

***Bhṛigu-Samhita*: An ancient manuscript with medical matters of interest**

The debate on the inclusion of astrology, as a science subject, has been quite acrimonious and at times sanctimonious too. This is evident in several issues of *Current Science*, other technical and lay publications and in the media. A good spin-off is the distinct polarization in the academia and the vocal expression of the partisan views. Indeed, such a debate should have been first invited by the UGC, before the decision. Controversy and an evidence-based debate amongst the 'experts' is the soul of science and technology. And the eventual consensus and the majority decision are then based on information, data and the level of contended knowledge.

Unfortunately, we still continue to be Lord Macaulay's educational products. We have not yet revolutionized our memory-loaded learning into concept-based education. Hence, barring a few exceptions, most of us have no roots in the Indian scientific traditions, languages and age-old knowledge base. We have been raised on a myth that science is universal and not culturally conditioned. Some of us who have attempted to study transcultural aspects of science know better.

During my study for M.D. (Medicine), I wrote a thesis on 'The medical aspects of *Bhṛigu-Samhita*' in 1963. It was a com-

parative study in the history of medicine. I invited the wrath of my examiners and the thesis was rejected because it was on 'Ayurveda'! But what interested me more in *Bhṛigu-Samhita* were the remarkable medical descriptions in Sanskrit, on the circulation of blood, cancer, embolism, etc. I have cited some of these excerpts from the manuscript below:

- 'The windpipe must be healthy for the movement of pure and impure air to and fro from the lungs. The lungs, in turn, supply the heart with the purified blood. Then the heart circulates the blood to the entire body rather rapidly.' It is quite a statement in an old Sanskrit manuscript (*Bhṛigu R II/6: 8-9*) (circa 3000 B.C. – Bhṛigu Rishi).
- 'If at times, due to whatever reasons, impure blood, a blood clot, or a piece of fat were to move into the heart, during circulation, this can jeopardize the heart.' (*Bhṛigu R II/7: 5-6*)
- 'The germ can also move into the bones or the seat of the heart. The disease is called by the name – *Kshaya Roga* – The germs are so virulent that via breath a rapid spread can occur from one person to another.' (*Bhṛigu R III/20: 5-7*)

- 'At times even the heart will be replaced. Such devices exist in India . . . Indian scientists of a high calibre will one day replace even liver or spleen, in future.' (*Bhṛigu R II/10: 1-4*)
- 'Occasionally, diabetics would benefit especially from treatment that is carried out after proper urine examination. There can be help in other diseases too by a careful urine examination.' (*Bhṛigu R IV/31: 6-8*)

There is an urgent need to salvage many of our ancient manuscripts of medicine, astrology, philosophy, etc. We must conduct ¹⁴C-dating to determine the period of the palm-leaf and other manuscripts. But the time has come to look seriously at our heritage in sciences and humanities, without any ancestral vain-glory or an outright rejection because, something does not fit into the western reductionist world-view.

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Politeness or fear of dissenting?

P. Balaram's editorials are always original, interesting, provocative and elegantly written. Unfortunately, they do not appear to attract sufficient discussion, despite the fact that such discussions would greatly enhance their value. Though I am an avid reader of these editorials, I have been remiss in not reacting to them even when I have felt the urge. I would now like to make amends by commenting on the editorial *The importance of being impolite* (*Curr. Sci.*, **80**, 1245-1246).

The editorial starts with J. B. S. Haldane's conclusion that 'science in India is developing with disappointing slowness . . . because Indians . . . are too polite'. Without going into an expatriate's conclusion almost half a century ago, the point is that Haldane has attributed to politeness the failure of Indian

scientists to voice criticisms of the work of their senior colleagues and their silence, even when they differ. Being a fearless person himself, Haldane did not think of ascribing the silence to *fear* of having to pay the price of dissent (impediments to career advancement, loss of funding, privileges and perks, etc.). Most Indian scientists 'are polite about one another's work' because they are afraid of being critical. This fear is an inevitable consequence of an environment in which dissent is strongly discouraged and 'constructive criticism and debate on science' is virtually absent.

It is only when there is no fear of dissenting that the question arises of how to express the dissent. And can one recommend anything other than the most courteous and civilized forms of expression? Haldane argued that there was a 'choice between politeness and efficiency';

instead I submit that there is firstly a choice between silence and efficiency and then a choice between politeness and rudeness. Balaram, therefore, should not have emphasized 'The importance of being impolite'; he should have stressed 'The importance of polite dissent', where dissent is warranted and required.

