.9 lakhs p.a. or \$18,000 pa on nominal basis (based on qualifications, experience and location of work.)

For more details and to apply, please visit <http://jobsforgood.com/microsite/icchn/>



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NATIONAL FOUNDATION FOR INDIA

15th NATIONAL MEDIA FELLOWSHIPS PROGRAMME 2009-10

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For Print and Photo Journalists

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In addition, fellowships are also awarded to print and photo journalists interested in covering issues of distress seasonal migration and food security, child malnutrition and women's health.

The fellowship amounts to Rs. 1,00,000/- each. Women journalists and stringers from small local newspapers are encouraged to apply.

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National Foundation for India is a professional, independent India grant making and fundraising body, helping people improve their own lives. It supports partners who look for innovative solutions to complex development and social problems in poor, remote and challenging parts of the country.

For more information & application guidelines contact

National Media Fellowships

National Foundation for India

Core 4A, UG Floor, India Habitat Centre, Lodi Road, New Delhi 110 003

Phone : 91-11-2464 1864/ 65, 2464 8490/ 92, Fax : 91-11-2464 1867

Email : info@nfi.org.in, mandirakalaan@nfi.org.in, Website : www.nfi.org.in

Science isn't above commerce

The high costs of publishing traditional journals open the door for sponsored content



SHOBHIT MAHAJAN

In April 2009, an online life sciences magazine, *The-Scientist.com* carried a curious story about a journal called *The Australasian Journal of Bone and Medicine* that was published in the early part of the century. The journal published by the reputed publisher Elsevier reprinted articles from other Elsevier journals and carried some news and reviews. Nothing unusual, except the journal was fully paid for by Merck and was started with the express intent of supporting drugs made by the pharmaceutical giant. Worse still, Elsevier “conveniently” forgot to mention this “relationship” in the journal which was possibly read by hundreds of doctors who took the plugged pieces as genuine medical research.

“Sponsored content” is not new to publications: advertorials are common in newspapers and magazines, with the recent ones being so cleverly done that one can't make out the difference between opinion and advertisement unless one looks hard. But scientific publishing was supposed to be above all this. This episode, involving two of the biggest and most reputed names in their respective industries, dispels all doubts about science being above commerce.

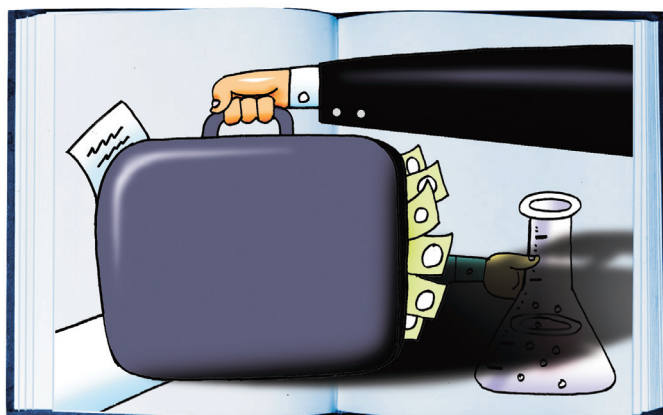
Years ago, it was fairly common, especially in medicine, for sponsored research to be published in reputed journals. In the cut-throat world of academia, where publish or perish is the mantra, researchers would welcome money from any source to carry out their work and advance their careers. The disclosure norms for authors were not stringent and scientists took money for research from industry (the pharmaceutical industry being the major one), and published their findings without

anyone being any wiser. Not surprisingly, the research was usually never unfavourable to the paymasters.

Then sometime in the mid-1980s, it was realized that something needed to be done to curb the growing abuse of “peer-reviewed scientific publication” by the industry: the pharmaceutical, the tobacco and health supplement industries being the prime culprits. Several journals had policies whereby the authors had to disclose any financial interests with the industry. The ambit of financial interests was not restricted to just research support but also included equity and consultancies with the companies. The *New England Journal of*

But what about the many journals that slipped out? It is, after all, fairly easy to find a “respectable sounding” journal somewhere in the world, less interested in the “colour” of research, and more in publishing. And once a piece is published in a journal which no one in the scientific community reads or refers, the company can just refer to that paper in its advertising claiming “scientific” credibility. The extraordinary amounts of money at stake in industries like pharmaceutical and medical diagnostics coupled with the high cost of publishing traditional journals, makes the model susceptible to abuse.

