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THE LOWER PALAEOLITHIC ROCK ART OF INDIA

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Abstract: *Petroglyphs of Lower Palaeolithic age have been discovered in central India since 1990, when two motifs were found that had been covered by Acheulian strata in Auditorium Cave, Bhimbetka site complex. Nine cupules occurring above ground in the same cave have been suggested to be of similar antiquity. A large corpus of cupules located in another quartzite cave, Daraki-Chattan, appeared to be of the same tradition. The presence of extensive exfoliation scars at the entrance to this site suggested that cupule-bearing wall fragments might occur within its floor sediments. Excavation of Daraki-Chattan since 2002 has yielded twenty-eight cupules on exfoliated slabs, and one more cupule made in situ, all of which occurred either within or below the substantial Acheulian deposits. In addition, three engraved grooves were also found in this deposit.*
Keywords: *Lower Palaeolithic, Petroglyph, Cupule, Quartzite cave, India*

Résumé: *Pétroglyphe datés du Paléolithique inférieur ont été découverts dans le centre de l'Inde depuis 1996. Deux motifs ont été trouvés lors de l'excavation d'un niveau Acheuléen dans la grotte de l'Auditorium. Cette grotte fait partie d'un système karstique comprenant une variété de sites connue sous le nom de Bhimbetka. Il a été suggérer que neuf cupules, situées au-dessus du sol dans la grotte de l'Auditorium, seraient des manifestations de l'Acheuléen. Un large corpus de cupules situées dans une autre grotte quartzitique et nommée Daraki-Chattan, seraient apparemment de la même période. La présence de vastes traces d'exfoliation à l'entrée du site pourraient signifier la présence de fragments de la parois associées à des cupules dans les sols sédimentaires sous-jacents. Depuis 2002, des campagnes d'excavations a Daraki-Chattan ont produit vingt-huit cupules sur des plaquettes exfoliées, et une autre cupule fabriquée in situ sur la paroi.*
Ces vingt neuf cupules sont toutes associées à un niveau Acheuléen, situées soit a l'intérieur ou au-dessous. Finalement, il faut noter trois rainures gravées associées à ce même niveau Acheuléen.
Mots clés: *Paléolithique inférieur, pétroglyphe, cupule, grotte quartzitique, Inde*

The defining characteristics of humans and their evolution have largely been disregarded in pursuing the two main preoccupations of palaeoanthropology, hominin origins and the emergence of modern humans. There is, contrary to much writing on these subjects, not one iota of evidence that the appearance of what is often described as 'modern human behaviour' appeared together with physical traits perceived as 'modern'. On the contrary, these two features are almost certainly unconnected and appeared separately.

Much of non-physical human evolution may have occurred outside of Africa, and in particular southern Asia is a region in need of special attention in that context. For instance, it was apparently here that *H. erectus* took to the sea around a million years ago, perhaps first in what today is Indonesia (Bednarik 1995a, 1997, 1999). The almost complete absence, east of Wallace's Line, of land-bound eutherians larger than rodents indicates, as Wallace (1890) correctly deduced, that there was never a land-bridge to the geologically very young islands of Nusa Tenggara (Lesser Sunda Islands). Proboscideans and hominins are the notable exceptions, and in the case of the former we know that they can swim more than twice the distance any other land mammal can (Bednarik and Kuckenburg 1999). Early seafaring, however, is far from being the only evidence suggesting that southern Asia could have been a hub of cognitive development in hominins. For instance, some of the earliest recorded use of pigment and presumed collection of crystal prisms comes from India (Bednarik 1990a; d'Errico *et al.* 1989). This implies a rudimentary appreciation of 'special qualities', or discrimination of ordinary from exotic objects, and the use of haematite and ochre pigments implies symbol use (Bednarik 1990b). These and other aspects suggest southern Asia, a geographically central region, was where much of cognitive human evolution occurred (Bednarik 1995b: 628).

The discovery of the oldest known rock art in the world in India adds yet another intriguing dimension. But it also highlights the neglect of Palaeolithic studies in the subcontinent, and the need for a greatly improved effort in exploring the Pleistocene history of that region. Unless *Homo habilis* or *ergaster* hominins reached eastern Asia via Siberia, which is very unlikely, we have no choice but to accept that they colonised southern Asia before reaching Java and northern China. On the basis of the fossil record as it stands, essentially erectoid hominins seem to appear in Africa as well as eastern Asia at the very same time, during the Plio-Pleistocene (Swisher *et al.* 1994). In whichever direction these presumed migrations took place, we should assume that India was greatly involved, and that India has been occupied by humans at least since the first appearance of *Homo erectus*, if not earlier.

