the abstract, the problems of Indian science?

There are at least two charges against the Mashelkar Committee. The first, that of plagiarism: the report contained material, without citation from a report by S. Basheer, commissioned by INTERPAT, a Swiss based coalition of western pharmaceutical companies. And this charge is proven beyond doubt and even Mashelkar has accepted it, although of course with feeble attempts to exonerate himself. The documentation for all of this is available on the Web and I have supplied a small part of this to *CS*. It turns out this is not the first time for Mashelkar – his book with Khan also contains extracts from another source without accreditation. The irony here is that these plagiarisms are in publications dealing with 'intellectual property', a favourite topic of Mashelkar.

However, in my opinion, the other charge is by far more serious, even though it is likely to be more controversial: the committee, by its unsubstantiated conclusions on the TRIPS compatibility of Indian patent legislation, endorsed the vested interests of certain foreign companies and compromised the interests of the vast majority of the Indian poor. If its recommendations had been accepted, the prices of many drugs would have increased dramatically. By all accounts the report was so shabbily put together (G. Dutfield says 'Frankly, the Mashelkar report is absolute rubbish and should be trashed completely'.) that it appears the committee had decided on its conclusions at the outset and then had its underlings put together a suitable report. But the fact of the matter is that the report is a weapon for foreign drug companies and indeed Novartis cited the report as a 'credible and authoritative' source in its case in Chennai.

Are these two issues not important enough that there should be some discussion of these in the Indian scientific community? And should not *Current Science* have had an editorial on this as soon as the matter broke into the news? And why is it that nobody has volunteered an opinion? Balaram is absolutely right that it is only with misgivings and distaste that we can talk of scientific misconduct. But, in my opinion, by pretending that nothing has happened, we only make matters worse – we contribute to maintaining bad traditions and practices.

The fact is that the Indian 'scientocracy' or scientific mafia exits and many of the charges made against it have a real basis. In this particular case, five 'experts' – R. A. Mashelkar, Goverdhan Mehta, Madhava Menon, Asis Datta and Moolchand Sharma have written an 'unprofessional and incompetent' report which not only contains plagiarisms but has conclusions which appear to be harmful to the Indian people and to the Indian pharmaceutical industry. If these are honourable men, would it not seem that they did this out of their hubris – they were big men, they knew what was good for us, they were not answerable to anybody and they did not need to take the trouble to support their conclusions by solid data or analysis? To the best of my knowledge, no member of the committee has apologized for what has happened or even expressed any real regret. And to me, this is the most damaging thing about the whole affair.

If the Indian scientocracy continues to exist, it does so at least partly because of our silent acquiescence. In cases like the Mashelkar Report, we are better off, unpleasant though it may be, to frankly air the issues involved even if we do not wish to make any judgments.

1. *Curr. Sci.*, 2007, **92**, 1467–1473.

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Is 'small' really the next big thing?

During the last decade there has been tremendous increase in research on nanotechnology. This unusual rise in nano research can be aptly justified by the uniqueness of the size-dependent properties displayed by nanostructures. These properties include optical, magnetic, mechanical, electrical phenomena and they are totally different in nanostructures compared to those in bulk material. Nanoscientists have found novel ways of exploiting these properties by merging the principles of nanoscience with almost every field of science under the sun.

Nano – the word that has entered the public consciousness rather prematurely (thanks to some of the popular fiction works), is also the word every scientist is excited about world over. Almost everyone in the scientific community is jumping on the bandwagon, falling to the spell of nanotechnology. Of late, 'nano' has become a magic word for researchers looking for hefty fundings; many research proposals have been redrafted to include this word to assure acceptance. Even the educational authorities have become convinced that nanotechnology can bring about a scientific revolution in the coming years and have already started preparing for the future. Many leading universities have upgraded their curricula and are now offering courses such as nanoscale science and engineering, nanoscale structures and devices, quantum devices and nanostructures at both undergraduate and postgraduate levels.

Nanotechnology and nanoscience truly can be defined as an interdisciplinary subject. The current hype surrounding the subject has seen scientists shifting from traditional sciences to 'merged' science. Physicists have taken up subjects like biophysics, toying around with the application of quantum mechanics to biological systems. Chemists, on the other hand, have moved to fields of lithography and nanoelectronics, dealing with chemical methods used for nanofabrication.

