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An early case of lithic recycling in India: evidence from the Acheulian site at Damdongri, Madhya Pradesh

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Research on recycled lithic artefacts in Indian prehistory is extremely limited when compared to the world scenario. In the present study we group the recycled activity of lithic artefacts into two categories – (1) artefact that is created and recycled during one ‘cultural age’ and (2) artefact that is created by the ‘ancestors’ and recycled during subsequent cultural ages. It is a fact that the earliest evidence of recycled artefacts belonging to Acheulian hominin is extremely limited and as such, the Damdongri site in Madhya Pradesh, India is the only Acheulian site where recycled artefacts have been identified pushing back the antiquity of such human behaviour to Acheulian culture for the first time in the country. Keeping in view this uncommon evidence and considering the nature of recycled artefacts from Damdongri, it is clear that recycling of lithic artefacts to put them back to use was uncommon during the Acheulian cultural phase in India. The present evidence from Damdongri is unique, where lithic analysis has shown that recycled activity on lithic artefacts was carried out during the Acheulian cultural phase with no intention

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to reuse them. Rather this action can be ascribed to certain symbolic activity. Finally, based on these evidences it has been hypothesized that recycling activity on ancestral lithic artefact during the Acheulian was probably considered 'taboo' and evidence from Damdongri was probably indicative of a site where artefacts were presented as symbolic object connected with some belief system during the Acheulian.

Keywords: Archaeology, cultural age, prehistory, recycled lithic artefacts.

STUDIES on recycled lithic artefacts in prehistoric archaeology are limited. It is probably because of the fact that this feature becomes difficult to recognize in lithic assemblages and as such, these aspects in prehistoric archaeology did not attract the attention of scholars to correlate and understand in conjunction with human behaviour and the socio-economic implications in society.

Recycling of lithic artefacts as popularly understood is that evidence on the artefacts which is indicative of some working or fabrication on a particular artefact with a temporal gap and of course, with two different objectives. Recycling of an artefact is done with an objective to reuse it or use it for a symbolic purpose. Sometimes, reworking at the recycling stage is done and discarded when it was realized that it will not serve any desired purpose. The reasons for this discard could be numerous.

The recycling activities in prehistoric context can be broadly divided into two categories based on time when the recycling activity was carried out in relationship to the cultural age of its primary manufacture. The first category of recycled activity is within one 'cultural age' and the second category of recycling is performed subsequent to a particular cultural age, which is termed as an 'ancestors'.

'Ancestor' is defined as that which is earlier than the existing memory of a given cultural age of a community. 'Ancestor' is also from whom one has descended, who lived in the past beyond the human memory of a community.

Here 'cultural age' denotes succession of generations that are considered as one unit in respect of cultural value and that is remembered as contemporary memory within that cultural age. Besides, the cultural age (also known as cultural period) is usually understood in terms of culture and the contemporary technology that was in use. Changes in cultural age are marked by fundamental changes, the way we perceive and understand the world in a broader sense of the term.

In case of the first category, i.e. within one cultural age, lithic artefacts are recycled with a small time gap. As a result, sometimes it becomes difficult to differentiate between the original knapping surface and recycled activity on the lithic artefact because of the absence of differentiable patination on the same artefact. In case of the second category, i.e. lithic artefacts belonging to ancestors of a cultural age, identification between recycled and

original activities is possible on the basis of differential patination due to considerable time gap.

Archaeologists are well acquainted with recycling activities, particularly while dealing with historical period sites. This is because '... simple exercise of historical memory would show that recycling was fully incorporated in the behavioural repertoire of traditional societies, from our recent past to historical times'¹. For example, some valuable or curious-looking objects of an earlier period are used as ornaments, or building materials such as bricks and stones are recycled by reusing them in subsequent structures of later periods. In a way recycling activities are integrated as a part of culture, unless considered 'taboo' by society.