Internet initiatives like the Public



ILLUSTRATIONS: DIVYA

In the cut-throat world of publish or perish, many researchers would welcome money from any source

Medicine (*NEJM*), for instance, as early as 1984 introduced disclosure norms for its authors. Other reputed journals also introduced similar policies and it was felt that the problem had been solved.

However, in 1996, *NEJM* reported a solicited editorial comment on a paper published in the journal on the impact of certain anti-obesity drugs on pulmonary hypertension had been written by consultants for a major producer of anti-obesity drugs. Of course, the journal set the record straight after this fact was pointed out to them.

Library of Science are yet to acquire the level of scientific respectability as some of the older journals like *NEJM* and *Nature*. Researchers feel they stand to gain more from publishing in the reputed journals than in open source ones. One can only hope Creative Commons initiatives will become as respectable for the scientific community as the older print journals. ■

Shobhit Mahajan is professor at the Department of Physics and Astrophysics, University of Delhi

Bound and gagged

Forget Maoists, West Bengal's Left Front has lost its social constituency through years of inaction



SUHIT SEN

The situation in Lalgarh in West Bengal's Midnapore district, still precariously poised, seems to have been overtaken by generous helpings of farce in nearby Kolkata and distant Delhi. Union Home Minister P Chidambaram kept urging West Bengal to ban Red ultras even as he completed the formality of notifying the CPI-Maoists as a proscribed organization countrywide. He might not have bothered had he been up to speed with the situation in the state.

Chief minister Buddhadeb Bhattacharjee has been talking about a political campaign against the Maoists for a while, especially since the attack on his convoy near Salboni (near Lalgarh) in November last year. Now, in the wake of the ban, he has announced a three-pronged strategy: police action, political campaigning and development.

The fact, however, is that for at least a year Maoist sympathizers, not insurgents, have been the soft targets of the government and CPI(M) cadres. Several have been incarcerated on charges ranging from pasting posters to being in the possession of what is presumably 'incendiary' literature. The role of the party cadre and the highly irregular proceedings against people who can at best be described as propagandists was dramatically publicized when the police tried to barge into the accommodations of some students of Jadavpur University with no authorization soon after the Salboni attack. It was only concerted and immediate opposition from the student and teaching community of the university followed by a public outcry that scotched this proceeding.

While all this has been going on, the Left has not been able to string together

anything even remotely resembling a convincing rebuttal of the Maoist claim that the genesis of their entry into Bengal goes back to a few years ago when they were 'hired' by the CPI(M) to take on the Trinamul Congress.

There is, of course, very little reason for surprise at the CPI(M)'s political paralysis. For almost two years, the CPI(M) has been under siege. In its embattled state, a political campaign is out of the question, not least because the siege the opposition—whether Maoists or mainstream—has mounted rests on the foundations, the political and social logic and the social constituencies that until recently were the Left's mainstay. As for the development programme, only folks in a total state of denial as Bhattacharjee and his comrades can speak of it without a trace of embarrassment. For over three decades

Basic facilities like two decent meals and drinking water is stuff of fantasy in West Bengal's tribal areas



the Left Front has wilfully deprived the tribal people especially, but also huge sections of other poor people in West Bengal of the fruits of development. Forget development, basic facilities like drinking water and two decent meals a day are the stuff of fantasy. It is only the colossally deluded self-image of Left leaders, fed by years of rhetorical posturing as the saviours of the oppressed, that prevents them from seeing how despicably corrupt and venal the establishment has become and how irretrievably the people have been lost to them.

Since all that leaves the police action, whether it is necessary or not, there is a big problem. How long are central forces going to park themselves in Lalgarh? And what if the Maoists open new fronts in the vast swathes of utterly disaffected tribal territory?