On present indications only a faint outline of the Lower Palaeolithic of India can be offered (Bednarik *et al.* 2005: 149–151). The subcontinent is rich in Acheulian industries (Petraglia 1998; Korisettar 2002) but there is limited dating information available about them (Misra 1989; Raghvan *et al.* 1989; Szabo *et al.* 1990; Chesner *et al.* 1991; Mishra 1992; Acharyya and Basu 1993; Bednarik 1996; Korisettar 2002; Bednarik *et al.* 2005). Some commentators exclude a great antiquity for the early Acheulian, others suggest an age of up to 1.4 million years for the earliest phase (Misra and Rajaguru 1994; Badam and Rajaguru 1994). The preceding cobble tools of India, first reported stratigraphically by Wakankar (1975) at Bhimbetka, are practically unexplored. Since it is logical to expect human occupation evidence in India for at least 1.8 million years, it is to be expected that cobble tools should precede the bifaces of the Acheulian.

In central India, no petroglyphs were reported until quite recently (Bednarik *et al.* 1991). Eleven petroglyphs were observed in Auditorium Cave, the natural focus of the large rock art complex of Bhimbetka, which otherwise consists entirely of rock paintings. Two of the petroglyphs, a cupule and a meandering line, occur in an excavation (Wakankar 1975) in an Acheulian occupation deposit directly covering them (Bednarik 1993, 1994, 2001a, 2003; Chakravarty and Bednarik 1997: 58–9). They were probably not seen by Wakankar, but became exposed by subsequent trampling and artefact collecting. The cup mark is well-shaped and circular, over 1.5 m below the sediment surface, on the sloping surface of the excavated boulder facing east. The line approaches the large cupule from above, then follows part of its circumference, running parallel to it but maintaining some millimetres distance from its periphery, and veers off to the right. It is not a natural marking of the rock, nor is the cupule (Fig. 3.1). The surface of the quartzite is quite weathered, including in the petroglyphs, as is the nearby bedrock. In view of the excellent recorded stratigraphy at the site it is possible to consider the cultural provenience of these petroglyphs. An important stratigraphic marker of the Pleistocene at the Bhimbetka site complex is a pisolitic layer, 60 cm thick at site III A-29 (Wakankar 1975). At that site, its upper part is looser and finer than the more compact, coarser lower part, and while the upper half contains an Acheulian, the lower half provides a heavily weathered cobble tool industry of choppers and scrapers. The pisolitic stratum occurs also at III A-30 and III F-24 (Auditorium Cave), and in trenches 1–7, Choti Jamun Jhiri Nala, V. N. Misra's (1978) excavation in III F-23 did not reach beyond the Acheulian, so here it was not encountered. The facies can be found widely throughout the Vindhyan Hills, it is often exposed at lower elevations where it contains early Acheulian tools and Levallois cores.

The Middle Palaeolithic stratum overlying the Acheulian in Auditorium Cave is so solidly cemented by calcite deposition that the possibility of post-depositional disturbance can be ignored. It has been proposed that the

Figure 3.1. Lower Palaeolithic petroglyphs in trench II, Auditorium Cave.

remaining nine motifs (all cupules), although found above ground, are almost certainly of similar age (Bednarik 1996). They are located on the vertical panel of a huge boulder on the floor of the cave, called Chief's Rock. The petroglyphs occur on heavily metamorphosed, extremely hard quartzite, which was extensively quarried for stone tool material in the Lower Palaeolithic. The Acheulian handaxes and cleavers at the site, and elsewhere in the Bhimbetka site complex, were made from it. The petroglyphs occur in the central part of the cave, well protected from weather, yet they are extremely corroded due to their extraordinary antiquity. An antiquity well in excess of 100,000 years is confirmed by an attempt to analyse the microerosion of one of the Auditorium Cave cupules (Bednarik 1993, 1994, 1996).

Kumar (1996) has since reported other cupule sites in central India that appear to be of great age. Daraki-Chattan is a small and narrow quartzite cave at the foot of a prominent escarpment. Apparent Acheulian and Middle Palaeolithic tools occur on the surface of its floor deposit. The two walls of the cave bear more than 500 cupules and Kumar recognised that there was a realistic possibility that their age might be similar to that of the Auditorium Cave petroglyphs. Since then, several more Indian cupule sites have been proposed to be of great antiquity.