In spite of this, the study of recycling activities as a human behaviour in archaeological research is limited, especially in Palaeolithic studies, perhaps due to scepticism about the usefulness of this concept. According to Odell², 'recycling is a concept that is too difficult to characterize adequately in interpreting the archaeological record'.

The basic theoretical concepts behind recycling activities as part of human behaviour in archaeological context were probably first put forward by Schiffer³ in his seminal article 'Archaeological context and systemic context' and elaborated in his subsequent contributions⁴⁻⁶.

Following Schiffer's concept, few other studies in the Palaeolithic context have been carried out and while reviewing these limited works on this specific human behaviour, it has been rightly remarked that '... recycling was often identified through the recovery of artefacts with double patina, especially in Palaeolithic sites, but this evidence was considered almost as a curiosity, without fully considering its behavioural or economical implications'¹.

However, subsequent to Schiffer and other isolated reports, interest in the study of recycling activities in lithic assemblage of Palaeolithic archaeology has increased to a great extent⁷⁻¹¹. These studies emphasize that: 'On the one hand, archaeologists are aware of the implications of recycling for different behavioural issues, like raw material management, settlement patterns, artefact use life, organization of technology and knapping methods. On the other hand, recycling offers a glimpse into the temporal nature of the archaeological assemblages'¹. It was also realized then that such studies would certainly '... provide a higher resolution picture of human behaviour'¹.

The renewed interest in this direction culminated with a thematic workshop in Tel-Aviv University, Israel in 2013, the contributions of which were published in *Quaternary International* No. 361 (ref. 12). This workshop was a turning point in recycling studies in Palaeolithic archaeology.

Lithic recycling has been studied from different perspectives and interpreted to determine diverse human behavioural causes, and archaeological studies have been made to understand its implications.

While citing certain ethnographic and archaeological examples on recycling, Amick⁷ suggests that ‘... the door should not yet be closed on this important issue. The behavioural context and archaeological evidence for lithic recycling deserve to be examined more closely’.

In spite of disagreement regarding the methods of measuring and interpreting the evidence of lithic recycling by various scholars, there is much positive headway to understand the concept of recycling in lithic artefacts. It has been variously interpreted at different sites, including, ‘reuse and recycling of artefacts found on previously abandoned sites is a significant cause of intra-site differences in patterns of stone tool consumption and reduction’¹³; increased recycled lithic artefacts are an indication of duration of occupation¹⁴, and lithic recycling increases as a function of increased mobility (and shorter length of occupation)¹⁵, etc. Based on Kuhn’s concept, Amick⁷ mentions that ‘... the role of lithic recycling deserves attention from the standpoints of mobility and the energetic analysis of lithic procurement’.

Interestingly, while citing a number of ethnographic examples where artefacts from earlier archaeological sites were collected and used, and sometimes refabricated to bring them back to use by many communities, Amick mentions that: ‘Although ethnographic accounts of lithic artefact scavenging and recycling are common, many archaeologists have failed to appreciate the implications of this behaviour for the archaeological record. Furthermore, those few archaeologists who have addressed lithic recycling seem more concerned about its potential to contaminate chronological and functional assessments rather than looking at lithic recycling as meaningful behavioural evidence of prehistoric procurement and technological processes’⁷.

As regards the evidence of lithic recycling belonging to Lower Palaeolithic culture and its implications in understanding early hominin behaviour¹⁶, such evidences are extremely limited and have been reported elsewhere like in Spain¹⁷, Romania¹⁸, Israel^{19–26} and Jordan²⁷.

With regard to the study of lithic artefacts recycling during the prehistoric period in India, it is extremely rare. So far, there is only one report on Indian prehistory that discusses recycling of lithic artefacts. It is the microlithic assemblage from Mandla district, Madhya Pradesh (MP)^{28,29}. As described, ‘The evidence of patinated dorsal features (flake scars) from previous use along with comparatively fresh flaking marks on the same specimen confirmed recycling practices. Large tools discarded by earlier users were reused as raw materials for microlithic production’²⁸. Surprisingly, so far, no such evidence of lithic recycling has been reported from any Acheulian site in the Indian subcontinent.

