CORRESPONDENCE

Polite and impolite dissent and lawlessness

This has reference to the views in Current Science (2001, 81, 735–736 and 2002, 82, 9) about too much politeness in Indian science. I agree with the latter article that it is unnecessary to differentiate the polite and impolite dissent, but for a different reason.

The latter article seems to point out that whereas there is lawlessness everywhere, there is too much politeness in Indian science and this politeness in Indians arises from fear. I disagree with this viewpoint, as I believe that it arises essentially from ignorance. For example, in our public life, majority of the people have been polite enough to accept all kinds of oppressions for centuries. However, after independence, especially in recent years, when people became more aware, they have been throwing out mighty ruling parties without any fear in each election. In this process of social development there will be some lawlessness, but this is only a temporary phenomenon and finally, things will be better as exploitation of the majority diminishes. Over the years, science has been practised by only a privileged miniscule minority in India. Thanks to the expansion and commercialization of engineering and commerce courses in the educational field, more new entrants to science come from the poor, not-so-sophisticated sections of the society and hence, sooner or later, there will be more polite or impolite dissent, which in my opinion is good for the growth of Indian science and India.

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March mania

If you are looking for funding, now is the right time — mid-march.

All indents must be ready to roll. Quotations must be couriered. You may even want to put an extra zero on the budget line. But no mess-ups please, this is not a bench experiment. For when the money arrives, remember, there are no comebacks.

If you have been thinking of making a trip to the capital, this is the time to go. Funding agencies are like ‘loan melas’ on some days at this time of year. And your long-lost proposal might just surface again.

Sales agents, who smell ‘moolah’ long before the scientists ever can, are thick with schemes at this time of year. And if you have bumped into sales agents with increasing frequencies in the institute corridors, you have probably caught the first signs of the coming season. ‘No last minute purchases, this time sir?’ Even if ‘The Fax’ has not arrived, most experienced sales persons will nevertheless swear by ‘The Fax’ which says that the cheque is in the mail, but the money has to be spent in seven days.

It is the time of year when projects are written thick and fast. Projects signed, sealed and delivered in three days are normal at this time of year. The key is to pepper them with the year’s catchwords. This year, for the benefit of the ill-informed, the catchword is still ‘functional genomics’. For sheer speed, some folks take the cake! A five-year proposal was written in all of ninety minutes. ‘Keep the budget reasonable’, the wise ones say. ‘But make sure it reaches Delhi, by 15 March, latest.’

If you had any doubts before, you should not now. ‘Beware the idees of March’ was penned by William Shakespeare, for none other than the ill-prepared scientist who has to see easy money slipping through his fingers at this time of year again.

Sorry friend, maybe next year.

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Vedic Saraswati

Roy and Jakhar (Curr. Sci., 2001, 81, 1188–1195) report that the legendary river is fully extinct due to tectonics-induced migration and that “there is absolutely no scientific basis for the belief that River Saraswati plunged underground and is now having subterranean flow of water” (emphasis mine). In support of this contention the authors quote our publication1. In this connection I would like to make the following observations/clarifications.

1. Most, if not all, of the remote sensing activity to delineate buried channels in western Rajasthan was based on moisture underground. The buried channel in the Kishangarh–Ghaniyali–Ghotaru sector in Jaisalmer district, considered as part of buried Saraswati for a variety of reasons (Vedic, Puranic, geomorphological and remote sensing evidence) has, for example, plentiful and fresh groundwater.

2. A large number of samples from the buried channel mentioned above have been analysed2 for their isotopic and chemical composition. The 14C dates show

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that the waters are several thousands of years old and are slow-moving, with a speed of about 5 m/year. The stable isotope composition indicates that the waters originated in much colder areas outside Rajasthan, but cannot be of glacial origin. This is because glacial rivers Ganga and Chenab have more depleted heavier isotope composition (δ¹⁸O = -10% to -11% compared to the buried channel water which appears to have had a value of above -9% at the source). It means that the groundwater in the buried channel has no headwater connection very high in the Himalayas, but more likely in the Sivaliks. This agrees with the references in the Brahmanas and the Puranas. There was hence no intention to suggest that Saraswati did not go underground.

Rigvedic rishis’ prayer ‘Oh Indra! On your being born and with fear of your rage, heavens trembled. Huge mountains were fearful and river waters started flowing moistening the desert. Oh Indra! You struck down barriers and broke open mountains’, indicates the sudden appearance of the Saptasindhu following the breaking up of mountains. This distinctly points out tectonics being responsible for the birth of Saraswati and other rivers. Glacier melting would have taken thousands of years for the river to attain the majesty and the tempestuous roar described in the Rigveda.

It is now generally acceptable that the tectonics-induced migrations of Yamuna to the east and Sutlej to the west were mainly responsible for the dwindling of Saraswati. But the later burial of the remnant stream under Aeolian sand due to aridity cannot be ruled out.

It is clear from the above that the legendary Saraswati was not of glacial origin and its present subsurface flow is a good possibility.

3. The authors hint at the possibility of Govardhan Parbat episode in the Mahabharata (in fact, it should be the Mahabhadragvata) as referring to the possible neotectonic movement resulting in the subsurface feature of the Delhi-Hardwar Ridge, which in turn was responsible for turning Yamuna east to join Ganga. Whatever be the merits of this conjecture, it needs to be noted that the Mahabhadragvata describes Krishna playing with his cowherd friends on the banks of Yamuna (near Mathura) even before the Govardhan Parbat episode, indicating it was already flowing east at that time.


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Response:

1. Neither the ‘moisture underground’ nor the presence of ‘plentiful and fresh groundwater’ proves that the Vedic Saraswati is having a subterranean flow.

2. How does the presence of ‘several thousands of years old’ groundwater, which has a movement at the rate of 5 m/year, prove that the Vedic Saraswati is having a subterranean flow even today? The Siwalik rivers are all rain-fed and cannot have the perennial flow of waters. The Ghaggar may represent the case in point. One should not try to read too much on the values of δ¹⁸O because of the fact that the stated variation of 1% could well be within the error limit of detection.

The proto-Saraswati must have originated hundreds of thousand years ago, after the rise of the Himalayas. We fail to understand why such a river could not have attained the ‘majesty and the tempestuous roar described in the Rigveda’ at a much later period.

Neotectonic studies suggest fragmentation of earlier river system that flowed through the region, parts of which could have remained buried under the sands, while some others must have turned into saline lakes.

3. We mentioned about Govardhan Parbat only as a passing reference to the timing of the neotectonic event that caused Yamuna to swap its course to the east, as we do not have any other proof of the date of this event. We agree that it could have been a pre-Mahabhadragvata event.


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The accuracy of modern mass spectrometric measurements of δ¹⁸O is ascertained to be ± 0.5%.

— Editor

**Phytoremediation: An emerging crucial issue and its present market trends**

Plants can be used for phytoremediation, that is for pollution abatement and as sentinel organisms (indicators) to measure toxic effect of pollutants or as scavengers of the environment.

Aquatic plants have been used as in situ biomonitors. Freshwater microalgae have been the test species in most phytotoxicity tests and in some cases as surrogates for marine species, and microphytic species. Recently the duckweed toxicity test has received much attention. Among the rooted aquatic plants, Myriophyllum spicatum has been used more frequently than others in pesticide toxicity evaluation.