that the desired value system percolates to the bottom. The Code of Ethics adopted by the Academy may serve as a blueprint to be enforced by all institutions, requiring every student, researcher and academic to study, endorse and follow healthy practices that will inevitably lead to quality publications.

The NCCS case reinforces the need to get our basics right. Figures or data that appear strikingly similar to those obtained previously present an opportunity as well as a problem. The opportunity is in researching their striking similarity and drawing conclusions. When authors fail to acknowledge and explain strikingly similar data, it is at best boring and at worst, controversial (both good reasons for rejecting a manuscript).

The reverse problem is that of irreproducibility. In a previous case covered by *Current Science*, no amount of repeat experiments was able to assist the concerned scientist in obtaining data similar to what he had reported earlier (even though all the data in repeat experiments were similar between themselves). By a remarkable coincidence, another national committee of equally reputed scientists was required to conclude that the phenomenon *itself* was difficult to reproduce! As aptly cited by my mentor, 'If you do not get your facts right, facts will get you'. The advance of science is facilitated by observation of reproducible phenomena. Researchers go to work driven by this promise.

Unreliable equipment, uncalibrated instruments, or the plain non-availability of a particular machine or process to obtain quality results cannot serve as an excuse for irreproducible or erroneous results, just as poverty cannot justify theft. Mature researchers are clear about where hard evidence ends and speculation begins. By failing to document the limitations of their study and potential errors in results, they may be misleading the reader, or, inviting controversy. Were the authors in the NCCS case aware of the glitches systematically introduced into results? Does it require a national committee to discover this possibility?

An investigation of alleged scientific misconduct should likewise cover all aspects, both scientific as well as administrative. It should clearly document what evidence and arguments were considered and what was ignored (and of course, *why*). The goal again is transparency and reproducibility, to ensure that if someone *else* were to repeat the investigation, he or she would come up with the *same* observations. The formal NCCS investigation appears to have shortcomings in this regard.

Why were laboratory records not available when the first (internal) investigation was conducted? What arguments formed the basis to initially conclude a *prima facie* case of misconduct? What eventually rendered these arguments invalid? Was SSV called in to present its case? If not, why? Did the committee seek these inputs? If it did not, it should explain why.

The committee could have set an example by meeting all those demands that are made of a scientific study. Unfortunately, a casual observer is entitled to conclude that the committee failed to scrupulously follow processes required for a conclusive scientific study. This was precisely what happened in the previous case cited in the editorial.

Reproducibility and originality of results in a manuscript are certainly necessary, but by no means sufficient to ensure acceptance for publication. Journals are equally concerned about the *intellectual value* carried by a paper. It may have been inappropriate for the committee to make a public plea for reinstatement of the controversial paper. If the paper indeed deserves to be published it can surely be submitted elsewhere. How about *Current Science*?

Rather than shoot the messenger, let us focus on the message. After all, SSV does not carry any authority. Those who make open allegations put their own credibility on the line. Their role stands exemplified given the thunderous silence of the Indian scientific community with regard to the IPR report cited in the beginning.

As Balaram rightly points out, deterrents do not prevent malpractices. But they do shrink the iceberg. We may be fooling ourselves by suggesting that (a) misdeeds in scientific research are difficult, if not impossible to prove, and that (b) the situation is no different elsewhere. Make no mistake. If we only keep our house in order, we can have the entire flattened global economy at our feet. A conscience of convenience will only nudge us to its edge.

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

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With reference to the Kundu episode[1], a number of learned people have made many comments, and there is little that I can add in terms of rights and wrongs.

Nevertheless, I cannot resist making a prediction about future events, and will only say that Kundu will now be deluged with a barrage of further high awards and distinctions from our scientific system, which after all is well known for its impeccable standards.

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

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Discussing misconduct

When I heard that Balaram had written an editorial[1] on scientific misconduct in the latest issue, I thought to myself 'Well, finally we face up to what has happened'. But I was wrong – the editorial was *not* about the Mashelkar affair but about a matter of far lesser importance and one where the facts are far more unclear. Why is it that, when there has been so much written about the Mashelkar Report in the popular press and in magazines like *Frontline*, there has been a deafening silence on the part of *Current Science* and the Indian scientific community? A community that endlessly debates, in

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