Studies on the Acheulian sites^{30,31} formed part of a larger project in the area confined to Narwar-Tikoda in the north and Putlikarar in the south in district Raisen. It was during 2011–12 when two distinct areas of Acheulian

artefact concentration were identified, i.e. Tikoda-Narwar and Damdongri. Both areas had Acheulian assemblages at a number of localities and clusters. The major distinction between these two areas is their location. The Acheulian localities at Tikoda-Narwar area lie in the Vindhyan quartzite–sandstone context, whereas localities in Damdongri area lie in the basaltic trap context. The present study is confined to one of the localities at Damdongri.

Altogether three localities have been identified based on spatial distribution of artefacts at Damdongri. Among these, locality-2 (23°16’56”N; 77°58’32”E; Figure 1) that lies about 450 m north of the present village settlement of Damdongri has been taken up for detailed studies besides other areas. This locality (DGR-2) forms part of a reserve forest in the area and major portion of this locality is under cultivation, except a small part on the eastern side.

In this locality Acheulian artefacts are found in two distinct sedimentary contexts: (1) reddish brown sandy silt and (2) black clay. Interestingly, besides Acheulian, no subsequent cultural succession was noticed at the site. The reddish-brown sandy silt sediment was found at higher elevation above 430 m amsl, whereas the sediment deposited below 430 m amsl is with black clay. Artefacts were noticed in both contexts. Subsequent excavations of both in reddish-brown sandy silt and black clay sediments showed that the former remained occupied throughout, whereas black clay got occupied only during the last phase of the Acheulian in the area.

One of the high-density artefact clusters on the eastern periphery of DGR-2 is associated with black sediment. This spot remained outside the cultivated zone, and hence was undisturbed. An interesting aspect of this cluster is the presence of high density of large-sized artefacts on quartzite on the surface. Besides, the assemblage contains high frequency of cleavers and handaxes. A preliminary study was initiated in this cluster on the occurrence of high frequency of large-sized artefacts in contrast to small-sized artefacts. Besides, there was unusually high frequency of bifaces in the assemblage, mostly with damages due to use.

With a view to understand human behaviour from the assemblage of this unusual lithic cluster, detailed sampling was carried out by plotting each of the artefacts within 378 sq. m area (Figure 2). In this sampled area, two distinct sub-clusters of artefacts were observed where maximum number of handaxes and cleavers could be noticed. Besides documenting these artefacts in the three-dimensional context, they were analysed considering certain well-defined parameters to understand artefact type, material used, size, technology, etc. As part of taphonomical observations, abrasion and patination were observed on each of the artefacts. The degree of abrasion and patination determines the differential abrasion and patination on each of the artefact surface and also between artefacts within the assemblage. Besides understanding various