These data reported from India contradict a great deal of the current model of Pleistocene archaeology. The establishment of a major research project focusing on the examination of these Indian data and of an international scientific commission to compile a comprehensive dossier on these extraordinary claims were initiated by the authors. Called the Early Indian Petroglyphs (EIP) Project it was established in 1999 (Bednarik 2001b). The Commission is to investigate all matters concerning the very early rock art of India thoroughly, using methods such as carbon isotope analysis, optically stimulated luminescence dating, microerosion analysis, uranium-thorium analysis and archaeological excavation. It consists of geologists, archaeologists, rock art scientists

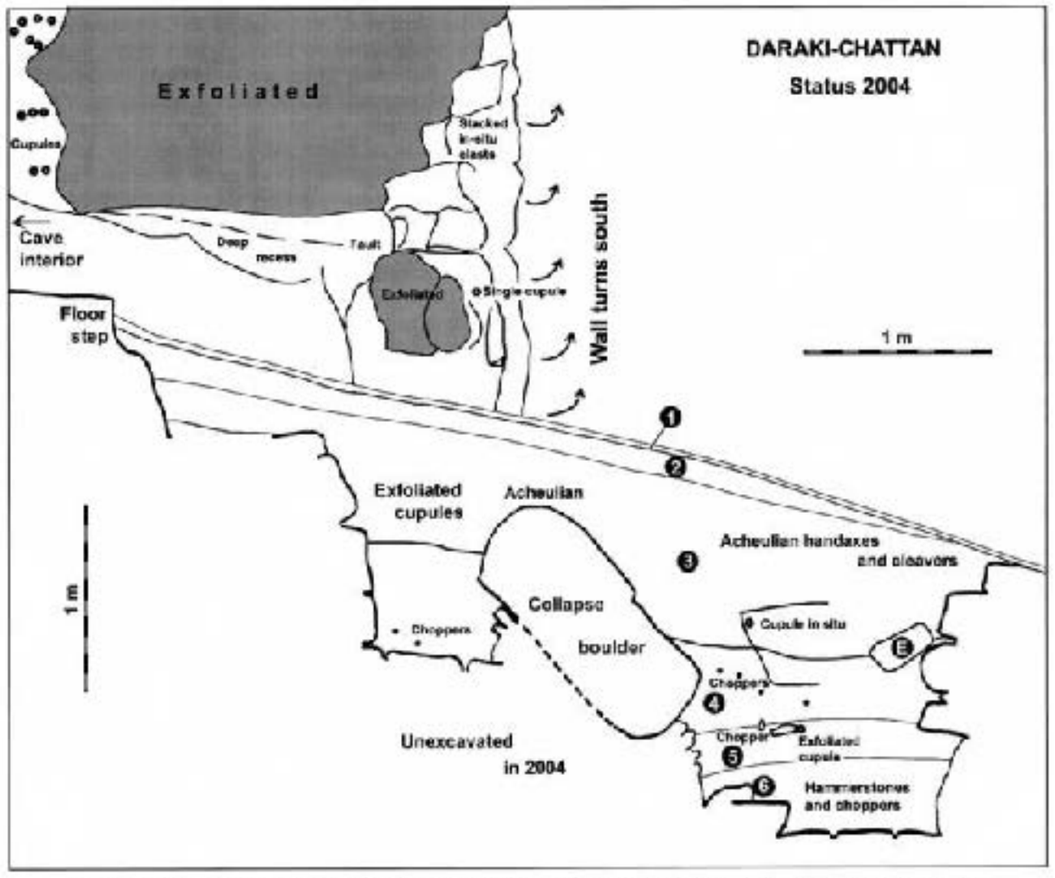

Figure 3.2. Generalised section view the entrance of Daraki-Chattan, looking south, with important features projected into the section. The spatial relationships of the exfoliated areas on the south wall, the outermost cupules on that wall, the general sediment layers, exfoliated slabs, engraved boulder 'E', and the excavated in-situ cupule are shown. Status November 2004.

and archaeometrists from India and Australia. In the course of its work so far, members of this Commission have already conducted research at almost twenty cupule sites in Madhya Pradesh and Rajasthan, as well as at numerous other, more recent rock art sites. The excavations of the EIP Project were commenced mid-2001 by Kumar and several colleagues, and peaked in 2002 with an intensive campaign involving several specialists (Kumar *et al.* 2002).