Even a cursory reading of the news will confirm that the forces in Lalgarh resemble suspiciously an army of occupation, not because of the Maoists but because the people themselves are thoroughly alienated—as indeed they are in so many places in the country. All you have to do is leaf through a report commissioned by and presented to the Planning Commission about a year ago by a committee consisting of former bureaucrats and policemen, and academics and mainstream activists.

Which brings us to the Maoists. For a while now the prime minister has been describing them as the most wasting disease in the body politic. It cannot be denied that the Maoists possess their fair share of delinquencies. It can hardly, too, be denied that in the richest of lands in this country, among the poorest of the people they represent the only ray of hope. To deny that the Maoists prosper because they work for the betterment of the most wretched of people and not just through the invocation of terror would be a kind of blindness that no one can afford—certainly not those who guide the destinies of this nation. ■

Suhit Sen is an academic, a journalist and a freelance writer

Two-leg safari

For adventures on streets in the urban jungle



HEMANT ANANT JAIN and **AKASH DAS**



THE LITTLE COMIC SHOP. ALL OF US KNEW ONE SUCH. WE USED TO GO THERE AND FIND INDESCRIBABLE TREASURES. AND THEN LIFE WENT ON THE FAST LANE AND WE STOPPED TURNING THE CORNER WHERE THE LITTLE SHOP USED TO BE. SOMETIMES WE WANTED TO, BUT IT WAS TOO SMALL A CORNER OF TOO SMALL A STREET AND CARS WOULD NOT GO THERE. SO WE FORGOT ALL ABOUT IT. THE LITTLE SHOP STOPPED WAITING FOR US TOO AND TURNED A PAGE AND THE CHAPTER SAID, THE END.

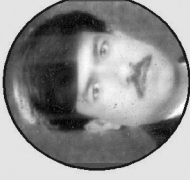
WE NEED THOSE LITTLE COMIC SHOPS. THOSE LITTLE HIDDEN GEMS IN THE SMALL CORNERS OF THE SMALL STREETS. THEY MAKE OUR LIVES INTERESTING AND TURN OUR TRAVELS INTO ADVENTURES. LET'S GET OUT OF OUR CARS AND LET'S WALK. LET'S WALK A NEW STREET, TURN A NEW CORNER AND DISCOVER A NEW COMIC SHOP, A CAKE SHOP, A CURIOSITY SHOP, A HIDDEN LITTLE PLACE IN OUR BIG LITTLE WORLD. EVERY DAY.

ढाई लाख लाडलियाँ बनी लखपति अब आपकी बिटिया की बारी



सम्भागवाह प्रगति

चाखल	114.42	नर्मदापुरम	14.558
खालिघर	17012	सागर	27732
उज्जैन	27527	जबलपुर	58424
इन्दौर	41565	रीवा	16197
भोपाल	24435	शहडोल	11810



मैंने लाइली लक्ष्मी योजना का लाभ लिया। एक दिन मेरी बेटी हट क्षेत्र में अपना, अपने समाज का, अपने देश का नाम रोशन करेगी।

— राजेश गिरोठिया, पार्षद सीतामऊ (मंसौर)



मैंने अपनी बिटिया के सुखद भविष्य के लिए परिवार नियोजन कराकर लाइली लक्ष्मी योजना का लाभ लिया। अब मेरी चाय की दुकान पर आने वाले ग्राहकों को भी योजना के लाभों के बारे में बताता हूँ।

— छोटेलाल नामदेव, छिन्दवाडा

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BOOK>> BRANDS UNDER FIRE • edited by Ivan Arthur and Kurien Mathews
• Penguin Books • Price Rs 499

A can of worms

AMITABH BAKSHI

In August 2003, the CEOs of Coke and Pepsi addressed a joint press conference. This unlikely meeting of minds was forced upon by an emergency. Centre for Science and Environment, a non-profit

weathered the crisis much better this time.

