

not fail to see the organisms for the molecules, and it is not forgotten that these organisms, singly and in populations, lead integrated lives outside of test tubes and away from shiny instruments and easy-to-use kits.

Is it then a surprising situation if students enter a course with naive aims like 'finding a cure for cancer', only to leave with the noble aim of cloning and

sequencing a gene, never mind which one? Are we not creating a situation where the techniques justify the ends, where the techniques *are* the ends? To me, that is an intimidating thought. *Vigyan* practised by scientists with no concerns or informed opinions beyond their technical expertise may be convenient for governments and bureaucracies. But in an age in which science and technology

are increasingly confronted with moral dilemmas, a *Vigyan* devoid of ethics (and aesthetics) will readily lend itself to abuse.

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Where are our C. V. Ramans?

The discovery of fossils of multi-celled animals which date back to 1.1 billion years by Pradeep K. Bose has made great news, and rightly so. The media flashed this news on 1 October. Some newspapers, while reporting the news, focused on the conditions under which he had carried out this research work. At least one newspaper soon followed this up by an editorial which showed that it was honestly concerned about it and wanted to highlight poor infrastructure which this university professor had—no access to internet in his office, no computer at home, insufficient funds, no mentor nor pedigree, lack of encouragement and so on.

While this is fine and does need to be highlighted, there are several questions which the public, the media and the decision makers need to answer. What fraction of teachers in the 250-odd Indian universities have access to internet in their office or have a computer at home? There are many university departments which do not even have a telephone. How many teachers in Indian universities have proper or reasonable funding for carrying out their research and the necessary laboratory facilities of analysis, synthesis and computation? It is only on such occasions when one of these teacher-scientists discovers something really big that public attention turns to the 'poor teacher'. This is indeed a complex problem and it is necessary to analyse it from various angles.

There are three kinds of universities in our country. There are about a dozen universities established by an act of the Union government and financially supported by the University Grants Commission or directly by the Ministry of Human Resource Development. Then, there are

about 75 deemed universities whose funds come partly from the centre and partly from the state. Finally, there are about 150 universities created and supported by one of the state governments. The facilities and infrastructure available in a central university far outweigh those available in a state university. There are quite a few state universities where the departments do not have a telephone line.

The office culture, the ten-to-five working hours, failure to recognize and encourage excellence, failure to sift the good from the not-so-good at all levels from the university to the UGC or state governments and tolerance of mediocrity are some other factors which contribute to the ethos. The recruitment procedure and policy on teaching positions in most universities lead to anything but excellence. I have yet to come across a single university where the faculty does not complain about the poor library services. It would be pertinent to ask as to how many departments allow teachers and research students to work beyond regular office hours. It is just not recognized that research is an altogether different kind of activity which is quite unlike any other activity.

But unfortunately, many state governments do not expect their university and college teachers to do any research work. Teaching is the primary and main activity. If the teachers engage themselves in research activity, it is their own responsibility and the university or the government allows little remission in their teaching load or any funding for research.

The condition of teachers in colleges is even worse. They do not get basic infrastructural facilities such as a table, chair, cupboard, etc. for their academic

work or study. In spite of these poor conditions, fairly heavy teaching load and little encouragement from the higher-ups, several teachers do wish to go for higher academic pursuits.

There is, of course, the other side of the coin too. Teachers cannot escape the blame altogether and they are responsible for the situation they find themselves in. They, as a class, barring exceptions, have failed to deliver the benefits of education to the society. They have become entangled in politicking and have failed to show that they can participate in nation building in a major way. As a result, they are losing sympathy and support from all the major sectors of society—public, industry, and government.

As a nation, we take pride in creating new institutions, very often to satisfy individual egos, rather than strengthening the existing ones. Such institutions take away a large chunk of budget in the name of modernity and excellence, further depriving the poorer institutions. However, we are unable to sustain its growth or even its status quo over a longer period of time. An institution may reach its peak within years of its establishment, but the downslide soon sets in after a few individuals leave the institution. Of course, I have not counted the few peaks of excellence in terms of individuals or departments or universities. What has been described here is applicable to any other area or endeavour, be it industry or sport.

