The world of rock art

An exhibition on 'The World of Rock Art' was held at the National Gallery of Modern Art, Bengaluru, in association with the Indira Gandhi National Centre for the Arts, New Delhi and Archaeological Survey of India (ASI), Bangalore Circle from 3 December 2013 to 3 January 2014. The objective was to spread awareness among school children, college and university students and general public about prehistoric art. The exposition was the result of an international conference held in New Delhi and later organized in different parts of the country owing to overwhelming response from the artists, intellectuals and the general public.

The exhibition was inaugurated by A. Sundara (formerly at Department of Ancient History and Archaeology, Karnatak University, Dharwad) and presided over by Parvin Srivastava (Director, ASI, New Delhi). Both the speakers emphasized on the need to educate people about prehistoric rock arts so that they are preserved for posterity and also about protecting the art from vandalism. Two special lectures were arranged – one on 'Rock art of southern India' by Sundara and the other on 'Rock art of southern India: Upper Paleolithic to Mesolithic' by Ravi Korisettar (Karnatak University, Dharwad). An open-house workshop on 'Impression' for school students was also part of the exhibition.

The exhibits were chosen from six continents of the world – Africa, Europe, Asia, Australia, North America and South America. A representative collection of the significant art traditions was displayed continent-wise. The exhibition unveiled the fascinating saga of human endeavour of aesthetic sensitivity during prehistoric times with vivid and panoramic details. Various rock paintings (pictographs) and rock engravings, carvings and brushings (petroglyphs) confined to open rocks and boulders were displayed.

Photographs of engravings of giraffes at Dabous in Africa's Niger, representation of the ancestral heritage of Australia, native American petroglyphs of California, etc. were displayed. Rock arts from Karnataka included those from Halkundi, Hampi and Kapgal areas of Bellary district.

Rock art sites have been documented from all parts of the world, except Antarctica. The largest continent, Asia, has diverse rock art heritage. Rock-art sites have been identified in different parts of India from Jammu and Kashmir, Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh, Rajasthan, Madhya Pradesh (Bhimbedka was declared a World Heritage site by UNESCO in 2004), Odisha, Andhra Pradesh, Karnataka, Tamil Nadu, Kerala and Manipur[1]. A comprehensive study was also made on Indian rock arts in the global context[2].

In Karnataka, rock art sites have been identified in the districts of Bagalkot (Badami cave rock art, Badami–Hosa-Mahakuta–Pattadkal–Aihole–Kutakankeri), Belgaum (Ramdurga), Gadag (Dumbala), Koppal (Hire Benkal, Anegundi, Chikrampur, Mallapur, Venkatapur, Anjanahalli and Oneke kindi), Gulbarga (Gavimath, Palkigundu), Bellary (Hampi, Narayanapur, Halkundi, Kupgal, Sangankallu, Sirwar, Chowdamma Hill, Bellary Fort, Tikkalakoti and Korgudu), Raichur (Pikhal and Maski), Haveri (Hire-Madapura), Chitradurga (Brahmagiri), Kolar (Tekal and Ghattamadamangala), Uttara Kannada (Sonda), Udupi (Gavali near Kundapura, Neralakatte and Buddhanajeddu) and Shimoga (Byse–Nilaskal Byana, Guddemaradi and Nagara).

The techniques employed to execute the art work, like shallow carvings, deep carvings, paintings and stenciling with varied subject matter from simple geometric lines to complex geometric designs were presented. The most favoured subjects of the early man were animals as they were sources of sustenance. Wild animals and hunting scenes showing brutal power were depicted in rock art. Bison, tigers, rhinoceros, wild bear, monkeys, fishes, flying birds, peacocks and turtles have been abundantly shown (representing different periods from Upper Paleolithic, Mesolithic, Chalcolithic to early historic and Medieval period). Horses, elephants, animal fights, dancing, disguises and masks, details of social life, etc. provide rare glimpses into the activities of prehistoric man. Other facts of the then day-to-day life, representing live documentation of the development of style in artwork from gradual to more advanced techniques and various adaptations in lifestyle have been expressed in the rock art.

The exhibition also showcased the 'living art traditions' of three communities in India – the Lanjia-Sauras of Odisha, the Rathwa-Bhils of Gujarat and the Warlis of Maharashtra, to show the

A collage of rock arts – engravings and paintings (photos taken at the exhibition).

continuity of the traditions in the Indian context.