The quartzite cave Daraki-Chattan consists of a single passage, quite narrow and high, with a bare rock floor. It widens at the entrance where a substantial deposit of floor sediment has accumulated. The two vertical walls are covered by cupules up to a height of 4.02 m above the floor, indicating that the cupule makers sometimes climbed to that height. The cupules located furthest from the entrance have only 40–41 cm clear working space. Most of the cupules relate in their height to the present floor level, which was probably no higher at any time. The spatial distribution of the over 500 cupules densely covering much of both walls of the passage suggests that their makers averaged a body height in the order of 1.7 m to m 1.8 m, in terms of the maximum reach in positions from which it is possible to work most easily. Many of the cupules appear to be grouped in some form (Kumar 1996: Figs 5 and 6), but the degree of intentionality involved in their patterned placing needs to be questioned. Most groupings are perhaps a result of convenience, of subconscious reactions, or of conscious choices not corresponding to modern constructs of spatiality. A few occur on a rock ledge forming the southern margin of the cave floor, and two more were placed on the actual rock floor of the passage. One solitary cupule occurs on the southern wall of the entrance area, just above the excavation, where it managed to survive the extensive exfoliation that occurred in that area (Fig. 3.2). Another was found nearly 170 cm above the floor where the

southern wall turns south. Apart from these two exceptions, there are no surviving cupules outside the distinct floor step at the cave entrance, which separates the entrance area or vestibule from the interior of the cave. Finally, there is a boulder measuring about one metre, some eight metres from the cave on the slope below the entrance, which bears several apparent cupules that are so weathered that they are almost beyond visual detection.

The almost complete absence of cupules on the walls of the entrance part of the cave is due to extensive mass exfoliation by insolation spalling. Because this occurred since the cupules were produced, it provides a prominent *terminus ante quem* for the cupules. Since the exfoliated slabs are likely to have been deposited in the floor sediment, we resolved to excavate the entrance of the cave, to establish the vertical extent of such fragments as well as that of the human occupation of the site. The stratigraphical position of exfoliated slabs, some hopefully bearing further cupules, would only provide minimum ages, but we also sought to recover any hammerstones that had been used in producing the rock art. In view of the large number of cupules it was very likely that many of these tools would be recovered.

The excavation yielded not only hundreds of stone artefacts, but also a large number of exfoliated slab fragments, many of which still bore cupules on their outer surfaces. These cupule-bearing slab fragments were vertically distributed through most of the sediment, almost down to bedrock, which indicates that the exfoliation process was very slow and gradual, rather than occurring over just a limited time period. Several of the slab fragments were refitted (Fig. 3.3).

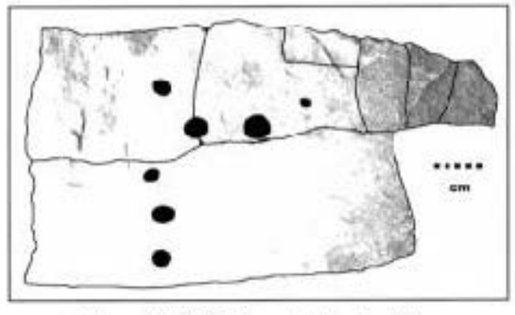

Figure 3.3. Refitted cupule-bearing slabs, Daraki-Chattan, Lower Palaeolithic.

Twenty-eight cupules and one doubtful specimen have now been recovered in the excavation, at varying depths throughout much of the Lower Palaeolithic deposit (Fig. 3.2). One more cupule was found in situ in the excavation, placed on the edge of a huge angular boulder. The trench also yielded three engraved grooves, two of them on one boulder and ranging in depth from 2.0 to 6.9 mm (Bednarik *et al.* 2005: Figs 36–38). All of the cupules on the walls appear to derive from a single period of cupule production. There are no obvious indications of greatly varying ages or differences in weathering. If this is the case, then the cupule production phase must correspond to the lowest sediment deposit, and exfoliation has occurred at various times over the duration of much of the site's sedimentary history. In the event that cupules were made over a much greater time span, the first to exfoliate and become buried must still be of an antiquity corresponding to the lowest sediment deposit, but others could have been made much later. However, the concentration of hammerstones of the type used to make petroglyphs (Bednarik 1998) just above and below the 'pavement floor' (see below) renders the first possibility more likely. In either case, the lowest occurrence of exfoliated slab fragments with cupules coincides with the earliest evidence of human occupation at Daraki-Chattan.

