Recent Research on the Upper Palaeolithic Phase in India

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Recent discoveries of artifactual assemblages based on blade-tool technology, occurring in post-Middle Palaeolithic and pre-Mesolithic contexts in different parts of India, are filling the gap in the Indian Stone Age sequence. These lithic industries, along with the bone tools obtained from the Kurnool caves, the faunal associations at some sites, and the available radiocarbon dates, are now seen beyond doubt to represent the Upper Palaeolithic *period.*

Introduction

During the first quarter of this century there were sporadic discoveries of blade artifacts in some parts of the Indian subcontinent, but not much was known regarding their chronological, typotechnological and cultural implications. L. A. Cammiade and M. C. Burkitt, by their pioneering studies of the riverine secondary sites on the SE coast, proposed a four-fold lithic sequence in a stratigraphic, technological, and palaeoclimatological context.[1] They labelled the four lithic industries Series I-IV, which are synonymous with the Lower, Middle, and Upper Palaeolithic, and Mesolithic, respectively. Moreover, the excavations of Billa Surgum caves (Kurnool district, Andhra Pradesh) as early as 1884-1885 by Robert Bruce Foote and his son Henry Bruce Foote, had already yielded bone implements in association with Late Pleistocene fauna.[2] Some of these bone implements (which were subsequently lost), according to Robert Bruce Foote, recalled Magdalenian types.

Additional Abbreviations:
RGSI: Records of the Geological Survey of India.
AI: Ancient India.
IA: Indian Antiquary.
IAR: Indian Archaeology—A Review.

Some of the later researchers, especially D. H. Gordon,[3] took into account the stratified evidence recorded by (1) K. R. U. Todd in 1939 from Khandivli and Marve, close to Bombay;[4] (2) Cammiade and Burkitt on the southeast coast;[5] and (3) A. C. Carlyle by his excavations of Morhana Pahar cave shelter in Madhya Pradesh during the years 1880-1881;[6] and observed that ". . . in India as elsewhere, there was a late Upper Palaeolithic blade and burin industry corresponding to late Magdalenian, followed in succession by larger less geometric and smaller non-geometric microliths."

Subsequently, H. D. Sankalia discovered an assemblage with some Upper Palaeolithic traits on the river Pravara in Maharashtra[7] and, with his exhaustive studies of the regional lithic sequences, he has argued for the recognition of an Upper Palaeolithic phase in this country.[8] Another noteworthy discovery was that of a blade and burin industry from the site of Salvadgi (Bijapur district, Karnataka), which was described by

1. L. A. Cammiade and M. C. Burkitt, "Fresh Light on the Stone Age in Southeast India," *Antiquity* 4 (1930) 327-39.

2. R. B. Foote, "Rough Notes on Billa Surgum and Other Caves in the Kurnool District,"*RGSI* 27:2 (1884a) 27-34; idem, "Mr. H. B. Foote's Work at the Billa Surgun Caves," *RGSI* 27:4 (1884b) 200-208.; idem, "Notes on the Results of Mr. H. B. Foote's Further Excavations in the Billa Surgum Caves," *RGSI* 28:4 (1885) 227-35.

3. D. H. Gordon, "The Stone Industries of the Holocene in India and Pakistan," *AI* 6 (1950) 64-90.

4. K. R. U. Todd, "Palaeolithic Industries of Bombay," *JRAI* 79:1 (1939) 257-72.

5. Cammiade and Burkitt, op. cit. (in note 1).

6. The work of Carlleyle is cited in J. A. Brown, "On Some Highly Specialized form of Stone Implements found in Asia, North Africa and Europe," *JRAI* 28 (1889) 134-39.

7. H. D. Sankalia, "Animal Fossils and Palaeolithic Industries from the Pravara Basin at Nevasa, District Ahmednagar," *AI* 12 (1956) 35-52.

8. See the discussion on terminology in D. P. Agrawal and A. Ghosh (eds.), *Radiocarbon and Indian Archaeology* (Bombay 1973) 509; H. D. Sankalia, *Prehistory and Protohistory of India and Pakistan* (Poona 1974) 207-30.