Several rock arts are probably hidden in remote places in dense woods, or in inaccessible mountain terrain. They are a rare source of knowledge about antiquity and tell us how the most primitive cultures kept aesthetic talent intact as a part of their living tradition.

Rock art heritage of India is still in its infancy as far as identifying new sites, and preservation and maintenance are concerned. There is ample scope to include rock art heritage sites in the tourist map of India. If these sites are preserved and maintained properly, future generations would be able to enjoy the open and aesthetically created vibrant rock arts created by early man. Damage due to human interference (graffiti, defacing, quarrying, etc.) and natural deterioration (heat, humidity, temperature) are the challenges to preserve these non-renewable cultural resources.

An exhibition of this kind is a rare treat and a golden opportunity for art lovers, students and general public to witness the world of rock art in one place. Surely, this would be a stimulating experience with prehistoric art and changing aspects of science and technology both in ancient times as well as in the contemporary cultures pertaining to this creative discipline of art.

1. *Young INTACH – The Heritage Club Newsletter*, 2007, **4**(3), 1–12.
2. Chakravarty, K. K. and Bednarik, R. G., *Indian Rock Art and its Global Context*, Motilal Banarsidas Publishers, Delhi (Indira Gandhi Rastriya Manav Sangrahalay, Bhopal), 1997, pp. 228.

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Drainage and dewetting of the tear film

Dry eye disease is caused by either decreased tear production or increased tear film evaporation. The tear film that protects the ocular surface is a complex and thin film. It is comprised of a collection of proteins and lipids that leads to a number of important functions. The meibomian glands located on the margins of eyelids produce oily lipid secretions that, after being mixed with the aqueous tears, contribute to the tear film. Meibomian glands are believed to form the tear film lipid layer. Previous work has focused on the role of this layer in reducing evaporation of tear drops from human eye.

Gerald G. Fuller of Stanford University in his Public Lecture on 'Drainage and dewetting of the tear film' (organized by the Indian Academy of Sciences at IISc, on 21 January 2014) highlighted the beneficial effects that are derived through the interfacial viscoelasticity of the meibomian lipid film, which is a duplex film comprised of a complex mixture of phospholipids, long chain fatty esters and cholesterol. Every time we blink we replenish meibum.

Fuller and his team have successfully used the technique of grazing incidence X-ray diffraction to study meibum and it has been found that the mixture self-assembles into highly structured layer with strong, interfacial viscoelasticity. By measuring the drainage and dewetting dynamics of thin aqueous films from hemispherical surfaces where those films are laden with insoluble layers of lipids at controlled surface pressure, it is evident that these layers strongly stabilize the films because of their ability to support surface shearing stresses. This alternative view of the role of meibum can help explain the origin of meibomian gland dysfunction, or dry eye disease, where improper compositions of this lipid mixture do not offer the proper mechanical resistance to breakage and dewetting of the tear film.

Fuller is a renowned scientist and engineer at the Stanford University. His area of specialization is rheology of complex fluids and complex fluid interfaces. He has achieved prominence in the development of techniques in optical rheometry, interfacial rheology and, more recently, biorheology.

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MEETING REPORT

Resonance: bringing together disciplines*

A two-week workshop on neuroscience was held recently, that aimed at demystifying some of the most electrifying research topics in the field.

*A report on Resonance – summer school in neuroscience held at the Indian Institute of Technology (IIT) Delhi from 26 June to 6 July 2013, an allied effort by Massachusetts Institute of Technology, USA, Harvard University, USA and IIT Delhi.

The teaching staff comprised of Pawan Sinha (MIT, USA), Venkatesh Murthy (Harvard University, USA), Amy Kalia (MIT), Garga Chatterjee (MIT), Tapan Gandhi (MIT), Laura Magnotti (Harvard University), Timothy Marzullo (Backyard Brains, USA) and Jitendra Sharma (Marnitos Center, Harvard). The host faculty members at IIT Delhi were Ambuj Sagar and Sanjiva Prasad. There were 21 participants and majority of them were engineers.

The first day started with a general discussion mediated by Sinha and Murthy on an important and necessary aspect: 'Why is neuroscience needed in developing countries such as India?' The discussion was quite expansive as all the students and faculty participated in it, pouring in their ideas and thoughts. The crux of the discussion was that India needs to burgeon in the field of neuroscience. Developing countries such as India have numerous cases of neurological and