The substantial stone artefact assemblage from the excavation comprises two distinctive main groupings, leaving aside Holocene material trampled in from the top. The upper sediment units exhibit neither clear Acheulian nor typical Middle Palaeolithic features, being a rather indistinctive 'intermediate' industry. The absence of points and the presence of at least two Micoquian-type bifaces are perhaps diagnostic features. Overall there are few handaxes present but one or perhaps two rough awls or borers occur. Acheulian handaxes and cleavers occur with few large Levallois flakes featuring broad striking platforms and typical tortoise-pattern flaking indicative of core preparation. A specific type of flake tool is a very broad, Clactonian-type flake. The lower strata present a very different industry and sedimentary conditions. The implements are reminiscent of chopping-tool industries with cobble tools. This industry appears to be related to the lowest assemblages Wakankar has reported from three sites at Bhimbetka (III F-24, III A-29 and III A-33), and which have also been reported elsewhere in India (Ansari 1970; Armand 1980). This possibility is reinforced by the presence at Daraki-Chattan of laterite, occurring also at Bhimbetka, perhaps referring to distinctive environmental conditions. Moreover, like the chopping-tools at Bhimbetka, those at Daraki-Chattan are also deeply corroded or saprolithic. The most distinctive typological elements in the chopper industry at Daraki-Chattan are a few very thick bifacial chopping tools. They have a flat base opposite a distinctive, zigzagging convex working edge that was created by the removal of deeply conchoidal flakes, alternatively from each side. The geometrical regularity of this coarse retouch and consistent morphology suggest that this is not a by-product, a core, but that the removed flakes were the by-product. Another feature of this industry is the occasional occurrence of polyhedrons. This assemblage needs to be closely compared with similar stratified finds elsewhere in India, and the chronology of the Middle Pleistocene laterisation events in central India needs to be resolved. For the moment it will suffice to make one categorical observation: the period of cupule manufacture at Daraki-Chattan, or at

least its earliest phase (if it should have continued later on, for which we lack evidence), coincides with this chopping tool industry with occasional coarse handaxes. The archaeology has shown this unambiguously, through the occurrence of exfoliated, cupule-bearing slabs down to the lower levels, as well as through the occurrence of definite petroglyph-making tools. At least ten of these hammerstones have been recovered from the excavation (Bednarik *et al.* 2005: 166–7).

We have also examined some cupule sites on the plateau of Indragarh Hill, i.e. above Daraki-Chattan, and some more in the wider vicinity of that key site. There are several cupule rocks at scattered locations on this plateau. There is no indication that these are of an antiquity comparable to that of the cupules in Daraki-Chattan as they are fully exposed to weathering processes and are relatively well preserved.

Almost 20 km south-west of Bhanpura, close to the shore of the Ganchi Sagar reservoir lake and near the village Hanumankheda is a prominent remnant of a quartzite formation, Pola Bata. Its huge, up to about 12-m-high weathered boulders form cavities that have for hundreds of millennia provided shelter to humans, as indicated by numerous Lower Palaeolithic surface artefacts. There are several concentrations of cupules among the rocks, especially on the wall of the main tunnel. Numerous largely faded red pictograms occur also in this cave-like space. The cupules are often unusually deep and large, and although there are many deeply weathered examples, others bear distinctively recent damage (Fig. 3.4). Indeed, some of the site's several dozen cupules are still being used, including at least three lithophones or 'rock gongs'.

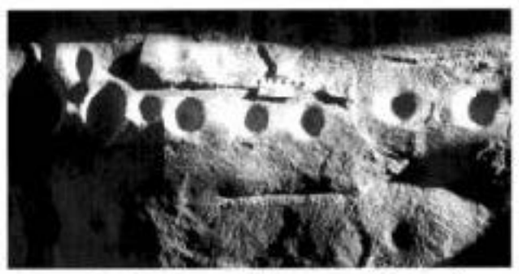

Figure 3.4. Cupules at Pola Bata, Gandhi Sagar dam, of unknown age.

About 3 km west of Pola Bata lies the small hamlet Amyabhau. Nearby is another of the quartzite stacks commonly observed in this otherwise fairly flat terrain, called Teej-kā-Pīnā. The site, elevated about 15 m, consists of the flat top of the steep-sided outcrop. It features several groupings of cupules and abraded grooves. Some of these petroglyphs form an extensive geometric arrangement, now partly exfoliated, and most cupules are arranged in rows. Some of the abraded grooves resemble axe grinding grooves, and it is possible that these are Neolithic.

