

CORRESPONDENCE

EXTRA TERRESTRIAL IMPACTS

This has reference to the Editorial "Extra terrestrial impacts" appearing in the August 2004, issue of your journal. Let me first thank Dr Radhakrishna for his kind words about my work on natural disasters in ancient India.

In his article, Dr Radhakrishna makes reference to regions of Gujarat, Kutch and western Rajasthan deserving careful ground survey for evidence of extra terrestrial impacts. Apart from indicating mineral resources, study and dating of such impact craters would be of help in sorting out some questions of history. A vexed question, still haunting us, is the long hiatus between the end of urban cultures *circa* 1500 BC and the rise of Magadhan cities *circa* 500 BC. What caused this millennium long dark age? It is generally held that the Indus valley civilization, more appropriately the Sarasvati-Sindhu civilization, collapsed due to severe tectonic upheavals. It is intriguing to note that as per our ancient literature these upheavals were possibly the results of extra terrestrial impacts. In this connection, a series of articles written by Mandelkehr in *Chronology and Catastrophism Review* should be of interest. He presents archaeological, climatological, geological evidences for what he calls an Earth-wide event at around 2300 BC. He draws our attention to large-scale climatic changes at 2300 BC including significant global drop in temperature and crustal phenomena occurring at that time caused by glacial build up and consequent crustal loading. His conclusion is that something important happened at that time that warrants our attention. He has synthesized more than 250 primary references spanning several scientific disciplines to arrive at the above conclusion. What could have been the root cause of this earth-wide event? Mandelkehr (2002) traces this to the likelihood of an intense encounter of earth with the Taurid meteoroid stream. Now, it would be interesting to see what astronomers have to say on the possibility of such an encounter.

Bailey, Clube and Napier (1990), authors of a monograph on the origin of comets remark, "Available records indicate that comets and comet related phenomena seems to have played an important part in the beliefs and social habits of most known civilizations from the very earliest times." They draw our attention to the evidence of a necklace made of iron-meteorite beads placed in an Egyptian pyramid dating back to 3000 BC. They raise the question whether,

decline of interest with comets in Greek astronomy is related to corresponding decrease in observed meteoritic activity. They forcefully remark – "The final picture that emerges, therefore, is one which during a very early period, prior to the second millennium BC, Man's knowledge of the pervading celestial environment gave him a relatively accurate understanding of comets and their potentialities." Even though these authors do not seem to be aware of developments in Indian astronomy, the parallels cannot be missed. Siddhantic astronomy, which peaked during 6-8th century AD, ignores comets. Varāha Mihira (5-6th century) no doubt has included a chapter on comets in his *Brhat-samhita*. But, he is frank enough to admit that he is writing only the views of his predecessors. He quotes the periodicities of some of the comets, but is categorical that their orbits are beyond mathematics. One of his predecessors, Vrddha Garga, who perhaps lived in the first millennium BC, boldly states that like the star-circle repeating itself in the sky the comet-circle also repeats in the sky (*naksatra cakram ākāśe yathaiiva parivartate, ketu-cakram tathaivedam ākāśe parivartate*).

Parāśara, whose works are known to us from later writers, provides a comet classification scheme, gives approximate positions of comets in the sky with respect to stars and also their return periods. Why was there so much interest in ancient India about comets? Was it because, they were a few too many and brought destruction on ground? It is said that comet Rasmī-Ketu rising in the star cluster of Pleiades would destroy Madhya-desa (Central Country) including Kosambi, Avanti, and Pushkaran. If there were to be no connection between comets and terrestrial impacts, did our ancients invent such correlation purely out of their fertile imagination? The astronomical framework, for understanding Earth as a bombarded planet, is provided in a series of papers by Clube and Napier (1984), Clube et al (1996), Bailey and Napier (1999) and Napier (2003). Napier (1998) in a paper addressed to non-specialists writes "Modern astronomical evidence does not support the common supposition that the night sky has been unchanging for 5,000 years. Occasional disastrous inundations and the raining of fire from heaven are reasonable expectations from the current astronomical evidence. The celestial fireworks in the night sky, especially in the form of annual fireball storms, would then be of an

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?

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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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