

clusion and justice done, taking into account the scientific record, record of public service and the reputation of the individual. Otherwise, a Nobel Prize-winner, Carleton Gajusck, would not have been jailed for about a year during 1997–98. In our country, in spite of the frequency of such cases being orders of magnitude higher than in the West (I invite Balaram to come and study just the ones on my record), not one serious investigation has taken place and not one person brought to books as he/she should have been. On the other hand, we have often attempted to crucify (with much greater vigour than we exhibit for the guilty whom we love to protect) the innocent, specially if they have dared raised their voice against injustice.

(11) Balaram calls me a 'once prominent member of the establishment' and places me in the category of those with a 'mindless desire for approbation from overseas'. Nothing ever could be further from truth. He forgets that I was actively involved in the fight for Independence and that there have been innumerable occasions on record from 1954 onwards when I have taken a stand against unfair Western domination (see, for example, my lead article 'US a World leader? An unsubstantiated claim' in *The Tribune* of 6 April 1996). He forgets that I was the only Indian scientist (that, too, while in the Government) who took an open and unequivocal stand against the original draft of the Indo-US Vaccine Action Programme when the scientists of the IISc supported it. Eventually, my stand was vindicated. He of course would not know of any of the cases (e.g. of cytome) where we saved nation-wide damage of substantial magnitude by Western commercial interests, by bringing them to the notice of the con-

cerned Governmental authorities and pursuing the matter, or of our actively fighting Union Carbide (and not unsuccessfully, vide the recent Supreme Court Judgement) from the day of the Bhopal disaster till today.

As regards my being a part of the Establishment, I do not know where to begin to contradict this. Shall I mention the parliamentary inquiry against me in the 1960s when I gave a talk on the Soviet arms aid to Pakistan; or my close links with the large number of NGOs which I thought were doing very well but which were black-listed by the Government of that time; or my being summoned by the Sarkar Committee in Delhi to give evidence on the statements that I had made against the then Government's stand on cow protection at the time of the cow protection agitation in the late 1960s; or the presence of a CBI person at every public talk that I gave for years (I think, till the 1980s) on account of my supposed left leanings; or the interception of my mail by CBI; or the telephonic threats to my life and that of my wife and children; or my severe indictment of the stand and action of the Janata Government during 1978–80 in regard to the Method of Science Exhibition, that I had set up during 1975–77 – an issue on which hundreds of articles have been written around the world (for example, see *Science*, 1979, 204, 393; *Nature*, 1984, 308, 598); or the occasions when questions have been asked by the Government as to why my services should not be terminated under the conduct rules; or hundreds of my articles and press statements that have been highly critical of the Government from 1960 onwards till today, published in some of the country's and the world's best-known magazines, newspapers and periodicals?

(12) Balaram concludes from my review that I do not have 'self-confidence and self-esteem'. I suspect his definition of these qualities is very different from the conventional one!

(13) Balaram talks about our 'shining stars', our 'men and women of brilliant achievement', etc., implying that I have ignored them. He obviously did not read the following part of my review: 'Then there are significant individual exceptions to everything he (Dilip Salwi) says. The life and work of some of these outstanding people who helped to build modern India still hold important lessons for the future of science here...'

(14) Balaram does not quite understand the title – 'The Cowboys in Indian Science'. The title was *Nature's*, not mine, and they could not have done better, for one meaning of cowboy, according to the *OED*, is 'one who is boisterous or undisciplined, or wrecklessly unscrupulous'. I, however, did not understand the cartoon that followed Balaram's review. And I wonder if there has not been an 'anagram-atical' mistake in the title of Balaram's editorial. Should it not have been titled 'Viewing a reviewer', rather than 'Reviewing a review'.

I am extremely embarrassed to have to write so much about myself but there are occasions when this needs to be done to make a point which is far more important than the individual, and I believe this is one such occasion.

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## Computational chemistry: Much ado about nothing

The ambivalence in India toward 'science', whatever one understands by that, is beautifully illustrated by different articles in your 10 December issue. On page 1099 the Editor writes on approving puff piece about 'virtual chemistry' continuing the propaganda on

behalf of such unreal science. He writes, 'the power of modern computational chemistry cannot be underestimated'. No! It certainly has been regularly and grossly overestimated and oversold for the last twenty years. On page 1122 a different article laments the fact that

India neglects her botanical resources for healing.