The early years of this century brought time to many brands. There were worms in a cache of Cadbury chocolates and UTI almost went bust—questions that had a generation of managers schooled by Peter

strike a deeper chord in these days of recession by advertising chocolates as a pay day candy.

Soft drink majors went heavy on fruit drinks. This is where *Brands Under Fire* leaves us wanting. Since the book is primarily about the battle for consumer trust, a



in Delhi has exposed dangerous levels of pesticides in soft drinks. Three years later, soft drinks were again in the firing line. Centre for Science and Environment again. This time Coke did not close ranks with its old competitor. It played Willie Wonka. The beverage giant announced its units were open to inspection. It was a home-grown strategy, developed in the early years of this century. Under fire from whistleblowers in Atlanta, the company decided to display its latest concoctions.

The strategy was replicated in India, albeit on a smaller scale. Coke also hitched onto the corporate social responsibility bandwagon. Journalists were invited to visit Coke's rain-water harvesting plants. Many of them wrote favourably. The soft drinks

Drucker textbooks fumbling.

To their credit, not for long. *Brands Under Fire* is about how they coped. But the contributions here are almost entirely by advertising honchos. So was the resuscitation of the brands the work of media glitz. To an extent yes. The Khans and Bachchans of Bollywood and the cricket stars pitched in with their assurances.

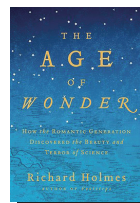
But brand ambassadors are not enough to sell products. Cadbury indeed de-glamorized itself. Gone was the fizzy-haired model breaking into a dance in the middle of a cricket pitch. In came Pappu—Amitabh Bachchan, alright but in a de-glamorized role. The middle class identified with the middle-aged bumbling Pappu's attempts to pass secondary school. Cadbury seems to be attempting to



few consumer surveys would have done the volume some good. For instance, did mothers try to shift the family to consuming fruit juices instead of colas?

Civil society groups are likely to punch more holes in brands in the coming years. And who can say they have not learned from the battles. They might have an ally in the Internet. Already civil society groups are taking the battle to Twitter or on Facebook. The future big fights are not likely to be won on TV. Civil society groups might find the equalizing character of the Internet to their advantage. *Brands Under Fire* could have done well to give us introduction into how advertising plans to deal with new media. I can speak from experience they are aware of the challenge. ■

Amitabh Bakshi has worked in the advertising industry. He is on a sabbatical now



BOOK>> THE AGE OF WONDER, HOW THE ROMANTIC GENERATION DISCOVERED THE BEAUTY AND TERROR OF SCIENCE • Pantheon Books, New York • Indian Price Rs 1,000

Poets in lab coats

PRATUL RATURI

In 1815, a medical student spent a drink-addled night enthusing over a newly purchased verse translation of Homer's *Iliad*. Next morning, he took less than four hours to pen down his own famous poem, in which he compared his feelings with those of "some watcher of the skies when a new planet swims into his ken". The medical student in question was the famous poet, John Keats. He was referring to William Herschel, the

astronomer who had effectively enlarged the solar system in 1781 by detecting a sixth planet, Uranus.

Herschel was an eccentric musician from Germany who came to England a few years earlier and then turned to astronomy. Assisted by his indomitable sister Carolyn—with whom he had a troubled relationship—Herschel invented powerful telescopes that mapped the heavens to hitherto unprecedented extent.

The distinction between arts and science was not

FROM THE BLURBS

AN AFRICAN DIARY, 12 DAYS IN KENYA'S MAGICAL WILDERNESS

by Valmik Thapar, Oxford University Press, Rs 1995

With nearly 200 photographs *An African Diary* captures the complex web of life in the Mara in Kenya and Tanzania. There are the usual awe-inspired notes on the lion and the elephant. But the author is also alive to small wonders like the black-backed jackal and the bat-eared fox.

WHAT ON EARTH HAPPENED? By Christopher Lloyd, Penguin India, Rs 399

Imagine capturing 13.7 billion years in a pocket-size book. In this thrill-ride across millenia and continents, the history of the Earth comes to life: from the first signs of human life to the tentative future of a world with a global warming crisis.