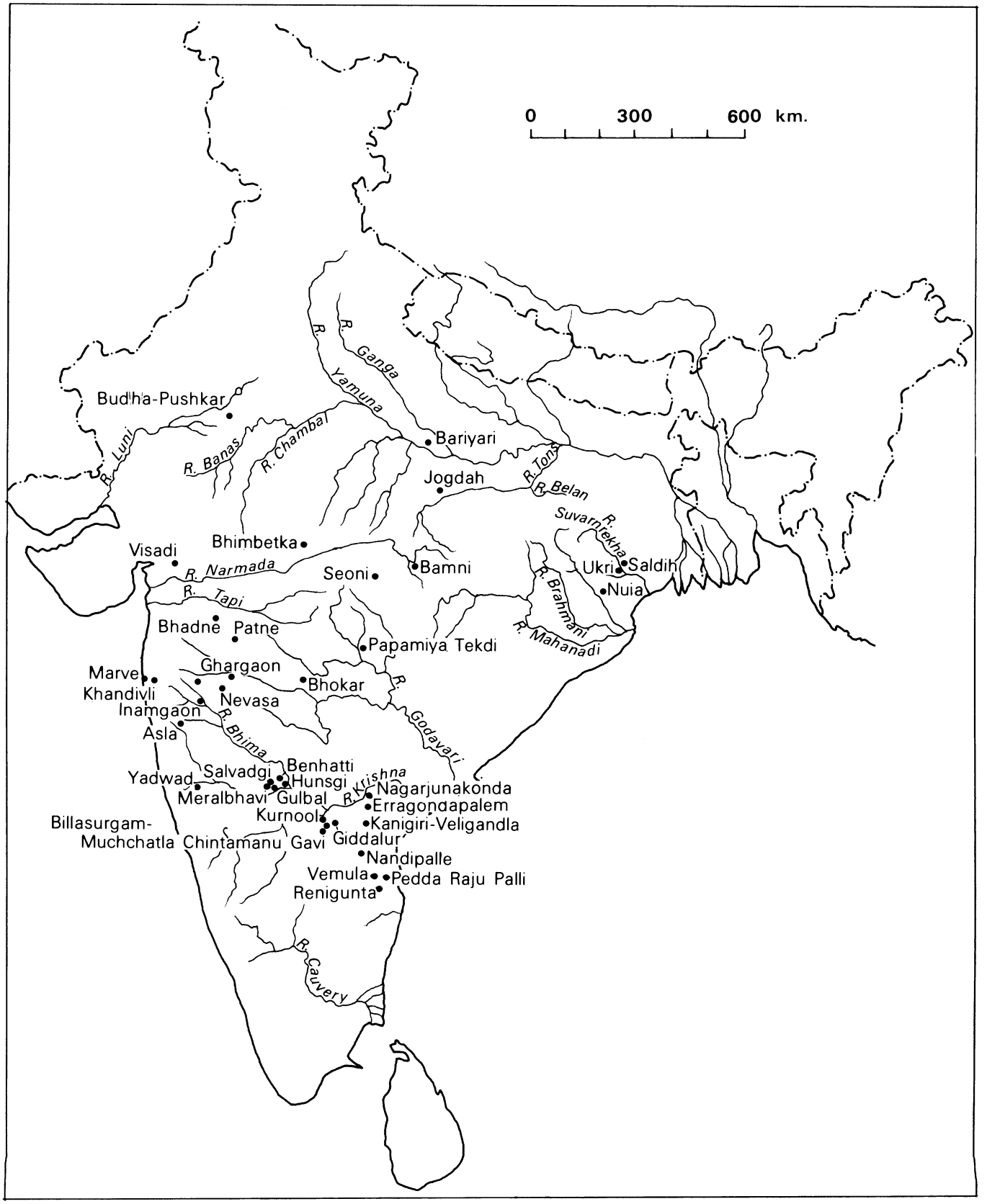

Figure 1. Map showing important Upper Palaeolithic sites in India.

M. Seshadri.[9] As this industry was found stratigraphically succeeding a Levalloisian industry, Seshadri wondered whether or not this could indicate the development of Upper Palaeolithic from the Levalloisian. And a few reports of artifactual occurrences, variously referred to by their discoverers as flake-blade, blade tool, blade and burin, Upper Palaeolithic and Upper Palaeolithic-like, have been published in *Indian Archaeology—A Review (1959-60 to 1971-72)*, an annual bulletin of the Archaeological Survey of India.

During the past decade, planned investigations have been undertaken to examine the archaeological status of some of the above mentioned assemblages, including the bone tools from the Kurnool caves; to excavate open-air and cave sites; and to determine the technological, ecological, and chronological parameters. These studies, on the one hand, are corroborating the findings of the previous researchers and, on the other, are proving that there is distinctive evidence indicating an Upper Palaeolithic phase (see footnote 16) in this country (FIG. 1).

The Lithic Industries

At the outset, it is imperative to note that an appraisal of the lithic industries suffers from two basic snags that exist in the available data. First, most of these assemblages are reported from riverine secondary sites. Second, qualitative and quantitative details of the artifactual occurrences are not provided in many cases. These deficiencies notwithstanding, there are fortunately a few sites with more definitive data, which help to suggest a reasonable taxonomic framework for the overall lithic evidence. Thus, as shall be demonstrated below, the Indian Upper Palaeolithic can be divided into three major techno-typological groupings: (1) flake-blade industries; (2) blade-tool industries; and (3) blade and burin industries, although it is difficult to recognize a succession of regional subcultural phases as elsewhere in the Old World.