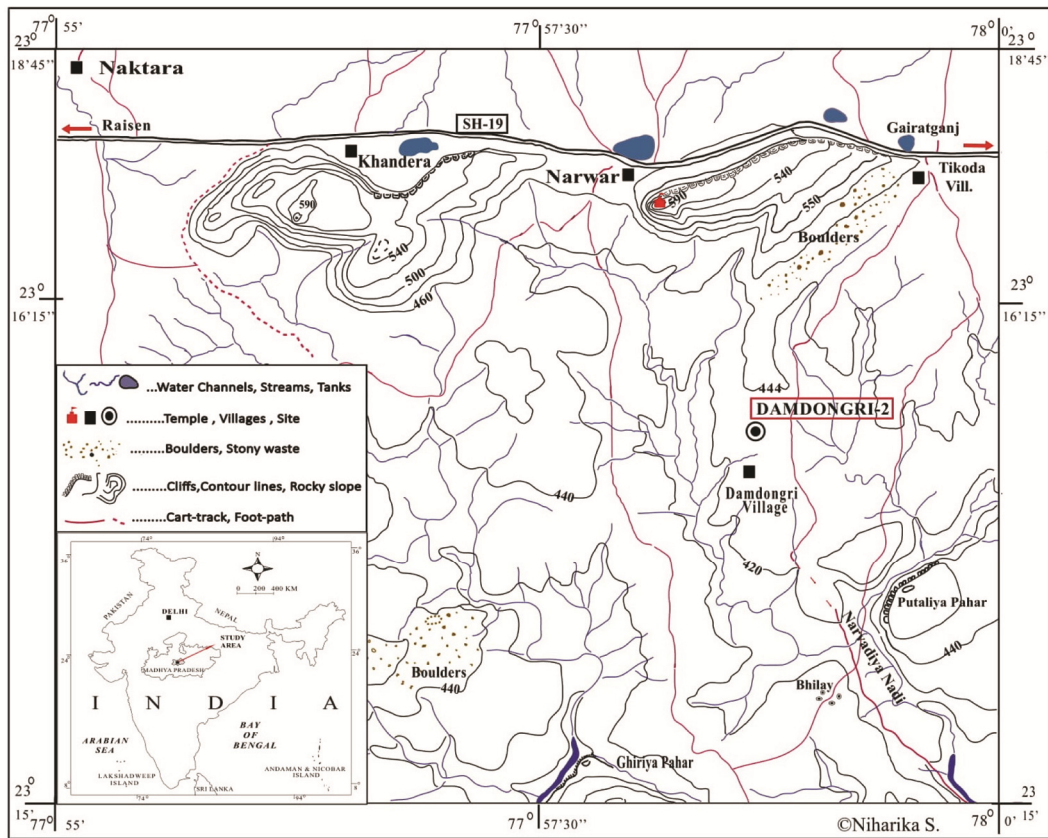


Figure 1. Location map of Damdongri locality 2, Madhya Pradesh, India.



Figure 2. General view of the cluster with artefacts.

aspects of human behaviour and taphonomical processes on artefacts, it helped identify the recycling activities on these artefacts. This in fact led us to consider in details of the recycling activities in this Acheulian assemblage. As part of human behaviour, the present assemblage at this cluster has been probably considered as a symbolic representation of a certain faith, where Acheulian artefacts have been offered as a part of the belief system.

As discussed earlier, a variety of criteria usually adopted for identification of recycled lithic artefacts

depending on the objective(s) of the study. Since the objective of this study is to find out the recycling activities on lithics with considerable time gap between both activities, i.e. original lithic modification and subsequent activity as part of recycling during the Acheulian, the criteria of abrasion and patination have been considered here. In fact, the present study attempts to find out the recycling activity, if any, on artefacts belonging to the ancestors of Acheulian hominin of a given cultural age during the Acheulian cultural phase in the area. If so, what was the intention of recycling of such artefacts? Recycled artefacts have been identified based on degree of patination and degree of abrasion. Degree of patination has been determined on the lithic artefacts based on visual observation on a comparative basis between artefacts of similar material and between flaking surfaces within one artefact. Further, the degree of patination also varies based on rock composition on which the artefacts are manufactured and the condition in which artefacts remain as part of archaeological context. Therefore, taphonomical conditions of artefacts have been considered while determining the degree of patination. The differential degree of patination on artefacts has been considered as one of the major parameters to understand recycling activity on the lithic artefacts. Same is the case for determining the degree of abrasion on the artefacts. For a more standardized

observation on the degree patination and intensity of abrasion on the artefacts, precaution has been taken for cross-checking the data by another scholar and thereby ensure the correctness of the observation. Interestingly, it has been realized that these two parameters help in determining the relative chronology if properly understood in taphonomical context within one lithic assemblage and also help in understanding different sub-phases of lithic activity(s), if any, within one assemblage.

