

cade, more species have been identified, bringing the present count to eight². The newly described *M. lehilahytsara* lives in the eastern Madagascar rainforest. 'Lehilahytsara', meaning a 'good man' in Malagasy, is the name given to the new species to honour Steve Goodman, a scientist with the Field Museum of Natural History in Chicago and WWF in Madagascar, who has conducted field research in remote parts of the island. *M. lehilahytsara*, only a little bigger than a big mouse, is an arboreal, nocturnal mouse lemur with short, rounded ears and a white stripe on the bridge of its nose. Its short, dense fur is bright maroon with an

orange tinge on the back, head and tail, turning creamy white on its stomach.

Little is known about the range and population number of the two new lemur species. The habitat of *M. zaza* is already highly fragmented. *M. lehilahytsara* is found within a protected reserve at Andisibe.

1. Goodman, S. M. and Benstead, J. P. (eds), *The Natural History of Madagascar*, University Press, Chicago, 2003.
2. Yoder, A. D. *et al.*, *Proc. Natl. Acad. Sci. USA*, 2005, **102**, 6587–6594.
3. Martin, R. D., *Philos. Trans. R. Soc. London*, 1987, **264**, 320–352.

4. Yoder, A. D., Rasoloarison, R. M., Goodman, S. M., Irwing, J. A., Atsalis, S., Ravoasa, M. J. and Ganzhorn, J. U., *Proc. Natl. Acad. Sci. USA*, 2000, **97**, 11325–11330.
5. Yoder, A. D., Burns, M. and Genin, F., *Int. J. Primatol.*, 2002, **23**, 1335–1343.
6. Kappeler, P. M., Rasoloarison, R. M., Razafimanantsoa, L., Walter, L. and Roos, C., *Primate Rep.*, 2005, **71**, 3–26.

*K. V. Ashokan is in the Department of Zoology, PVP College, K. Mahankal, Sangli 416 416, India
e-mail: ageing_2004@yahoo.co.in*

OPINION

Science in our lives – Too much or too little?

N. Panchapakesan

'Science can only answer a very small number of questions that face us in our day to day life. Answers to a very large number of questions, require a moral and ethical base and depend on our likes and dislikes (superficial and deep, hidden and manifest). These are outside science and are determined by our world view based on various factors – religion, culture, parental training (brain washing!).'

I had written this much when the telephone rang and the science teacher of a well-known school in Delhi, wanted to know if I would be a judge of a contest among schools for the C. V. Raman Symposium Trophy. I accepted and a few days later, found myself listening to teenagers from classes ninth to twelfth talking about what I thought would be science. But there was no science. Out of thirteen teams, seven chose to speak on 'Astrology – scientific reality or myth', five on 'What existed before the Big Bang?', both groups giving full play to imagination and speculation almost totally lacking in any concern about the validity of what they were saying. The third and only scientific subject 'Plastic electronics – the future technology' was cho-

sen by only one team, the host school which was not competing for any prizes.

The presentations were high tech – using the power point software. There was more than enough to catch the eye and sustain interest. One of the teams had Princess Diana on their opening slide. Not surprising, as these were all elite prestigious schools of Delhi. Except for one team which declared that astrology was not a valid science, the others were all in high praise for astrology assuming its validity and accepting it as science.

One unusual argument for astrology went like this. Astrological predictions are often wrong. But this does not matter as Dalton who is famous for his atomic theory was also wrong in saying that atoms were indivisible. Dalton's atomic theory, based on careful observation of chemical reactions, established the existence of atoms for the first time. Earlier ideas of Kanada in India and Democritus in Greece were speculations (albeit profound). Richard Feynman, a famous and colourful physicist and a Nobel Prize winner, had written in his famous books on physics called *Feynman Lectures*: 'If in some cataclysm, all of scientific knowledge were

to be destroyed, and only one sentence passed on to the next generation of creatures, what statement would contain the most information in the fewest words? I believe that it is the *atomic hypothesis* that *all things are made of atoms – little particles that move around in perpetual motion, attracting each other when they are a little distance apart, but repelling upon being squeezed into one another.*' To pick one wrong prediction and ignoring the other important observations of Dalton seems a highly wrong way of analysing an issue.

Cosmology is a science in which, unlike physics or chemistry or biology, planned experiments are not possible. One has to analyse astronomical observations, using science known from laboratory to reconstruct the past of the universe and predict the future. Little is known about early universe. Nothing is known about what happened before the birth of the universe. There is a point of view that holds that space time itself came into existence at the birth of the universe and so the question of what was there before is meaningless. The teams that spoke on 'Before the Big Bang' did say that little

was known about what happened before Big Bang, but immediately went on to speculative theories that abound in cosmology. Here the fault lies as much in the undue publicity given to speculative theories in science as in the speeches by the students and the coaching by their teachers. One felt like shouting the words of the famous Russian physicist Lev Landau 'Cosmologists are often wrong but never in doubt'. Cosmology in the last two decades has become a science with observations of great precision. But this has not changed its highly speculative character yet.

Generally a glorious time was had by all – students, speakers, teachers, judges – maybe a justification for the way the event was held. However if the idea was to promote knowledge of what is science, how it rejects authority and demands rigorous proof – it was a total failure. When the controversy over teaching of astrology in universities came up a few years ago, it was finally resolved by allowing the teaching of astrology in the university but not in the natural science depart-

ments of physics, chemistry, biology and related subjects. (Even the Supreme Court was not in favour of total ban on astrology in the university). In spite of this, astrology has sneaked into science departments in schools.

S. Chandrasekhar, the famous astrophysicist and Nobel Laureate of the University of Chicago was happy during one of his visits to India that All India Radio and Doordarshan television had not objected to his condemnation of astrology in an interview on TV. On the other hand he said that television companies in US had wanted him to tone down his condemnation of astrology. The real reason for the tolerance in India is of course the feeling that Indian faith in astrology is so strong that condemnation by anyone, however esteemed he or she may be, does not make any difference.

I tried to tell the youngsters that such nonscientific beliefs and discussions would have made C. V. Raman unhappy at such a turn of events. Most speakers seemed unaware of the difference between an intuitive surmise and a scientifically establi-

shed fact. As a memento on the occasion I was given a book *A Guide to Spiritual Enlightenment*. A very good book but giving the wrong emphasis for the occasion.

I looked at the essay I had begun writing. I scratched out what I had written earlier and wrote: 'There are a few areas in our life where our ancient knowledge and wisdom is not of much use. In these areas, science and its application has deepened our knowledge, has brought immense benefits to mankind and has helped in improving the lives of poor and rich. (It has also led to some avoidable misuse.) Science makes us question authority and leads to knowledge structures which are verifiable by everyone with access to well-known equipment. Application of science in these areas and changing our false knowledge structures is specially needed in our country.'

*N. Panchapakesan lives at K-110, Hauz Khas, New Delhi 110 016, India
e-mail: panchu@bol.net.in*