Flake-Blade Industries

These industries are characterized by relatively broad blades suggesting a crude stage of blade-tool technology. Scrapers, points, and borers, made mostly on flakes and flake-blades, are the common types, but scrapers form the predominant element. The other forms, although less common, are blades, knives, burins, and small choppers. Flake-blade industries are better known from the Singhbhum district in Bihar where A. K. Ghosh has worked out the details from about 15 open-air, river valley secondary sites.[10] The features of flake-blade industries as reported by their discoverers are given in Table 1.

Blade-Tool Industries

These industries constitute large to small sized blades; backed blade tools; and scrapers, points, awls, and burins on flakes, flake-blades, and blades. Among the points on flakes, a couple of well finished shouldered points found at the site of Bhokar in Maharashtra (from where a sample collection from a chipping floor has been made) are noteworthy. The important feature of the blade-tool assemblages is the regularization of blade-tool technology, as they are marked by a significant increase (in relation to the flake-blade grouping) in the occurrence of standardised blades and retouched blade tools, especially the scraper variants. All the same, the occurrence of backed blade variants (like the backed points) and burins is minimal. Assemblages in this category have a wider geographical distribution and are known from several open-air riverine sites in the states of Karnataka, Maharashtra[11] and Uttar Pradesh, and both open-air and cave sites in Andhra Pradesh and Madhya Pradesh. The evidence recorded from factory sites in Karnataka[12] is by far the best known for this grouping, and a wealth of information should become available with the completion of G. R. Sharma's work in the Belan valley (Allahabad district, Uttar Pradesh), V. N. Misra's work in the cave sites of Bhimbetka (Raisen district, Madhya Pradesh), and that of R. V. Joshi at Bhokar (Nanded district, Maharashtra). The available information on this grouping is provided in Table 2.

Blade and Burin Industries

The distinctive feature of these industries is the predominant blade, backed blade, and burin element, though tools on flakes and flake-blades also form a

9. M. Seshadri, "Stone Age Tools from Salvadgi, Bijapur District, Mysore State," *Journal of the University of Mysore* 25:2 (1962) 1-5.

10. A. K. Ghosh, "The Palaeolithic Cultures of Singhbhum," *TAPhSoc* 60:1 (New Series 1970) 1-68.

11. Preliminary investigations of S. N. Rajaguru (personal communication) at Asla and Ghargaon, situated in the valleys of the Krishna and Pravara (in Maharashtra) respectively, have disclosed blade artifacts. At Ghargaon especially, the blade artifacts are found associated with faunal remains in riverine sediments succeeding the Middle Palaeolithic. These two sites, shown in FIG. 1, assume some significance as the radiocarbon dates (one from each site) suggest ca. 8000 B.C. for the younger sediments of the ancient alluvium.

12. K. Paddayya, "The Blade Tool Industry of Shorapur Doab," *IA* 4:1-4 (1970) 165-90.

Table 1. Flake-blade Industry.

STATE, District, *Site(s)*	*Mode of occurrence/features*
ASSAM. Garo Hill. *Selbalgiri and Watri Abri.*	Surface sites on the terraces of Rongram river. Flake and blade assemblage with a high frequency of blade-flakes at Watri Abri.[1]
BIHAR. Palmau. *Prattappur and Marvania.*	Surface sites in the north Koel valley. Upper Palaeolithic blades.[2]
BIHAR. Palmau. *Dhekulia.*	Flake-blade assemblage in a stratigraphical context. Scrapers, points, blades, knives, burins, awls, cores and waste flakes. Porcilinite rock.[3]
BIHAR. Singhbhum. *Fifteen sites in the Chandil, Sini, Ghatsila, and Jamda areas of these, the sites of Saldih, Ukri and Nuia are shown in FIG. 1).*	In the upper clay deposits of the stratified river sections of the Subarnarekha (Chandil, Ghatsil and Sini areas) and the Sanjay (Sini area) valleys, succeeding a flake industry (Middle Palaeolithic). Flake-blade industry: choppers (11.91%), scrapers (53.32%), points (11.91%), blades (9.05%), knives (1.91%), borers (1.43%), burins (0.95%) and cores (9.52%). Agate, jasper and other siliceous rocks.[4]