Having said all this, it can be argued that this merging of disciplines is nothing new and that nanoscience is just a fancy new name for research that has been going on for decades. In fact, the first seeds of nanotechnology as we all know, were sown by Richard Feynman in 1959 with his prescient lecture, 'There's plenty of room at the bottom'. Chemists, however, claim that the origin of nanoscale science took place years before the lecture was

delivered. Back then, the understanding of nano phenomenon was highlighted in the form of what was referred to as the neglected dimension: the colloidal state. Wilhelm Ostwald, a chemist and Nobel laureate, credited with numerous discoveries in catalysis and synthetic chemistry, was the one responsible for claiming the existence of this neglected dimension. As is well known today, the colloidal state is one that lies somewhere between single molecules and bulk matter, with particles of size ranging from 1 nm to 1 μm dispersed in solution. Ostwald envisioned that such materials display unusual mechanical, electrical and optical properties. He had also proposed many interesting applications of these colloidal systems, ranging from responsive materials, flocculants and dispersants, to better pigments and drug delivery systems, much like the ones proclaimed by nano-scientists in today's world with the use of sophisticated technologies.

It can be claimed that nanoscience is just an over-hyped extension of colloidal chemistry. The current hype has helped in the development of the field which remained unexplored for years. In other words, it has helped in re-inventing nanoscale chemistry, something that colloidal chemistry could not do all these years. With the awareness of the unlimited possibilities resulting from the introduction of nanoscience and nanotechnology to conventional science streams, the expectations of the scientific community and general public have soared sky-high. Maybe it is time we start believing that nanotechnology is really the next big thing.

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Patent office and patent applications – Bridging the disparity

The Indian Government is proactively taking steps to increase awareness about protection of intellectual property in all fields of technology. The efforts of the Government are paying rich dividends as a lot of interest and awareness has increased among researchers regarding intellectual property. A number of researchers are protecting their intellectual efforts through patents. This was not the case a decade ago. The reason for this awareness and importance is due to India's accession to GATT and eventually to WTO. Annual reports published by the Patent Office of India show the patent applications filed, number of applications reviewed and the number of patent applications granted. Though there is a good sign of improvement in the number of applications filed, the number of patents granted is dismal. Perhaps, more patent examiners can help expedite review of patent applications and grant of patents. The number of applications filed in the last four years was 10,592, 11,466, 12,613 and 17,466 for the years 2001–02, 2002–03, 2003–04 and 2004–05 respectively. The patents examined were 5104, 9538, 10,709, 14,813 and those granted in the corresponding period were 1591, 1379, 2469, 1911 respectively. This clearly shows the disparity in the number of applications filed and number of patents granted. The reason for this is that patent offices in India are not connected digitally, data on patents filed across the globe are not easily accessible and data of one branch office cannot be shared with other offices. This is particularly required to ascertain and share details of prior art and to review the applications accordingly. Traditional knowledge used in India over the years has been exploited by foreigners and the Indian Government had to spend a huge sum of money to revoke patents based on traditional knowledge. A database of traditional knowledge in the form of a Traditional Knowledge Digital Library with help from CSIR, New Delhi is a welcome step in this direction.

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Planetary explosions

There should be a deliberate effort from the earth scientists to seek and solve many pending problems in earth physics. More than twenty-five years ago, I raised the matter of existence of an innermost core in the earth at the centre, where immediately on the formation of the liquid earth, heavy elements like U, Th, Tb, Ta, Lu, Ho, Hf, Ir and Dy sedimented[1]. It may be asserted that the gravitational separation of critical layer of fissionable uranium, ^{235}U, leads to a violent atomic explosion assisted by the presence of large quantity of fissile material in the innermost core[2]. Similar atomic explosions must have also occurred in other planets, perhaps leading to the disruption of a small earth-like planet between the orbits of Mars and Jupiter. Such explosions would be the natural cause for the appearance of planetary satellites and also would have provided a scab from the earth's iron core expelled beyond the earth's Roche limit for the formation of the moon around it. I have not been able to publish the complete theory, but I circulated a private booklet entitled *Earth's Innermost Core* and delivered lectures both in India and abroad on this theory. Now the international community has