Hathikheda is an outer suburb of greater Ajmer, Rajasthan. A series of rock outcrops, spaced about one kilometre apart, extends to the west of the built-up area, forming a roughly discernible alignment along an east-west line (Bednarik and Kumar 2002). They rise between 8 m and 20 m above the alluvium and consist essentially of white quartz monoliths. They appear to mark the remains of an unusually broad quartz dyke that extends over a number of kilometres. The first outcrop occurs within the housing area and bears a small temple. The second is called Moda Bhata ('Big Rock') and is located immediately north of a usually dry watercourse, on the present periphery of Hathikheda. Moda Bhata is about 8 m high on its northern approach, and 15 m on its much steeper south side, which has given rise to a shallow rockshelter. The upper platform bears twenty distinct cupules as well as several faint cupules or worked surfaces bearing traces of impact, plus one very large cupule. Most occur in small groups and there is a preference in their positioning on slight rises of the rock platform. In addition there are four vertical cupules in the shelter below. We have applied microerosion analysis to one of the cupules on the plateau, noting two distinctive peaks in the micro-wane widths: one corresponds to an antiquity of about E2300 years BP, the other to roughly E9000 years BP. This clear separation cannot reasonably be accounted for by sampling inadequacies or imprecision, it is far too pronounced and we interpret it as unambiguous evidence that the older cupule surface was reworked at a much more recent time.

About one kilometre to the south-south-west of Moda Bhata lies a very similar formation, named Koteshwar Mahadev Bhata after a deity. Its dimensions and morphology are much like those of Moda Bhata, with steep sides and a horizontal platform with similar cupules. A line of such further quartz hills extending west were examined in 2003 and 2006 (Kumar and Prajapati 2005), and explored as far as Nankya Talav, about 2 km west of Moda Bhata. Koteshwar Mahadev Bhata is an elongated flat hill followed by smaller outcrops named Hills 3 and 4. The latter has a big rockshelter bearing large and small cupules. Opposite to them, nearly 500 m to the north, are rock outcrops numbered Hills 5 and 6 (Kannodia-ki-Pahadi). About 1 km west of this group occur Hills 7 and 8. The latter, Nankya Talav-ki-Pahadi, contains two big shelters facing north-west. Opposite them are two rocks named Hills 9 and 10. The nature, technique of execution, patination and state of preservation of the cupules found on all these ten quartz hills resemble those found on Pola Bhata.

Morajhari is located about 20 km east of Nasaribad, near Ajmer, Rajasthan, extending over almost 200 m near a shallow *nala* (Kumar 1998). There are several hundred gneissic boulders strewn over the flat alluvial plain, many of which bear cupules. The focal point of the site is a

lithophonic rock resting on top of another boulder, immediately next to a much larger boulder that forms one of the highest of the site (Fig. 3.5). The lithophonic rock is of roughly discoid shape and bears numerous cupules on both sides. This means that only those on its upper surface can now be effectively worked, because those on the lower surface, although mostly visible, are too close to the support boulder to be struck effectively. Therefore the rock, which might weigh around 400 kg, must have been turned at some time. This event effectively provides a *terminus ante quem* for the cupules on the underside, which also cannot bear any recent reworking.

Figure 3.5. Cupule boulder at Morajhari, Rajasthan, of the Holocene.

Microerosion analysis of three cupules on the Morajhari ('Feathers of the Peacock') lithophone suggests that the groupings of the wane widths of one on the upper side indicates re-working at about E2600 years BP, E1750 years BP and E800 years BP. The results from one cupule on the underside substantiate the assumption that the petroglyphs on the rock's underside are older, with a mean age estimate of about E5000 years. The data derived from the third cupule is very compact, by contrast, favouring an age of about E1900 years, i.e. falling within the range of the events expressed in the results from the first cupule.

Another candidate for Palaeolithic-age cupules is Bajanibhat ('Rock that gives sound'; i.e. lithophone). The site is located about 24 km east of Kotputli (Sharma *et al.* 1992; Kumar and Sharma 1995). Near the foot of the mountain range Kalaphad is a prominent shallow shelter, 8 m wide and 5.5 m high. It features a corpus of sixty-seven cupules on its vertical wall, which vary greatly in both their sizes and ages. We consider that there were initially a few cupules, which prompted similar behaviour at much later times, and the practice was continued in many of the cupules until historical times. The latter bear still relatively fresh bruising evidence. One of the younger cupules yields a microerosion age in the order of 6000 years. Lower Palaeolithic tool types occur in profusion at the site, and in its vicinity for hundreds of metres. These include very finely worked, typical ovoid Acheulian handaxes in considerable quantity, rougher bifaces, cleavers, hammerstones and thick Levallois flake tools.