WATER AND THE LAWS IN INDIA, edited by Ramaswamy Iyer, Sage, Rs 995

Laws relating to water in India have diverse origins, including ancient local customs and the British Common Law. The chapters in this compendium straddles two domains: water-resource policy and water law. The book also briefly explores the case for an over-arching national water law.

THE COLLECTED ESSAYS AND SHORTER WRITINGS OF SALIM ALI,

edited by Tara Gandhi, Permanent Black, Rs 895

Sálim Ali, without question India's greatest ornithologist, was a prolific writer. Apart from his many books he wrote a large number of scientific papers, essays, and popular articles. This first-time collection of all these shorter writings has been painstakingly ferreted out and put together by Sálim Ali's former student Tara Gandhi

known in that age, Richard Holmes tells us in *The Age of Wonder*. At school, Keats had learnt about gravity through theatrics: while one pupil remained stationary to act as the sun, the other child-planets circled round at different speeds and distances to form a living orrery.

Holmes teases out elusive meanings between the works of poets and scientists. To modern eyes, Keats or Virgil should not stand cheek-by-jowl with anatomy, but this is precisely what happened in the science writing of the time.

Science in the Romantic Age needed speculation because commitment to scientific observation and method alone could be seen as merely and vulgarly empirical. In this age, science's reliance upon speculation had the practical result of dispensing with the butchery of animal experiments.



ILLUSTRATIONS: DIVYA

Holmes is a gifted story teller. But there are stories, he chooses not to tell. Women writers of the time are neglected: the poet Anna Seward wrote the opening lines to Erasmus Darwin's *The Botanic Garden* and Charlotte Turner Smith wrote of the latest discoveries in geology and fossils in her poem *Beachy Head*. ■

Pratul Raturi is a science writer



BOOK >> THE CAGED PHOENIX: CAN INDIA FLY • by Dipankar Gupta • Penguin India • Rs 550

The weak wings

SHEFALI KUKRETI

In early 2007, India joined the club of trillionaires. The country's GDP had touched the trillion-dollar economy. India became the world's 11th trillion-dollar economy. It was another occasion to pat ourselves on our backs.

Dipankar Gupta is amongst those who believe we congratulated ourselves too early. The tale is familiar one. The country is still caste-ridden, its middle classes are self-serving and its politicians venal.

The IT industry offers hope. But the (Narayana) Murthys and Premjis are not Rockefeller yet. And merely 3 million are employed in that sector anyway. Almost 20 years into liberalization, the middle class takes refuge in the argument that structural constraints and not cultural factors hobble democracy in the country.

Gupta does tell his story with panache weaving anecdotes with sociological analysis. He takes you to the badlands of Uttar Pradesh, to the fields of Punjab and into the homes of untouchables in Bihar.

But the JNU don does overstate a few times. Consider, for example, his argument on the increasing use of mobile phones. Today, even unskilled or semi-skilled workers carry mobile phones because these are their lifeline to gainful employment. But Gupta does not see this as any communication revolution. For



him, this is a contradiction of sorts. So, even if many mobile owners survive at subsistence levels, they still invest in such gadgets. The possession of a mobile phone does not signify a rickshaw puller's entry into the middle class category. But none bar the copywriters who wrote the Idea cellphone ad would make this claim.

Gupta's is, however, no apology for socialist India and what the economist Raj Krishna once described as the Hindu Rate of Growth. He sees hope in Dalit assertion. This is, as he shows, is not just confined to the political arena, but also noticeable in business. But this does not fit well with his critique of post-liberalization India.

