

during the last two years, who participated in the INSPIRE Camps in a small town, Arupukottai, have joined mathematics and physics degree courses, after foregoing their engineering seats. Of course, the overall impact of DST's INSPIRE Camps is small, especially in Tamil Nadu, but it is very much required. Certainly, its impact will be more in the future. The enrollment in arts and science colleges in Tamil Nadu, which was

low during the past few years, has increased this academic year.

Of course, I certainly agree with Koul that DST should fund only institutions which provide compulsory lodging facility to promote horizontal interaction among the participants. DST may also secure feedback from mentors in a sealed, signed envelope.

1. Koul, M., *Curr. Sci.*, 2013, **105**, 145–146.

ACKNOWLEDGEMENT. I thank Drs M. Lakshmanan, T. Esakidurai, V. Rajendran and S. Gandhi for inputs.

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The Achilles heel of sophisticated instrumentation in pheromone research

Quite a few young workers in India are now keen on doing research in chemical ecology/ethology. This is a good choice, because, in our country we have a wealth of fauna and flora to choose from for research. However, lack of expensive, sophisticated apparatus is a well-known hindrance to our research. For lack of a gas chromatography mass spectroscopy (GCMS) column in which dichloromethane can be used, we missed certain molecules while studying the body odour of wild tigers¹. One wistfully thinks of the good old time around 1950 when the worthwhile discovery of the 'cat spot' was possible with a simple technique². In the span of 20 years my colleagues and I have traced 40 odd compounds as putative candidates for tiger pheromone. But

at one fell swoop, Burger *et al.*³ have now detected a hundred odd compounds!

Rather strangely, neither Burger *et al.*³ nor Soso *et al.*⁴ could detect 2-acetyl-1-pyrroline (2AP) in the tiger with the help of solid phase dynamic extraction (SPDE) GCMS, although I did so with paper chromatography and gas chromatography packed column⁵. The Achilles heel of SPDE GCMS is the 'absence of high abundance of usefully selected ions' of the mass spectrum of 2AP (P. Apps, pers. commun.) and the large number of putative pheromonal compounds.

1. Poddar-Sarkar, M., Ray, S., Pal Chowdhury, S. G. and Brahmachary, R. L., In *Chemical Signals in Vertebrates*, Springer, USA, 2013.

2. Datta, S. P. and Harris, H., *J. Physiol. (London)*, 1951, **114**, 39.

3. Burger, B. *et al.*, *J. Chem. Ecol.*, 2008, **34**, 659.

4. Soso, S., Poddar-Sarkar, M., Koziel, J. and Brahmachary, R. L., In Annual conference of Ethological Society of India and National Symposium on Live Organisms and their Expression in the Environment, University of Calcutta, 26–27 November 2012, abstr.

5. Brahmachary, R. L., *Curr. Sci.*, 1996, **71**, 257.

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Lion figurine from Abhayagiri

Rajendran¹ reports a lion figurine carved into a quartz nodule from Abhayagiri, described as a 'non-Acheulian Lower Palaeolithic' occurrence in Kerala. To date, not a single Palaeolithic site has been meticulously excavated and well-dated in Kerala and the presence of Lower Palaeolithic hominin occupation here remains enigmatic². The most widely accepted Palaeolithic palaeoart in the Old World comes from younger contexts and well-dated sites that have been studied using multidisciplinary scientific techniques. No comparable example of a Palaeolithic figurine on quartz has been

reported previously from anywhere. Pre-historic engravings and carvings exist on comparatively softer rocks and materials such as ochre, sandstone, laterite, ostrich eggshells, bone, ivory and wood. The site of Abhayagiri and the so called 'figurine' lack analytical and interpretative frameworks and the report favours superficial sensationalism over science.

First, it is impossible to actually carve figures from quartz using quartz due to its crystalline composition and random fracture mechanics. No scientific analysis of any kind has been carried out on the so-called figurine to validate its

authenticity as being man-made. For instance, Rajendran could have applied 3D digital scanning, (environmental) SEM, or even experimental carving on quartz. There is not even a simple black-and-white line drawing of the 'lion' carving next to or superimposed upon figure 1 in the paper¹ to enhance its visual integrity. Readers are left just with their imagination to see the 'carved lion' (if there is any at all). Moreover, it is surprising that only a short paragraph at the end is dedicated to the specimen itself – the rest of the paper represents a rough review of global and Indian palaeoart.

CORRESPONDENCE

Irrespective of the authenticity of the figurine, additional methodological rigour that is commonly applied at well-studied archaeological sites is also lacking. There is no general photograph or map of the site showing its geographic association with other alleged Lower Palaeolithic occurrences in Kerala. There is no associated stratigraphic profile and regional geological information of the site. No geochronological efforts have been made to date the archaeological material, especially if the lithics were encountered in 'an undisturbed manner', as Rajendran¹ states. Most importantly, there is no discussion of the precise stratigraphic and geological contexts of the figurine and associated stone artefacts. Context and geochronology are the very foundations of archaeological and palaeoanthropological research. In that regard, the stone tools associated with the figurine appear to have been misinterpreted and erroneously utilized to assign a relative age to the 'carved figurine'. For exam-

ple, most or almost all of the illustrated quartz specimens do not appear to be convincing stone artefacts as no clear flake scars are visible. Indeed, it is universally challenging to often distinguish naturally and artificially flaked quartz, especially when the technology is simple^{3,4}. Even if some of the associated lithics are archaeologically genuine, the assemblage composition does not automatically warrant a Lower Palaeolithic classification. Such evidence can also be younger in age as simple core-and-flake assemblages without bifaces have been reported in South Asia and elsewhere in much younger contexts⁵. Such simple technologies, especially on quartz, often persisted until the Holocene in many regions around the world.

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 2. Chauhan, P. R., *Evol. Anthropol.*, 2009, **18**, 62–78.

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4. Tallavaara, M., Manninen, M. A., Hertell, E. and Rankama, T., *J. Archaeol. Sci.*, 2010, **37**, 2442–2448.
5. Chauhan, P. R., In *Asian Paleanthropology: From Africa to China and Beyond* (eds Norton, C. J. and Braun, D.), Paleobiology and Paleoanthropology Series, Springer Press, 2010.

ACKNOWLEDGEMENT. I thank Prof. A Sahnii and Prof. K. Krishnan for their comments on an earlier draft of this letter.

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