1. T. C. Sharma, "Recent Archaeological Discoveries in North-Eastern India," *Puratattva* 7 (1974) 17-19.

2. Sitaram Roy et al., in *IAR* (1959-60) 12 & 14, Pl. VIIB.

3. A. K. Ghosh et al., in *IAR* (1965-66) 8.

4. A. K. Ghosh, "The Palaeolithic Cultures of Singhbhum," *TAPhSoc* 60:1 (New Series 1970) 1-68.

component. The evidence recorded from primary open-air riverine sites around Renigunta is the best known to date on this grouping (FIGS. 2-5).[13] As is known from the Renigunta sites, backed blade tools (points, "pen knives," a few macro-lunates, macro-triangles, and macro-trapezes); scrapers on flakes, flake-blades, and blades; typical burins; and well defined blades make a significant percentage. The other forms, excluding the waste debitage, include unifacial points, a single tanged point, choppers, bored stones,[14] and anvils. With the recent investigations (which are still in progress) by other scholars[15] in the adjoining districts of Cuddapah,

13. M. L. K. Murty, "Blade and Burin Industries near Renigunta on the Southeast Coast of India," *ProcPs* 34 (1968) 83-101; idem, "Blade and Burin and Late Stone Age Industries around Renigunta, Chittoor District," *IA* 4:1-4 (1970) 106-128. Examples from the blade and burin industry alone are illustrated here. As it is felt desirable to show the range of artifact forms from a single site, rather than at random from different sites, specimens from only Renigunta are illustrated in FIGS. 2-5.

14. The association of bored stones with the blade and burin industry at Renigunta cannot change the Upper Palaeolithic nature of this industry. Bored stones do not necessarily form a component of the Neolithic or early Holocene microlithic cultures. The excavations at Matupi cave, Zaïre, for instance, brought to light a bored stone fragment in microlithic levels ascribed to the oldest microlithic sequence, with radiocarbon dates of ca. 20,000 B.C.; see F. van Noten, "Excavations at Matupi Cave," *Antiquity* 51:201 (1977) 35-40.

15. D. Ramalinga Raju (University of Poona, Poona) and V. V. Madhusudhana Rao (Nagarjuna University, Guntur) working for their doctoral dissertations on Cuddapah and Prakasam districts, respectively, discovered interesting sites in the Gunjan valley (Patagunjan river) and Paleru basin. I am thankful to them for providing me this information.

Table 2. Blade-tool Industry.

STATE. District. *Site(s).*	*Mode of occurrence/ features*
ANDHRA PRADESH. Cuddapah. *Vemula.*	Surficial occurrence. Tools on flake and flake-blade, predominantly scraper variants, simple and retouched blades, a few tools with burin edge, flakes, and prismatic and flake cores. Chert and chalcedony.[1]
ANDHRA PRADESH. Kurnool. *Betamcherla.*	Open-air findspots in the cave areas. Scrapers (7.33%), chisels on nodules (3.33%), perforators (0.70%); burins (2.00%), flakes (28.66%), blades (34.66%), nodules (10.66%), cores (9.33%) and chips (3.33%). Chert, quartzite, limestone and sandstone.[2]
ANDHRA PRADESH. Kurnool. *Muchchatla Chintamanu Gavi, a cave site near Betamcherla.*	In stratified cave sediments along with a bone tool industry and Late Pleistocene fauna. Flakes (26.00%), blades (41.35%), cores (5.45%) and chips (27.20%). Limestone, cherty limestone and compact shale.[3]
KARNATAKA. Bijapur and Gulbarga. *Salvadgi, Meralbhavi, Gulbal, Benhatti and Hunsgi.*	Workshop sites on surface; at Salvadgi, the tools occur up to a depth of 60 cm in a matrix of black sticky clay. The artifact forms at Salvadgi and Meralbhavi comprise: finished tools—retouched blade tools (51.52%), backed blades (3.84%), burins (8.39%), simple points (14.12%), tanged points (2.29%), borers (6.11%); misc. types (13.73%); and simple artifacts—blades (62.02%), blade sections (15.89%), core flakes (6.91%), core rejuvenation flakes (3.16%), fluted cores (9.48%), flakes (0.53%) and rejects (1.61%). Chert.[4]
KARNATAKA. Belgaum. *Yadwada.*	Surficial occurrence. Scrapers on flakes and blades, points, simple blades, a few backed blades, flakes, flake and blade cores. Chert.[5]
MADHYA PRADESH. Mandla. *Bamni.*	In a stratified context on the river Banjer, a tributary of the Narmada, preceding the Mesolithic. Predominantly scrapers, points, and burins. Jasper, chert, and flint.[6]

1. K. Thimma Reddy, "Vemula Industry in the Cuddapah Basin," *IA* 4:1-4 (1970) 227-34.

2. M. L. K. Murty and K. Thimma Reddy, "The Significance of Lithic Finds in the Cave Areas of Kurnool," *Asian Perspectives* 18:2 (1976) 214-26.