After independence several national laboratories were established to cater to research in various areas. They were created outside and independent of the university system. The river of central funds flowed through these national labo-

ratories, and further starved the universities. It is well known that, unless one is extremely cautious at each step and thinks of various possible consequences before decision making, the poor get poorer and the rich get richer. It is as true in the context of academics as in any social context. The wisdom of creating this huge structure of national laboratories independent of the university system is now being questioned by scientists and science educationists because these laboratories have started feeling the pinch in the form of not

getting properly trained students who would man their research programmes. After all, where else are they going to get their manpower input from if not from the colleges and universities? But solutions are hard to come by.

C. V. Raman did his Nobel prize-winning research under poor conditions in a small laboratory and with equipment costing only a few hundred rupees. And then the public comes up with the question as to why we have not been able to produce any Nobel laureates in spite of having equipment worth crores of rupees.

(It is implied here that the work should be done in India. One wonders whether Hargovind Khurana, S. Chandrasekhar and Amartya Sen would have won the Nobel prize had they stayed back in India.) I would say that discoveries like that of Pradeep K. Bose show that we still have our C. V. Ramans!

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A shower of meteors

It was an exciting and spectacular moment for all amateur star gazers in this part of the world. A shower of shooting stars (meteors) especially originating the constellation of LEO, (the Leonid meteor shower) was observed. We could see about 40 to 45 meteors from the southern outskirts of Bangalore (about 25 km from the city). The twinkling stars played hide and seek with us till 2 am, since clouds interrupted our view. We could spot some meteors around 1.45 am and then we had to wait for a long time for the next set of showers at about 2.25 am. The meteors (about 1–2) showered for every 3 min. Unexpectedly they varied largely in sizes and colours. Many of them were green, red, and the golden colour of the streak was prominent. Some of the shooting stars left trails behind for about a second

and disappeared suddenly. About 10–12 sporadic meteors were also spotted.

Though experts say that the show was not as expected or not so prominent, amateurs had a memorable show. We hardly get a chance to observe 40 meteors in a single night. Though the meteors were our focus of observation, we could not prevent our eyes from watching the rest of the sky, consisting of stars all around. Sirius, Pole star, the constellations of Ursa Major, Ursa Minor, Orion, Auriga, Cancer, Crab nebula, Orion nebula and of course the Leo constellation were very prominent due to a clear sky after 2 am. The belt of the Milky-Way galaxy was also observed.

We had a fantastic time gazing the stars from east to west. Especially the Leonid shower was quite exciting and

prominent at about 50° up in the eastern horizon. The showers became very sparse after 3.45 am and we had to call it a day to the explorative and highly educative wee hours of 18 November 1998. It was really an amateur star gazers' night.

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Editors' note: Chastened astronomers who were taken aback by the widespread disappointment on the morning after the Leonid meteor shower may take heart from this letter. Star gazing even when no meteors are expected may be a fruitful pastime.

Animal research in India

The future of animal research in India will be severely hampered if the conditions proposed by the Committee for the Purpose of Controlling and Supervising Experiments in Animals (CPCSEA) are fully implemented. The reactions of senior scientists like Ramalingaswamy (*Curr. Sci.*, 1998, 75, 344–348) and Nitya Nand (*Curr. Sci.*, 1998, 75, 667–671) voice the concern of those who are involved with biomedical research in India. As Nitya

Nand points out, the committee should be functioning as a supervising body, rather than trying to impose impractical conditions which will only serve to curtail the scientific research in the universities and retard the progress of the various time-bound projects. Research in the universities is generally supported by sponsored projects for a period of 2–3 years. As a large number of laboratories are doing animal research, and, therefore, will

be seeking permission from the committee, how efficient and fast will the committee be in clearing the applications in time for the projects to be started and completed in the stipulated time? This is of serious concern, considering the slow functioning of our government.

It is very well to have alternative experimental models like cell cultures. But all said and done, we have to accept that animal experiments are an unavoidable