While we have huge numbers worldwide of Middle Palaeolithic rock art motifs, mostly from Australia, the incidence of Lower Palaeolithic examples remains very rare, and confirmed cases remain limited to India. There are specific common characteristics emerging, but because this subject has been so severely neglected until very recently it might be premature to elaborate on possible universal variables within these very early traditions, or the significance they might seem to have shared over immense spatial and temporal distances. The EIP Project (Bednarik 2001b; Kumar 2000–01; Kumar *et al.* 2002) is endeavouring to secure the first data of Lower Palaeolithic petroglyphs. It provides unambiguous evidence of such rock art from archaeological occupation strata at two sites, Auditorium Cave and Daraki-Chattan.

References

ACHARYYA, S.K.; BASU P.K. (1993) – Toba ash on the Indian subcontinent and its implications for the correlation of Late Pleistocene alluvium. *Quaternary Research* 40, p. 10–19.

ANSARI, Z.D. (1970) – Pebble tools from Nittur. In S. B. Deo & M. K. Dhavalikar (eds.): *Indian antiquary 4: Professor H. D. Sankalia felicitation volume*, p. 1–7. Bombay: Popular Prakashan.

ARMAND, J. (1980) – The Middle Pleistocene pebble tool site of Durkadi in central India. *Paleorient* 5, p. 105–144.

BADAM, G.L.; RAJAGURU, S.N. (1994) – Comment on 'Toba ash on the Indian subcontinent and its implications for the correlation of Late Pleistocene alluvium' by S.K. Acharyya & P.K. Basu. *Quaternary Research* 41, p. 398–399.

BEDNARIK, R.G. (1990a) – An Acheulian haematite pebble with striations. *Rock Art Research*, Melbourne, 7, p. 75.

BEDNARIK, R.G. (1990b) – On the cognitive development of hominids. *Man and Environment* Pune, 15, p. 1–7.

BEDNARIK, R.G. (1993) – Palaeolithic art in India. *Man and Environment*, Pune, 18/2, p. 33–40.

BEDNARIK, R.G. (1994) – The Pleistocene art of Asia. *Journal of World Prehistory* 8/4, p. 351–375.

BEDNARIK, R.G. (1995a) – Wallace's barrier and the language barrier in archaeology. *Bulletin of the Archaeological and Anthropological Society of Victoria*, Melbourne, 1995/3, p. 6–9.

BEDNARIK, R.G. (1995b) – Concept-mediated marking in the Lower Palaeolithic. *Current Anthropology* 36, p. 605–634.

BEDNARIK, R.G. (1996) – The cupules on Chief's Rock, Auditorium Cave, Bhimbetka. *The Artefact*, Melbourne, 19, p. 63–72.

BEDNARIK, R.G. (1997) – The origins of navigation and language. *The Artefact*. Melbourne. 20, p. 16–56.

BEDNARIK, R.G. (1998) – The technology of petroglyphs. *Rock Art Research*.Melbourne. 15, p. 23–35.

BEDNARIK, R.G. (1999) – Maritime navigation in the Lower and Middle Palaeolithic. *Comptes Rendus de l'Académie des Sciences Paris*. Farsi. 328, p. 559–563.

BEDNARIK, R.G. (2001a) – Cupules: the oldest surviving rock art. *International Newsletter on Rock Art*. Foix. 30, p. 18–23.

BEDNARIK, R.G. (2001b) – The Early Indian Petroglyphs Project (EIP). *Rock Art Research*. Melbourne. 18, p. 72.

BEDNARIK, R.G. (2003) – The earliest evidence of palaeoart. *Rock Art Research*. Melbourne. 20, p. 89–135.

BEDNARIK, R.G.; KUCKENBURG, M. (1999) – *Nale Tasih: Eine Floßfahrt in die Steinzeit*. Stuttgart: Thorbecke.

BEDNARIK, R.G.; KUMAR, G. (2002) – The quartz cupules of Ajmer, Rajasthan. *Purakala*. Agra. 13: 1–2, p. 45–50.

BEDNARIK, R.G.; KUMAR, G.; WATCHMAN, A.; ROBERTS, R.G. (2005) – Preliminary results of the EIP Project. *Rock Art Research*. Melbourne. 22, p. 147–197.

BEDNARIK, R.G.; KUMAR, G.; TYAGI, G.S. (1991) – Petroglyphs from central India. *Rock Art Research*. Melbourne. 8, p. 33–35.