3. M. L. K. Murty, "A Late Pleistocene Cave Site in Southern India," *ProcPhilSoc* 118:2 (1974) 196-230.

4. K. Paddayya, "The Blade Tool Industry of Shorapur Doab," *IA* 4:1-4 (1970) 165-90.

5. R. S. Pappu, in *IAR* (1971-72) 37; and personal communication.

6. D. Sen, in *IAR* (1960-61) 60; A. K. Ghosh, "A New Lithic Site in Mandla District," *The Eastern Anthropologist* 14:3 (1961) 209-15.

Table 2. (Continued).

STATE. District. *Site(s).*	*Mode of occurrence/ features*
MADHYA PRADESH. Raisen. *Cave IIIF 23, Bhimbetka.*	In a stratified sequence ranging from Acheulian to Mesolithic, succeeding the Middle Palaeolithic and preceding Mesolithic. Scrapers (especially end scrapers being most typical), blades, burins, points, and denticulate tools. Chiefly quartzite.[7]
MADHYA PRADESH. Seoni. *Alonia, Chhapara and Bandol (all close to Seoni).*	Associated with the gravel II of the upper Wainganga valley, succeeding Middle Palaeolithic (gravel I). Wainganga B industry: scrapers, points (including tanged and shouldered), borers, thick blades, tranchets, and burins. Chert of varied colours.[8]
MAHARASHTRA. Ahmednagar. *Nevasa.*	Surficial occurrence that may correspond to gravel III (younger than Middle Palaeolithic). Blades, flake tools, and burins. Chalcedony.[9]
MAHARASHTRA. Ahmednagar. *Dhavalpuri.*	Surficial occurrence of workshop centres. Scrapers, flake-blades, blades, a few backed blades, burins, borers, cores, and debitage. Chalcedony, chert and agate.[10]
MAHARASHTRA. Chanda. *Papamiya-Tekdi.*	On the surface of the topmost gravel (yielding Middle Palaeolithic) of the Jharpat nala, a tributary of the Wardha. Blades, scrapers, burins, and awls. Carnelian, agate, chalcedony, jasper, and vein quartz.[11]
MAHARASHTRA. Greater Bombay. *Khandivli and Marve.*	A blade industry on the top of middle clay comprising cores, blades and scrapers. On the top of the overlying upper gravel occur factory floors of blade and burin industry. This is succeeded by a brown clay which had yielded a developed blade and burin industry comprising polyhedrons, angle and parrot beak burins, scrapers, borers, and blades. A microlithic industry occurs on the surface.[12]

7. V. N. Misra, Y. Mathpal and M. Nagar, *Bhimbetka—Prehistoric Man and his Art in Central India* (Exhibition Souvenir, Poona 1977).

8. R. V. Joshi, "Middle Stone Age in India," *Atti del VI Congresso Internazionale dell Scienze Preistoriche e Protostoriche* V-VIII (1966) 276-80.

9. H. D. Sankalia, "Animal Fossils and Palaeolithic Industries from the Pravara Basin at Nevasa, District Ahmednagar," *AI* 12 (1956) 35-52.

10. H. D. Sankalia, *Prehistory and Protohistory of India and Pakistan* (Poona 1974) 207-30.

11. L. K. Srinivasan, in *IAR* (1960-61) 22-24.

12. K. R. U. Todd, "Palaeolithic Industries of Bombay," *JRAI* 79:1 (1939) 257-72. This is included here under "blade tool industry" since Sankalia (personal communication) believes that the burins and backed blade types are not very typical.

Table 2. (Continued).

STATE. District. *Site(s).*	*Mode of occurrence/ features*
MAHARASHTRA. Nanded. *Bhokar.*	Workshop centres on hill slopes. Scrapers, burins, blades, borers, points, knives. Chert, jasper, chalcedony, and agate.[13]
MAHARASHTRA. Pune. *Inamgaon.*	In a gravel horizon on the river Ghod. Scrapers, blades, points, and fluted cores. Chalcedony.[14]
RAJASTHAN. Ajmer. *Budh Pushkar lake.*	Factory floors on surfaces I and II of the sand dunes overlooking the lake. Blades, flakes, burins, scrapers, composite points, and barbs, awls, blade cores, flake cores, and blade core tablets. Quartz, quartzite, and crypto-crystalline silica.[15]
UTTAR PRADESH. Allahabad. *Belan Valley.*	In stratified sections of the river Belan and in three contexts. Layer 5: Middle Palaeolithic type scrapers (43.00%) and Upper Palaeolithic blades (55.00%); Layer 4: exclusively blade industry; and Layer 3: Upper Palaeolithic type blades (27.00%) and non-geometric microliths (73.00%). Chert and other fine grained materials; quarzite artifacts (6.00%) are also present in Layer 5.[16]
UTTAR PRADESH. Banda. *Bariyari.*	In stratified sections of Terrace 2 of a tributary of the river Yamuna. Flakes and flake tools of the Levallois technique and tools on larger blades showing Upper Palaeolithic traits. Quartzite.[17]
UTTAR PRADESH. Allahabad, Banda and Mirjapur. *Near Jogdah bridge and Khajuri dam on the river Son; Amilia Kachchha Ka Nullah and Khajuri Nullah of the Belan river; and Lohand Nullah of the Seoti river.*	Near Jogdah bridge, in the uncemented younger gravels preceded and succeeded respectively by Middle Palaeolithic and Mesolithic tool bearing clay deposits; on surface as well as in the river sections at other places. Large number of broad blades distinct from the Middle Palaeolithic and Mesolithic. Chert.[18]