Limited no doubt, the dismantling of the licence permit raj has surely offered opportunities to the marginalized. ■

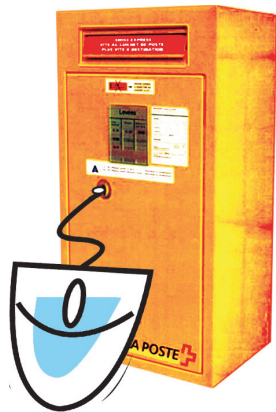
Shefali Kukreti is a civil servant. The views in this article are hers alone

POSTAL SERVICE >> E-MAIL • Switzerland

Post box to inbox

Swiss citizens can now do away with tiny letter boxes in their houses. The Swiss Postal Service has tied up with an IT company that will scan the envelopes of all letters and e-mail them to clients for a fee. The clients can select the letters they want to read, and have them opened, scanned and e-mailed to them. They can also archive their scanned letters or ask for unopened letters to be sent to other addresses or be shredded.

The technology partner, US-based Earth Class Mail, has thousands of individual



ILLUSTRATIONS: DIVYA

subscribers worldwide. This is the first time it has licensed its technology to a postal service.

The advantage of such an arrangement is subscribers do not miss snail mail when away from home, nor do they have to inform their post office each time they change address. It will also cut the clutter; after all people do not want everything in hand, in paper. But they do want privacy. Online identity theft is not uncommon.

Earth Class Mail's chairperson Ron Weiner claimed their technology is "extremely robust" and there has never been a case of breach of security. Employees did not have access to mail that had been opened and scanned and the digital images were encrypted, he said. ■

NEWS SNIPPETS

>> The Sydney Theatre Company is set to become environmentally sustainable under a federal government programme to "green" public buildings. The theatre's historic Finger Wharf building is being outfitted with solar panels and will also be fitted with a rainwater harvesting tank.

>> Rocksilde, one of Europe's largest rock music extravaganzas created an environmentally friendly campsite for this year's event, which began on July 9 in the Danish capital Copenhagen. "Campers were encouraged to recycle their garbage, and to hop on wired exercise bikes to generate electricity to recharge their mobile phones or iPods. Only low-energy LED lighting and recycled materials were used at the campsite," Esben Danielson, the spokesperson of the event, said.



DAVID MERRIGAN

PUBLIC ART >> SMOKING • The UK

This is art

British sculptor Antony Gormley's wish to make "truly democratic public art" in London's Trafalgar Square was fulfilled in a spectacular manner on July 6. Gormley had mobilized a cast of amateur artists that included homemakers and plumbers for the show, *One and the Other*. But he hadn't reckoned for Stuart Holmes. The London resident who has spent 26 years campaigning against actors

smoking in films, slipped past four security guards by running along a balustrade, swung his legs over the netting and clambered onto the plinth five minutes before the first official participant was due to start. He stood there holding up an anti-smoking banner.

Boris Johnson, the Mayor of London, chuckled as he prepared to give a speech. "That is exactly what public art is about," he said, admiringly. Once the security guards entered, the protester capitulated without a struggle, and was applauded as he was brought down on the hydraulic lift. ■

RESTAURANT >> ABORIGINALS • Australia

Fine dining

Melbourne has a well-earned reputation for being a gastronome's delight. That reputation is sure to be enhanced with the opening of *Charcoal Lane*, Australia's first aboriginal food restaurant.

Mission Australia, the non-profit behind the project, is used to running kitchens for the homeless. But in the Melbourne suburb of Fitzroy, pressed

linen and polished silver was out for the launch of its latest project. "We see reconciliation through food," Paul Bird, the head of the charity, said. Damien Style, the head chef, said, "I will learn from indigenous Australians.

We will have kangaroo on the menu."

Charcoal Lane is named after a significant meeting place in Aboriginal history, also documented in rock star Archie Roach's 1999 song and album of the same name. ■





NOKIA
CONNECTING PEOPLE!!

PROTEST >> MOBILE PHONES
• Iran

Handset falls

The mobile phone company Nokia is being hit by a growing economic boycott in Iran. Consumers sympathetic to the post-election protest movement are targeting companies deemed to be collaborating with the regime. Wholesale vendors in Tehran report that demand for Nokia handsets has fallen by as much as half in the wake of calls to boycott Nokia.

NSN, Nokia's joint venture with Siemens, provided Iran with a monitoring system as it expanded a mobile network last year.

The company says the technology is provided to dozens of countries, but protesters say NSN should have provided the network without the monitoring function.