The cluster that was sampled yielded altogether 2430 artefacts, of which 62 showed recycling activity constituting 2.55% of the total assemblage. The recycling activity has been determined on the basis of degree of patina and abrasion noticed on the artefacts. The identified recycled artefacts fall under the category of recycling work that was undertaken after considerable time gap between the first knapping of raw material and the subsequent recycled activity. These recycled artefacts by hominins must have been known to themselves that such artefacts originally belonged to their ‘ancestors’.

These 62 recycled artefacts comprise handaxes, cleavers, scrapers, bolas, discoid, flake cores, flakes, worked blocks, etc. Among these, 22 artefacts are on cores, 20 are on various types of flakes, 16 on various types of finished tools and 4 artefacts are on worked boulder and splitted nodule.

When the nature of recycling activities was analysed, it was found that recycled artefacts can be divided in two types – the first category is retouching with a view to bring the earlier artefact into working condition, while the second category is of random working in the form of random flaking on the earlier artefact. This in fact suggests the intention of early hominins behind the recycling activity. In the present collection, the first category of recycling activities constitutes 17 numbers (Figures 3 *a* and *b*), i.e. 27.42%, whereas the second category is of random removal of flakes constitutes 45 numbers (Figures 3 *c*, *d* and 4) with 72.58% out of a total number of 62 recycled artefacts. Interestingly, none of these artefacts showed any signs of use damage subsequent to recycling activity. Further, when the first category of recycled artefacts was analysed, it was found that only four finished tools of the earlier period were recycled to retain the finished tool status that included three cleavers and one side-scraper-cum-point, whereas rest 13 simple artefacts of the earlier period were modified to finished tools like side scrapers, choppers and point. The nature of retouching showed that these artefacts could be utilized as cleavers or scrapers in certain cases. Interestingly, none of these retouched artefacts showed any kind of positive sign of reuse subsequent to recycling, which is noteworthy.

Interestingly, the second category with 45 artefacts that were not fabricated into finished tools during the recycled activity showed some sort of random working, which

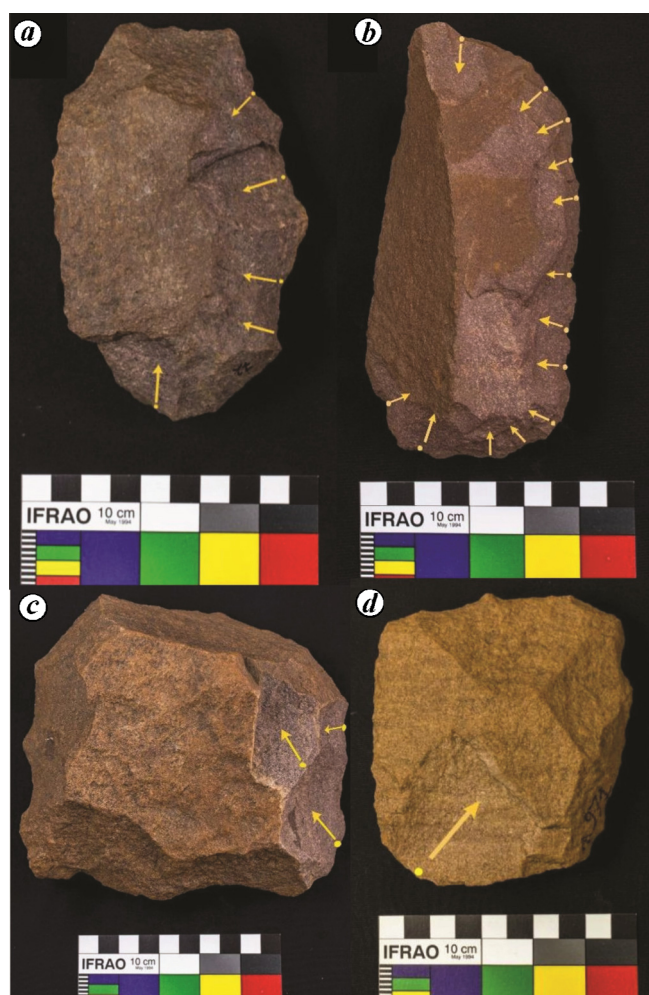


Figure 3. *a*, Side flake converted to chopper after recycling. *b*, End flake converted to side-cum-end scraper after recycling. *c*, Core recycled with random flaking; *d*, Cleaver recycled with random flaking.

