Tragedy of geology

Comments of S. K. Acharyya, in 'Mapping of Indus ophiolite: Need for introspection' and reply by the authors V. C. Thakur *et al.* (*Curr. Sci.*, 2000, **79**, 1423–1425) are unwarranted. Almost 97.7% of India have been systematically mapped on 1 : 50,000 scale by the Geological Survey of India (GSI). The officers of GSI have mapped the area under reference, though inaccessible. Lately GSI has published valuable geological maps of Himalaya on 1 : 1 million and of India on 1 : 2 million scales. But Thakur *et al.* have not referred to the geological maps prepared by GSI. Acharyya is upset over the deliberate neglect of the pioneer work carried out by the 150-year-old GSI by Thakur *et al.* Such neglect and omission are tragedy of geology and are responsible for the decline of geology in India. Unfortunately off-shoots of GSI like Central Groundwater Board, ONGC and AMD also condemn the work of the parent organization. It is an open secret that all such institutions obtain unpublished reports and maps of GSI before proceeding to the field, though most of these documents are classified under secret and restricted category.

Satellite data are important tools in mapping, especially in inaccessible terrains. But validation of such data is a prerequisite for publication of geological maps. And rigorous fieldwork is essential for validation. Geology is a field science. Researchers for want of time, interest and infrastructural backup avoid fieldwork. But with or without limited fieldwork, they conceptualize various themes based upon imported ideas and discard the basic work carried out by officers of GSI. In the paper under reference, the authors had claimed to have prepared a geological map on the basis of satellite imageries and thus made out refinement on existing geological maps. Further authors have called GSI records, viz. 'Extended Abstract' as in-house publications. They failed to appreciate that GSI publications are deemed to be Government of India publications and are readily available on sale at regional offices of GSI located at Kolkata, Hyderabad, Nagpur, Lucknow, Jaipur and Shillong and at the sale counter of Controller of Publications. Officers of GSI and field geologists use topographic maps supplied by Survey of India in the field. Ladakh falls under restricted and secret category. Accordingly, users are forbidden to name the locality, drainage, and location (latitude and longitude) in their publication. Strangely authors in their reply stated that the map shown in the comments of Acharyya does not provide any locality name or drainage features. However the authors had rightly stated that geological maps prepared by different groups of geologists at GSI show different interpretations. It is a natural phenomenon and a routine practice in GSI. But such maps are compiled later and published as geological maps on various scales. Both, Acharyya and Thakur *et al.* join horns on whimsical issues. Though both appreciate 'off and on scientific interactions among workers from different institutions engaged in the study', they quite often hit each other below the belt. It is high time that GSI and other members of the geological fraternity join hands for the cause of geology and respect the criticism. Both are complementary to each other. Rivalry will create only bitterness.

BRIJESH BARTHWAL

C-203, Rohtas Apartment,
Sector 9, Vikas Nagar,
Lucknow 226 022, India

Abiotic stress and crop genetic engineering

The communications by Anil Grover and his group[1–3] are very informative and would arouse other research workers to take up genetic engineering of crop plants for abiotic stresses. As regards academia–industry partnership, Grover[2] laments that while genetic engineering of crop plants for abiotic traits (herbicide resistance, improved quality, etc.) and biotic stresses (insect, fungal and viral disease resistance) has received tremendous support from private seed industry, a similar response for abiotic stress research is not forthcoming. The reasons for this are not difficult to visualize. The private industry essentially targets its efforts (and support) on areas of assured capital gains. Mostly subsistence level farming is practiced in areas chronically infested with abiotic stresses like salinity and drought. Farmers of such regions are unlikely to form a profitable market for the costlier genetically engineered seed inputs. The need for Government-based funding for such research is obvious. On the technical front, a perusal of experimental reports (also listed by Grover[2]) indicates that engineered tolerance against salinity and drought stress have utilized single genes. The achieved tolerance is mostly due to overproduction of osmolytes or osmoprotectants due to which the transgenic plants survive under stress for extended periods of time, but are less productive in terms of biomass. For real success it would be imperative to transfer multiple genes that target different complementary mechanisms, both for optimal tolerance and yield. Engineering for abiotic stresses like salinity and drought is much more complex, though pathbreaking efforts in this direction have begun.

1. Grover, A. *et al.*, *Curr. Sci.*, 1998, **75**, 689–696.
2. Grover, A., *Curr. Sci.*, 2000, **79**, 550–551.
3. Grover, A., Agarwal, M., Katiyar-Agarwal, S., Sahi, C. and Agarwal, S., *Curr. Sci.*, 2000, **79**, 557–559.

RAJIV ANGRISH*
K. S. DATTA

Stress Physiology Laboratory,
Department of Botany and Plant Physiology,
CCS Haryana Agricultural University,
Hisar 125 004, India
**For correspondence*