ONLINE www.openlibrary.org
BOOK LOVER'S DELIGHT

Open Library beta site
What's New: 1 minute ago - [jules/walker1184](#)

Beta Site

The OPEN Library
One web page for every book.

Scanned books only [▶ ddd.com](#)

featuring 23,285,412 books (including 4,064,822 with text)

Find Books	Build The Library	Dev
<ul style="list-style-type: none"> ▶ Request scan ▶ Recent changes ▶ Example search ▶ Add a book ▶ Index of books 	<ul style="list-style-type: none"> ▶ About the project ▶ About the technology ▶ About the librarianship ▶ A guided tour 	<ul style="list-style-type: none"> ▶ ▶ ▶ ▶ ▶

Open Library beta site

Siemens is also accused of providing Iran with an Internet filtering system, Webwasher.

"Nokia mobiles have been Iranians' first choice for several years. But in the past weeks, priorities have changed," said Reza, a mobile phone seller in Tehran's Big Bazaar. Hashem, another mobile phone vendor, said, "We had customers who wanted to exchange their Nokia handsets with handsets of any other company."

A Nokia spokesperson refused to comment on the company's sales in Iran. ■

ONE web page for every book ever published. It's a lofty goal. But it's achievable, according to the people who run www.openlibrary.org. The online catalogue is a project of the non-profit Internet Archive and is funded by a grant from the California State Library.

"This is an open project—the software is open source and the data and

documentation is free," said a spokesperson of Internet Archive. Twenty million books have been catalogued so far, and 10 million more are on the way.

The site runs on participation. Everyone can participate, from a librarian who wants to add records of digitized books to the local catalogue, to bibliophiles wanting to make sure their favourites are well represented, to data freaks looking for information.

FILM >> HUMAN RIGHTS
• Rwanda

My lawyer's a killer

In 1994, thousands of people from the Tutsi community were slaughtered by their Hutu neighbours across Rwanda. Nine years later the killers came home from prison to live side by side again with their victims. The complexities of this homecoming are explored in director Anne Aghion's film *My Neighbour, My Killer*.



The film premiered at the Human Rights Watch International Film Festival in the last week of June.

In 2003, the Rwandan government set up courts based on the traditional dispute resolution mechanism, gacaca, meaning "justice on the grass" in Rwanda's national language Kinyarwanda. In the process, as a Rwandan prosecutor explains in the film, "Your lawyer will be your neighbour, your prosecutor will be your neighbour, your judge will be your neighbour." Aghion followed this process. "The camera allowed them to say things they wouldn't have said to each other." There is a scene in which some widows talk to a man who had terrorized their community in the genocide. They sip beer and slowly speak about the horrible events that haunt them. ■

SURVEY >> SCIENCE • USA

America thinks

When it comes to climate change and the teaching of evolution there is a large gap between what scientists think and the views of ordinary Americans, a new survey has found.

Almost all scientists surveyed accept that human beings evolved by natural processes and that human activity, chiefly the burning



of fossil fuels, is causing global warming but the general public is far less sure. A third of the Americans surveyed said human beings have existed in their current form since the beginning of time and only half of the

respondents agreed that people are behind climate change. Eleven per cent do not believe there is any warming at all.

The survey by the Pew Research Center for the People in

Washington involved about 2,000 members of the public and 2,500 scientists drawn from the rolls of the science advancement association, which includes teachers, administrators and researchers. ■

GoodBAU, cruel world

Business As Usual has been the bane of climate negotiations. Its answers are equally bad



AT L'AQUILA in Italy, during a meeting of the world's major boys and girls, India agreed to cap its carbon emissions. The agreement proclaimed the signatory countries would work together to limit global temperature rise to 2°C from pre-industrial time. It was as if they were writing off bad debt. India, it seemed, had deviated from its stand that only rich countries should take up binding commitment on emission reduction (see p10).