13. R. V. Joshi and R. S. Pappy, "An Upper Palaeolithic Factory Site from Central Godavari Basin, Maharashtra State," (manuscript).

14. S. A. Sali, "Upper Palaeolithic Research Since Independence," *Bulletin of the Deccan College Research Institute* 34:1-4 (1974) 147-60; the reference to Inamgaon appears on p. 154.

15. B. Allchin, K. T. M. Hegde and A. Goudie, "Prehistory and Environmental Change in Western India: A Note on the Budh Pushkar Basin, Rajasthan," *Man* 7:4 (1972) 541-64; B. Allchin and A. Goudie, "Pushkar: Prehistory and Climatic Change in Western India," *WA* 5:3 (1974) 358-68.

16. G. R. Sharma, *Explorations in Allahabad, Mirjapur and Sahajahanpur Districts* (unpublished report circulated in 1967).

17. G. R. Sharma, in *IAR* (1955-56) 4, Pl. IB.

18. G. R. Sharma et al., in *IAR* (1968-69) 33-34.

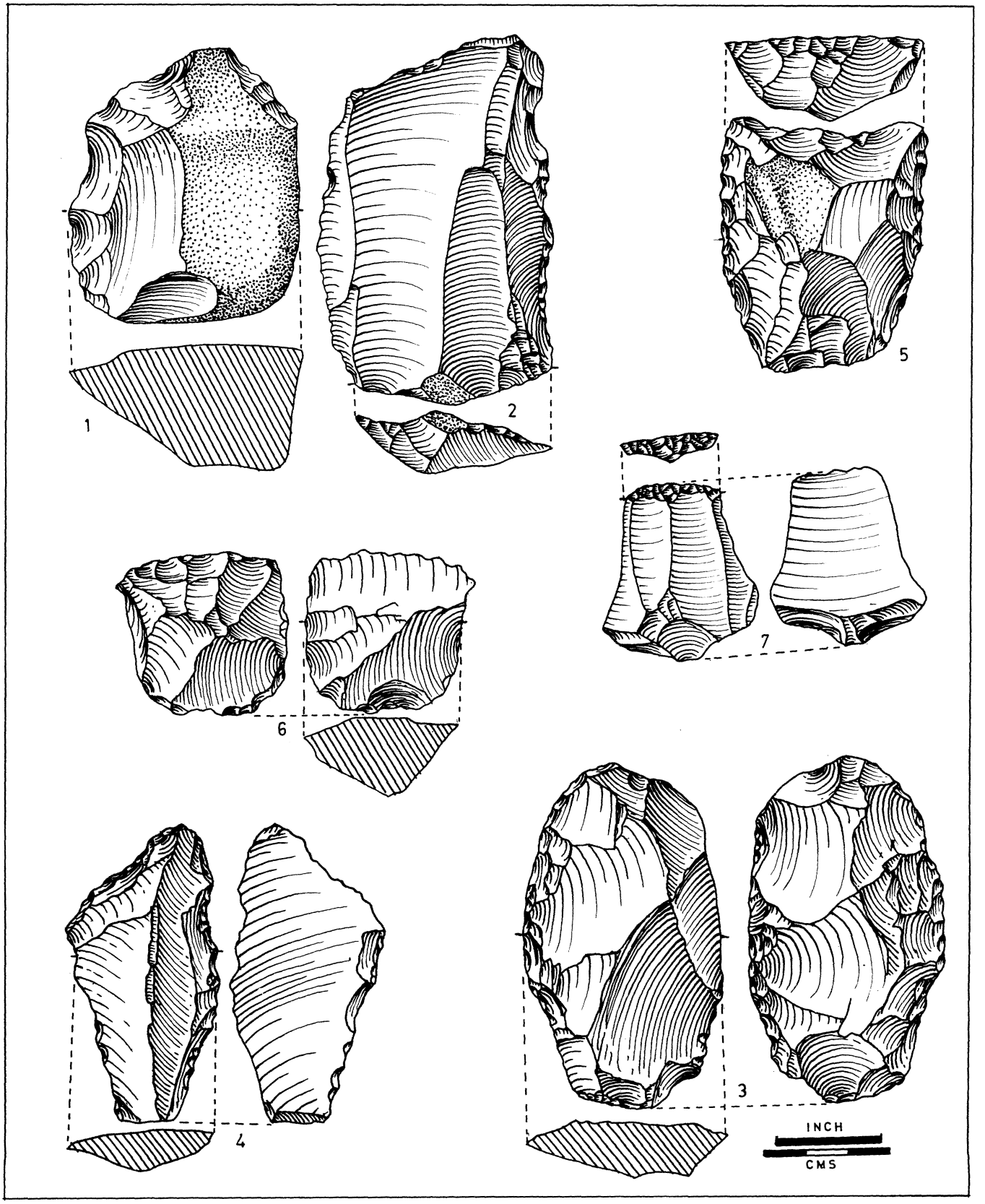

Figure 2. Artifacts of blade and burin industry from Renigunta. 1, chopper; 2-7, scrapers.

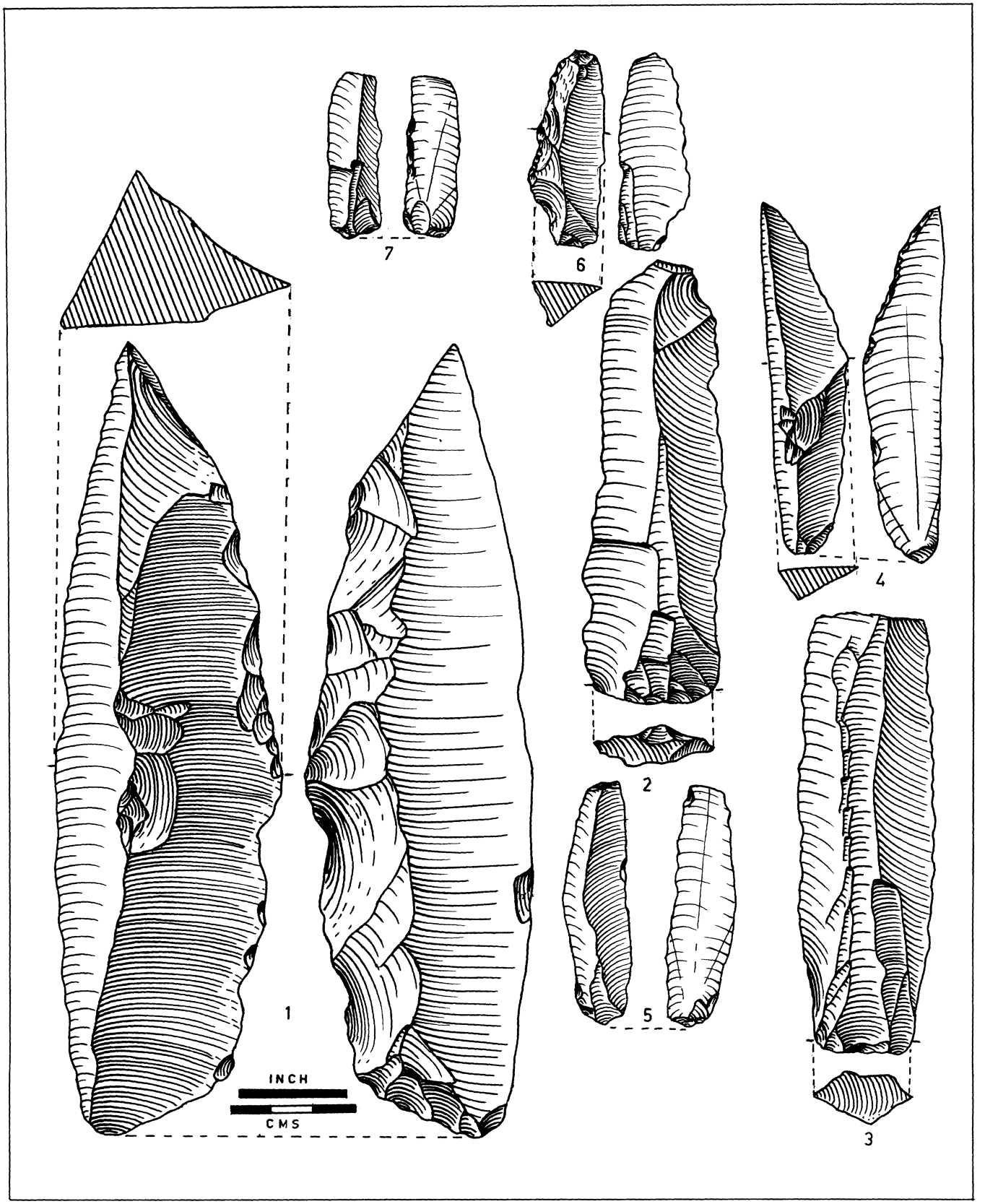

Figure 3. Artifacts of blade and burin industry from Renigunta. 1, 4, 6, retouched blades; 2, 3, 5, 7, simple blades.