The empirical fact is that so-called first principles calculations, increasingly funded for 20 years, have made a flat zero contribution towards the structure or synthesis of solids. Max

Born tried for years to correctly predict the structure of NaCl and failed. Forty years later, no theorist contributed one iota to the discovery of high  $T_c$  superconductors or buckyballs. Indeed ask yourself one simple question – if the prediction program is asked to predict the structure of C, or S, or H<sub>2</sub>O, or SiO<sub>2</sub> to name only the simplest monatomic and diatomic solids, which one of the dozen polymorphs of each would be the correct answer? The danger in wasting public funds (except for funding one or two outstanding groups) on this fifty-year-old will-o-the-wisp is illustrated by M. Cohen's fiasco with C<sub>3</sub>N<sub>4</sub>. Here was a theoretical 'prediction' on a new 'harder than diamond' material made with state of the art computational chemistry at Berkeley. What is the result? After a decade of work and well over 500 (yes, five hundred) papers published, it is clear that no such compound has ever been synthesized. Much of this bogus chasing of this fad took place in the third world – with public funds. Which theorist wishes to claim that as success?

No. The record at least in inorganic chemistry is absolute, and unchangeable. The first principles of synthesis were thoroughly, correctly and adequately (for their time) laid down by V. M. Goldschmidt and Linus Pauling. The first principles, *that work*, are at the atomic, not electronic level. On the basis of those principles, literally thousands of new and useful compounds (such as ferroic perovskites, magnetic spinels, etc.) have been made by the world's leading synthesizers. Surely any

unbiased scientist or administrator should demand that the computer-wallas with their 10<sup>10</sup> or is it 10<sup>20</sup> increase in computing power since 1950 put up, and make a half-dozen new or useful materials soon, or have their work phased out.

The negative impact, in the zero sum game of Indian science, is illustrated by your article on page 1122 on Healing Plants. I have recently delved deeply into Integrative Medicine, which, *with its wholist perspective*, is introducing the only really new advances into science in 70 years. Turning the reductionist computational virtual approach on its head, the most intriguing science is coming out of solid, empirical, real science, codified into Chinese and Indian medicine and healing arts. The discoveries are literally terrifying the science establishment in the US. By trying to destroy the Office of Alternative Medicine (\$5 million out of a \$10 billion NIH budget), distinguished Washington scientists got a black eye as the Congress instead increased the OAM budget to \$50 million for studies this year, and made it more independent of NIH.

In case one thinks I exaggerate the case, the reader can refer to the paper by Z. H. Cho *et al.*, *Proc. Natl. Acad. Sci.*, 1998, **95**, 2670–2673 to see the extraordinary confirmation by state-of-the-art MRI measurements, of the specific location of 4000-year-old Chinese acupuncture points for stimulating the visual cortex. Even more extraordinary was Cho's report on the ability of yin-yang distinction (made by pulse taking by the acupuncturists) to unearth second de-

rivative fine structures in the MRI, which had never been suspected. A popular version has appeared in *Discover* (Sept. 1998). What is relevant to this journal is the fact that both *Nature* and *Science* refused to *even* review the paper. How is that for science's openness to the truth?

Valiathan's case on the neglect of healing plant research in India is the one that is understated. I believe the scientific, technological and economic potential in India setting up to exploit all botanicals by the highest science, best production and manufacturing, and aggressive marketing is enormous. It holds more potential for the highest ROI for India's R/D than any other field. In the emerging peace-time economy of the new millennium, no bigger economic prize, outside of high tech, animated (somewhat Westernized) movies and TV for the global market based on India's solid film industry, can be logically presented. Indian *science*, with its limited budgets, still has the opportunity to become the world's leader in many aspects of Alternative Medicine. This specifically includes the natural products but should not be limited to that. From Valiathan's article I gather that no policy or concerted effort is being made by India in these directions. That is a pity.

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