CHAKRAVARTY, K.K.; BEDNARIK, R.G. (1997) – *Indian rock art and its global context*. Delhi: Motilal Banarsidass.

CHESNER, C.A.; ROSE, W.I.; DRAKE, A.D.R.; WESTGATE, J.A. (1991) – Eruptive history of earth's largest Quaternary caldera (Toba, Indonesia) clarified. *Geology* 19, p. 200–203.

D'ERRICO, F.; GAILLARD, C.; MISRA, V.N. (1989) – Collection of non-utilitarian objects by *Homo erectus* in India. *Hominidae. Proceedings of the 2nd International Congress of Human Paleontology*, p. 237–239. Milan: Editoriale Jaca Book.

KORISETTAR, R. (2002) – The archaeology of the south Asian Lower Palaeolithic: history and current studies. In S. Settar & R. Korisettar (eds.): *Prehistory. Archaeology of south Asia*, p. 1–65. Indian Archaeology in Retrospect, Volume 1, Manohar: Indian Council of Historical Research.

KUMAR, G. (1996) – Daraki-Chattan: a Palaeolithic cupule site in India. *Rock Art Research*. Melbourne. 13, p. 38–46.

KUMAR, G. (1998) – Morajhari: a unique cupule site in Ajmer District, Rajasthan. *Purakala*. Agra. 9, p. 61–64.

KUMAR, G. (2000–01) – Early Indian Petroglyphs: scientific investigations and dating by international commission, April 2001 to March 2004. *Purakala*. Agra. 11/12, p. 49–68.

KUMAR, G.; BEDNARIK, R.G.; WATCHMAN, A.; ROBERTS, R.G.; LAWSON, E.; PATTERSON, C. (2002) – 2002 progress report of the EIP Project. *Rock Art Research*. Melbourne. 20, p. 70–71.

KUMAR, G.; SHARMA, M. (1995) – Petroglyph sites in Kalapahad and Ganesh Hill: documentation and observations. *Purakala*. Melbourne. 6, p. 56–59.

KUMAR, G.; PRAJAPATI, S. (2005) – Petroglyphs discovered in Ajmer, Rajasthan. *Purakala*. Agra. 14–15, p. 116–117.

MISHRA, S. (1992) – The age of the Acheulian in India: new evidence. *Current Anthropology* 33, p. 325–328.

MISRA, S.; RAJAGURU, S.N. (1994) – Comment on 'Toba ash on the Indian subcontinent and its implications for the correlation of Late Pleistocene alluvium' by S.K. Acharyya and P.K. Basu. *Quaternary Research* 41, p. 396–397.

MISRA, V.N. (1978) – The Acheulian industry of rock shelter HF-23 at Bhimbetka, central India – a preliminary report. *Australian Archaeology*. Canberra. 8, p. 63–106.

MISRA, V.N. (1989) – Stone Age India: an ecological perspective. *Man and Environment*. Puna. 14, p. 17–64.

PETRAGLIA, M.D. (1998) – The Lower Palaeolithic of India and its bearing on the Asian record. In M. D. Petraglia & R. Korisettar (eds.): *Early human behaviour in global context: the rise and diversity of the Lower Palaeolithic record*. p. 343–390. London: Routledge.

RAGHVAN, H.; RAJAGURU, S.N.; MISRA, V.N. (1989) – Radiometric dating of a Quaternary dune section, Didwana, Rajasthan. *Man and Environment*. Puna. 13, p. 19–22.

SHARMA, M.L.; KUMAR, V.; SHARMA, P.T. (1992) – New rock art sites discovered in Sahibi valley, Rajasthan. *Purakala*. Agra. 3, p. 84.

SWISHER, C.C.; CURTIS, G.H.; JACOB, T.; GETTY, A.G.; SUPRIJO, A.; WIDIASMORO (1994) – The age of the earliest hominids in Indonesia. *Science* 263, p. 1118–1121.

SZABO, B.J.; MCKINNEY, C.; DALBEY, T.S.; PADDAYYA, K. (1990) – On the age of the Acheulian culture of the Hunsgi-Baichbal valleys, peninsular India. *Bulletin of the Deccan College Postgraduate and Research Institute*. Puna. 50, p. 317–321.

WALLACE, A.R. (1890) – *The Malay Archipelago*. London: Macmillan.

WAKANKAR, V.S. (1975) – Bhimbetka – the prehistoric paradise. *Prachya Pratibha* 3/2, p. 1–29.