India and other developing nations do not want to take the lead to cut emissions because the historical responsibility for climate change rests on industrialized countries. So the backroom boys of the North have created a new term to avoid the word 'commitment'. They call it deviation from BAU (Business As Usual). And India almost agreed, politically. Climate negotiations have always been full of deception, clever wordplay, and bluffing. Business as usual, one may say.

Nobody wants to reduce emissions, because that is linked with making money—usual business. The chief US climate negotiator said recently that his country will take the year 2005 as the baseline for

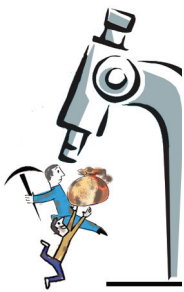
reduction, as opposed to 1990 as science demands, because US emissions have already increased since then. He said 1990 was politically unacceptable. It is a sad reflection on our times that politics cannot be seen outside business. The atmosphere does not respond favourably to these tricks. That is business as usual, too.

The rich countries will meet a large part of their commitments through carbon offset, a market-driven process. This is another mockery—the price of carbon is too low for developing countries to replace their fossil fuel-based energy with renewables. Rich countries are turning transfer of technology and finance into a business opportunity. The purpose of diplomacy is furthering a country's business opportunities. Business, as usual.

It won't surprise if India also tries to maximize its climate-business in poorer nations. Diplomats of the old school control climate talks, under politicians of the old school, where each party wants to win. Only in this game, we all need to lose so that everyone wins. In that respect, no one is deviating from BAU. Our future is bleak. BAU, BAU, take care. ■

Faceless workers

They work in our interest



WE HAVE heard a great deal in recent years about the demand-supply chasm in India's electricity supply. Solemn discussions abound on whether India's newfound recognition as a nuclear power will plug this gap. Almost every participant to this debate seeks a clincher in the oft-repeated, if rather grubby, concept of "national interest". India's recent bonhomie with the US promises an end to the country's energy problems or threatens to turn the country into a lackey of imperialism, depending on one's political position. The energy in question is largely above reproach—unless you are one of those obscure peaceniks. A boost to the electricity grid is, after all, in national interest.

National interest demands sacrifices. The electricity grid has so far proved no exception—even before the promised bounty of nuclear power arrives. About 500,000 people in Uttar Pradesh's Sonbhadra district live with the mercury that creeps out after coal is burnt in the nine plants that supply 10 per cent of the country's electricity (see p14). Forget the good citizen's award, these people have no place in the agendas of the several toxicology institutes in the country.

But research institutes in the country rarely have

a place for the faceless. Professors engaged in the cerebral task of national income accounting see no reason to reckon for the work of ragpickers. This despite a paradigm shift towards capital-intensive, large-scale privatization of solid waste management services. Goaded by judicial action, municipalities sub-contract agencies to help set up rag-picking dumps, *dhalos*, via a global bid. But the real work happens at the level of the ragpickers, who sift through sharp shards of glass, plastic scraps, pointy metals, dirty paper, segregate the waste and sanitize it for the contractor, most likely to be a terrible bully (see p24). The money ragpickers save municipalities does not really make it to the planners's books.

Such denial is symptomatic of our society's schizophrenic relationship with the faceless. It exacts its homage from them, almost a ritual, only to consign them to anonymity. But why mouth platitudes about national interest and planning when human history is replete with stories of our ambivalence towards the faceless, the small and minuscule.

It's more than 300 years since the first microbe was observed. Science shows we cannot do without them (see p29). But the general feeling is microbes somehow spoil our party. Human nature? ■

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Their Problem

Not OLD AGE.....



BONDING BUDDIES: Natasha from Fomento spreads cheer at the old age home run by *Missionaries of Charity* at Karmali, Old Goa

.....But AGE OLD

The elderly do not have a problem with aging.. but with an age old ailment.. lack of care.. the old age home at Karmali, in old Goa run by the *Missionaries of Charity*, and supported by the *Ashiyana* trust of Fomento does just that. Gives care and lights up the lives of elderly women through little joys like visits by our staff. Essentials like blankets, doctors and medicines are taken care of, but the success of our therapy is this...that the elderly can laugh like children.