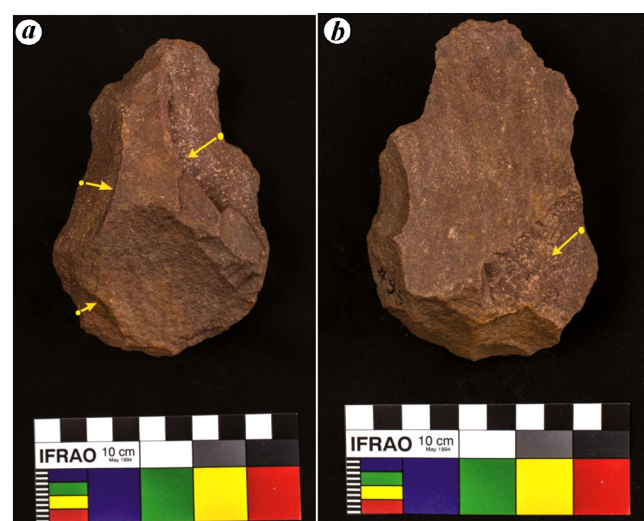


Figure 4. Handaxe recycled with random flaking (*a*) Dorsal view and (*b*) Ventral view.

suggests that they were possibly used for some sort of symbolic purpose. The specimens of this category having random flaking at the recycled stage, contained three random flakes on each of the 21 artefacts. Rest 24 specimens had random flaking frequency of 4–6 flake scars on 9 specimens, 7–9 flake scars on 11 specimens, and more than 10 flake scars on 4 specimens.

Another interesting feature that has been noticed as part of the recycling activity study based on degree of patina is that, 58 and 4 artefacts showed one and double cycle of recycling activity respectively, out of the total collection identified on the basis of double and triple patina.

Further, percentage of surface removal on each of the artefacts at the recycling stage is significant. It is interesting to note that the first category of recycling activity, i.e. retouching type, constitutes almost 7 out of 17 artefacts on which 10% removal of flakes can be noticed (Table 1). Likewise, the second category of random removal of flakes as part of the recycling activity exhibits 10% removal of flakes that constitutes 14 out of 41 artefacts (Table 2). Another noteworthy feature is that four of the artefacts of the second category (45 nos) show two levels of recycling, which is unusual.

Table 1. Frequency of artefacts vis-à-vis percentage of flake scar area on artefact surface (first category)

| Percentage of flake scar area on the artefact surface (first category) | Total number of artefacts |
|--|---------------------------|
| 00–10 | 7 |
| 11–15 | 3 |
| 16–20 | 1 |
| 21–25 | – |
| 26–30 | 3 |
| 31–35 | 1 |
| 36–40 | 2 |
| Total | 17 |

Table 2. Frequency of artefacts vis-à-vis percentage of flake scar area on artefact surface (second category)

| Percentage of flake scar area on the artefact surface (second category) | Total number of artefacts |
|---|---------------------------|
| 00–10 | 14 |
| 11–15 | 6 |
| 16–20 | 5 |
| 21–25 | 3 |
| 26–30 | 3 |
| 31–35 | 4 |
| 36–40 | 3 |
| 41–45 | – |
| 46–50 | 1 |
| 51–55 | 1 |
| 56–60 | 1 |
| Total | 41 |

Both the features, i.e. random manner of working on most of the artefacts at the recycling stage without any intention to bring back the discarded artefacts to actual use, and limited recycling work on finished artefact (14 nos) of the earlier period (ancestors) can be attributed to some restriction or taboo on recycling activity on the artefacts among the Acheulian hominins in Damdongri area. In the light of the absence of recycled artefacts from the Palaeolithic level, particularly the Acheulian horizon prompts us to hypothesize that recycling of artefacts belonging to the ancestors of any given period during the Palaeolithic was probably a ‘taboo’. Further, the percentage of flake removal during recycling stage suggests a casual attitude towards recycling activity without any intention to bring the recycled artefacts to further use, thus supporting the view that recycling of artefacts for day-to-day use was taboo among the Acheulian hominin of Damdongri.

