

intensity quite outside that of modern experience. It is likely that for periods of centuries or millennia one or two comet fragments would dominate being bright, recurring objects in the night sky. Comet splitting and even multiple disintegration would be a common observed phenomenon. If such a disruption had happened within historical times, it is difficult to imagine pastoral societies remaining indifferent to this annual show. In fact, the most active recent phase of the Taurid progenitor comet appears to have been about 3000 BC. Conservative estimates have the short-period progenitor at that time brighter than Venus. Thus the night sky around 3,000 BC, and for a period of at least centuries and probably one or two millennia after it, was disturbed. There are likely too to have been epochs when the sky contained one or more visible, periodic comets, associated with annual fireball storms of huge intensity and perhaps

also with devastating impact. Such phenomena, enduring for centuries, surely had a profound effect on the minds of early peoples. At a minimum, traces of this ancient sky should still be detectable in the artefacts and belief systems of the earliest cultures."

Dr Radhakrishna's call for conducting surveys for locating and dating impact craters in the subcontinent is very timely. It is hoped that our scientific institutions specializing in Space, Earth and Marine Sciences would take up this research seriously.

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WHITHER FIELD GEOLOGY?

(1)

It is gratifying that Dr Pronab K Banerjee blew the conch through his note entitled 'Whither Field Geology' (*JGSI*, v 64, no 3, p 367), at the right time, to save 'Field Geology' from slipping into oblivion. Diminishing (vanishing?) field inputs, increasing patronage to fanciful jargon-ridden hypotheses (probing into the past only) that mystify more and inform less, and undue enthusiasm to transgress into others' domains are the three major evils that plague the geological sciences today. Relying more on laboratory data than on field data in dealing with geoscientific problems-sometimes to the extent of ignoring even the mandatory field inputs-would only erode the credibility of geosciences. Trying to tackle geoscientific problems sitting in air-conditioned laboratories is as

ridiculous as trying to seed the clouds sitting before a computer. The sooner the authorities realize that there is no substitute to fieldwork, the better they help the society in effectively utilizing geosciences for tapping hidden mineral wealth. Hopefully, Dr Banerjee's note would serve as a wake-up call to spur the authorities into action.

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(2)

“Whither Field Geology?” by Dr P K Banerjee (*JGSI*, v 64(3), p 367) sounds a timely warning on the neglect of field evidences to support the conjectures being made out in publications on geology from the Indian subcontinent. Although, it is not possible to totally agree with the suggestion of Dr Banerjee that ‘the toxic invasion of second rate chemistry and physics is slowly paralyzing the limbs and muscles of field geology’, the truth remains that those vital tools so efficiently used by the westerners are practised with avowed mediocrity in this country. Who shall be blamed for it?

If we trace the history of geological investigations in the country, or of the GSI, we will discern a gradual, but steady decline of standards. Post independent India witnessed it more glaringly. Possibly, after a decade or two since independence, the towering personalities of GSI who were good both at field and publication arena were on the exit. Bureaucratisation and ‘third world psychosis’ took the upper hand. Concomitant with the general decline of standards in the University system, teaching of geology started giving way to mediocrity too. GSI’s mapping output began showing symptoms of paralysis, report quality started deteriorating. This was the time when major advents in the fields of geophysics and geochemistry started revolutionising geological research world-wide. Indian geology, essentially represented by GSI in numerical terms, could not catch up with the new thinking. Field-detached university/research system (with exceptions in a few instances) grabbed the opportunity and landed Indian geology in its present plight, as being lamented by Dr Banerjee. One can sympathise with the current state of affairs, though the onus for this rests mostly with the GSI being the largest geological fraternity in the country. Compare for example the functions and status of the USGS if any doubt persists! Vital tools of geological investigation have been periodically detached from the GSI. Seismological observatories are not with the pioneer Survey institution, capable of seismo-tectonic interpretation of data sets. Some of the classical contribution to seismological research in India belongs to late Dr R D Oldham of GSI. The sad plight of Indian geology today can be broadly attributed to the above chronology

of events, and GSI’s contribution is no less. I hope that Dr Banerjee will agree with it. Academics, to quote Dr Pushpa Mitra Bhargava and Chandan Chakravarti, have been rendered ‘intellectually sterile’, and in geology, field component has been relegated to the margins.

Demolition of infrastructure for field work in many research institutions in the country is also contributing to acute academics. Geology, as a science, whose natural laboratory is rocks and their outcrops, is better understood when the ground truth is elaborated and substantiated with the help of data sets generated through sophisticated instrumentation, in order to have quantification of various attributes. Maintaining classical natural outcrop museums with state-of-the-art attribute data sets would be ideal to elaborate on the need for the happy marriage of field and laboratory components of geological research. The former is possible only by the GSI, while the latter component can be a collective effort. Vast amount of subsurface data available from drilling operations, and the seismic profiles are kept in vaults of various agencies. When all these are occasionally put together, then only we can get a glimpse of the total geology in its evolution. This is a gigantic task, and needs attention. May be, as in the western countries, occasional debates on “modern trends in geological research with prime thrust on primary (field) data collection” can be thought of using the good offices of the Geological Society, ensuring that the platform will not be totally carried away by the academics alone.

It is time for us to reform, if not to become redundant in the social frame as warned by Dr Banerjee. Reform must be two-way too: (1) primacy of field work and adherence to societal needs, and (2) application of modern analytical and exploration tools to support and substantiate the ground truth. Had there been a national policy on geological instrumentation, most of the wasteful expenditure and duplication could have been avoided and the precious acquisitions would have been in operational condition for the benefit of researchers from all over the country. Isolated micro-plate like existence is no more good for the geological fraternity!

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