Hence, it is not politeness that is a major impediment to the advance of science, but the absence of debate, criticism and dissent. For Indian science to flourish, what is required is a *community of interacting* scientists with the well-established traditions of a peer system. Without the environment of an actively interacting scientific community, there cannot be the natural selection of scientific ideas and data, which alone will ensure that the fittest theories and experiments survive. Natural selection of ideas implies competition and diversity.

It cannot arise if there is a monoculture of views. Truth cannot emerge and science cannot advance if there is an absence and/or exclusion of dissent. The standard way of avoiding genuine controversy and peer review is to exclude unorthodox views from seminars, committees, journals and other forums (including the peer-reviewing process). Underlying all this violation of the scientific tradition and its codes of behaviour is the fact, 'he who pays the piper, calls the tune'. Government and quasi-

government sources are responsible for the overwhelming share of science funding, so that scientific activity depends strongly on this funding, and almost all scientists are on the government pay-roll or perk-roll. There are also a number of cash-carrying prizes and awards which act as further inducements to conform, rather than dissent.

The nuclear tests exposed this weakness of Indian science. Faced with a complexity of issues raised by the tests, it would have been natural for the body

of intelligent and creative scientists to develop a spectrum of views. Instead, the virtually unanimous euphoria was astonishing. Since, it is statistically unlikely that almost the whole body of scientists had independently arrived at a single view, one cannot help suspecting that it was the fear of dissenting that explained the 'unanimity'.

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Losing innocence to big science

This is with reference to the two consecutive editorials, 'Big science, small science' (*Curr. Sci.*, 2001, **81**, 133–134) and 'Lost innocence' (*Curr. Sci.*, 2001, **81**, 229–230). To me, it appears that 'big science' or 'applied science' cannot come into existence unless 'small and basic science' is created first. Consequently, only 'small and basic science', or 'science' to be more precise, is the terminology that needs to be used. The editor is absolutely correct when he says, 'Would it not have been better for the academy to limit its domain to conventional aca-

demical science and avoid straying into the difficult waters of strategic science and technology'. But then, who cares for etiquette. The very fact that Balaram, a genuine scientist to the core and staunch supporter of 'basic science', himself has used the word 'big science' to describe the so-called applied science being practised under the handful of mega schemes which are eating the bulk of the meagre funds available for research these days, tells a lot about the direction of the wind. Like anything else, science has become a commodity and the importance

of scientific research is not judged merely on its merit or its contribution to the welfare of mankind in the long run; instead it is judged by its glamour and apparent gains, both socio-political and otherwise. If so, the priorities are bound to be decided accordingly. No wonder, therefore, that 'big science' has robbed the naiveté of the academy.

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Social geology

Scientific temperament among the masses is a must for safety, security and prosperity of the nation. However, this faculty is uneven at the level of common man with respect to different branches of science and is particularly negligible or minimal in the case of geology. People generally rely on media coverage, accurate or inaccurate, and form opinions accordingly, about the ongoing geological processes. This situation is very alarming because of the twin nature of geology, i.e. on the one hand, once plentiful mineral resources are continuously being depleted at a relatively faster rate leading to a situation when the bountiful nature may be deprived of such precious treasures whereas, on the other hand, natural disasters, viz. earthquakes, volcanic eruptions, landslides, avalanches, flash floods, sinking of ground-

water level, etc. are causing irreparable losses to the society. However, the exaggerated media coverage and reporting by the not so well-informed reporters add fuel to the fire of the public psyche.

Things are further complicated by the so-called estimated predictions about time, location and intensities of the natural calamities. For example, this is quite common with respect to earthquakes in the Himalayan and other regions or groundwater poisoning in West Bengal and Bangladesh by arsenic or groundwater depletion, particularly in the areas of intensive agricultural practices. The public is generally deprived of realistic assessment of the situation arising out of geological factors.

This sorry state of affairs can be attributed to general neglect of geology at

the school level in science curricula, late commencement of study, i.e. only at the university level, resulting in a very limited number of students choosing the subject, general ignorance of safety, security and preparedness aspects in the geologic text books, lack of interaction between practitioners of geology and the masses and lack of attempt on part of the authorities to educate the citizens.

A well-informed and scientifically-equipped public, with knowledge about the pros and cons of geological processes, will be able to combat the adversaries caused by such inevitable processes. The need of the hour is to launch a new discipline called 'social geology' at all levels through formal or informal education or through social agencies, which can enlighten the public