As it has been rightly mentioned, ‘In India, recycling evidence in prehistoric assemblage may not be so lacking, but has probably remained unnoticed in archaeological interpretations so far’²⁹. This is true with the present discovery of earliest reporting of recycled lithic artefacts belonging to the Acheulian cultural phase from Damdongri, MP. It is noteworthy in this context that though such observations of recycled artefacts are difficult to notice in the lithic assemblage; it is certainly not impossible as has been studied in various parts of the world. Surprisingly, in India, where prehistoric studies have a long history of 150 years, one cannot simply argue that none of the scholars working in the field could recognize the recycled artefacts belonging to the Acheulian cultural phase in the country.

Based on the observations made at Damdongri and the available research in the field, we can conclude that definitely there is a scarcity of recycled artefacts during the Acheulian cultural phase in the country. In contrast, it is argued by archaeologists that recycling was part of human behaviour in the past, as it was a paramount necessity. The retouching of damaged tools was done to bring them back to use or sometimes tools of an earlier period was used as blank for fabrication of a new tool. If these activities were done in one generation or within a couple of generations in an area without considerable time gap, then it becomes difficult to identify in archaeological context on the basis of degree of patination, as this would remain almost the same. However, recycling activity with considerable gap, i.e. recycling of artefacts belonging to the ancestor of one generation can certainly be identified based on intensity of patina. Somehow the frequency of recycled working on artefacts belonging to the ancestors of one generation of Acheulian Hominin is so limited that these have never been noticed by the archaeologists in India, the reasons of which have neither been questioned nor explained.

Further, though recycled artefacts have been noticed in the present site at Damdongri, the pattern of recycling

activities clearly suggests that the intention at Damdongri was never to bring back the damaged and discarded artefacts to use again. This limited evidence of recycled activity of symbolic nature at Damdongri has been interpreted as a symbolic offering as an indication of certain belief³².

We therefore hypothesize that probably reworking on the artefacts of ancestors was 'taboo' in the past, at least during the Acheulian period. The early hominins could very well recognize their own workings of artefacts and also could identify/differentiate the artefacts made during their life time or their predecessors from the artefacts made by their ancestors. Early hominins could have recognized the artefacts of their ancestors from the workings (style/technique) and patination. It is emphasized here that if recycling activities were a continuous process and done throughout the Palaeolithic period in the area, then one must obtain a large number of recycled artefacts with differential patination. In fact, such examples are very few in any Acheulian site anywhere in the world. There are many large Acheulian sites with high density of artefacts that continued for a long duration. In spite of this, archaeologists do not find substantial number of recycled artefacts with differential patination.

Almost absence of recycled artefacts in Acheulian lithic assemblage could be interpreted as some sort of belief among the Acheulian Hominin not to recycle the tools manufactured by their ancestors as a symbol of respect and hence considered as 'taboo'. Therefore, we do not get substantial number of such artefacts in any Acheulian assemblage. Early hominins could recognize and differentiate what belonged to them and what belonged to their ancestors.

Therefore, the present study is significant from the point of view of Damdongri being the first such evidence of recycled lithic artefacts from any Acheulian site in India. Besides, the limited occurrence of such activities during the Acheulian has been explained considering the recycling of ancestral property, i.e. lithic artefacts as 'taboo'. However, it may be concluded that the observations made at Damdongri need to be evaluated in future in the light of more such studies carried out for prehistoric sites in other parts of India.

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