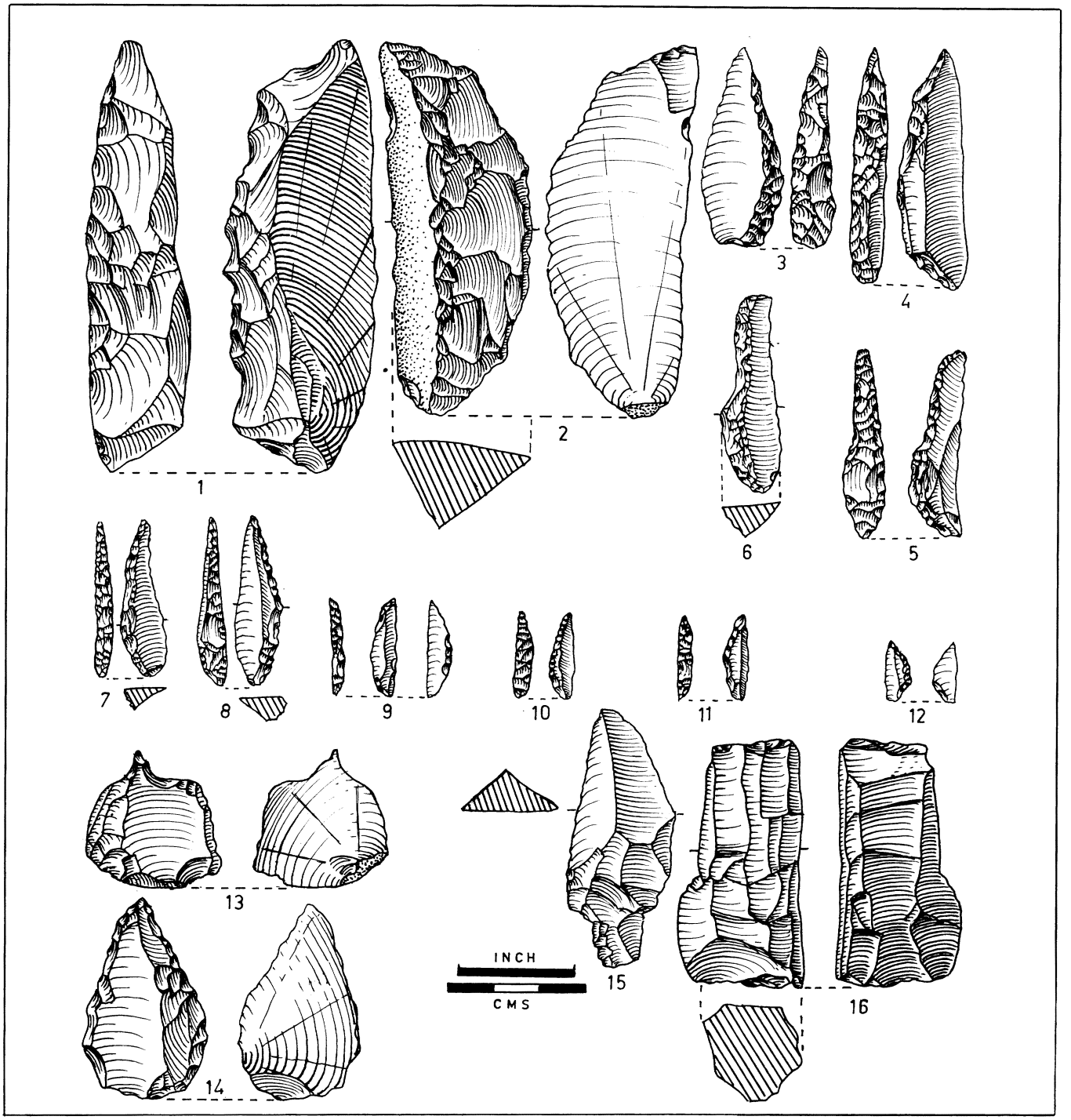

Figure 4. Artifacts of blade and burin industry from Renigunta. 1-2, backed knives; 3-12, backed blade and bladelet variants; 13, awl; 14, unifacial point; 15, tanged point; 16, blade core.

Prakasam, and Nellore, there are indications that the blade and burin assemblages form a distinct techno-typological entity on the SE coast of India. Striking features observable among these industries (in relation to each other) are the following: (1) minimum representation of the backed blade and burin element at Erragondapalem and Veligandla (Prakasam dist.); (2) a predominant representation of the backed blade and burin element at Renigunta (Chittoor dist.); and (3) a maximum representation of the backed blade element,

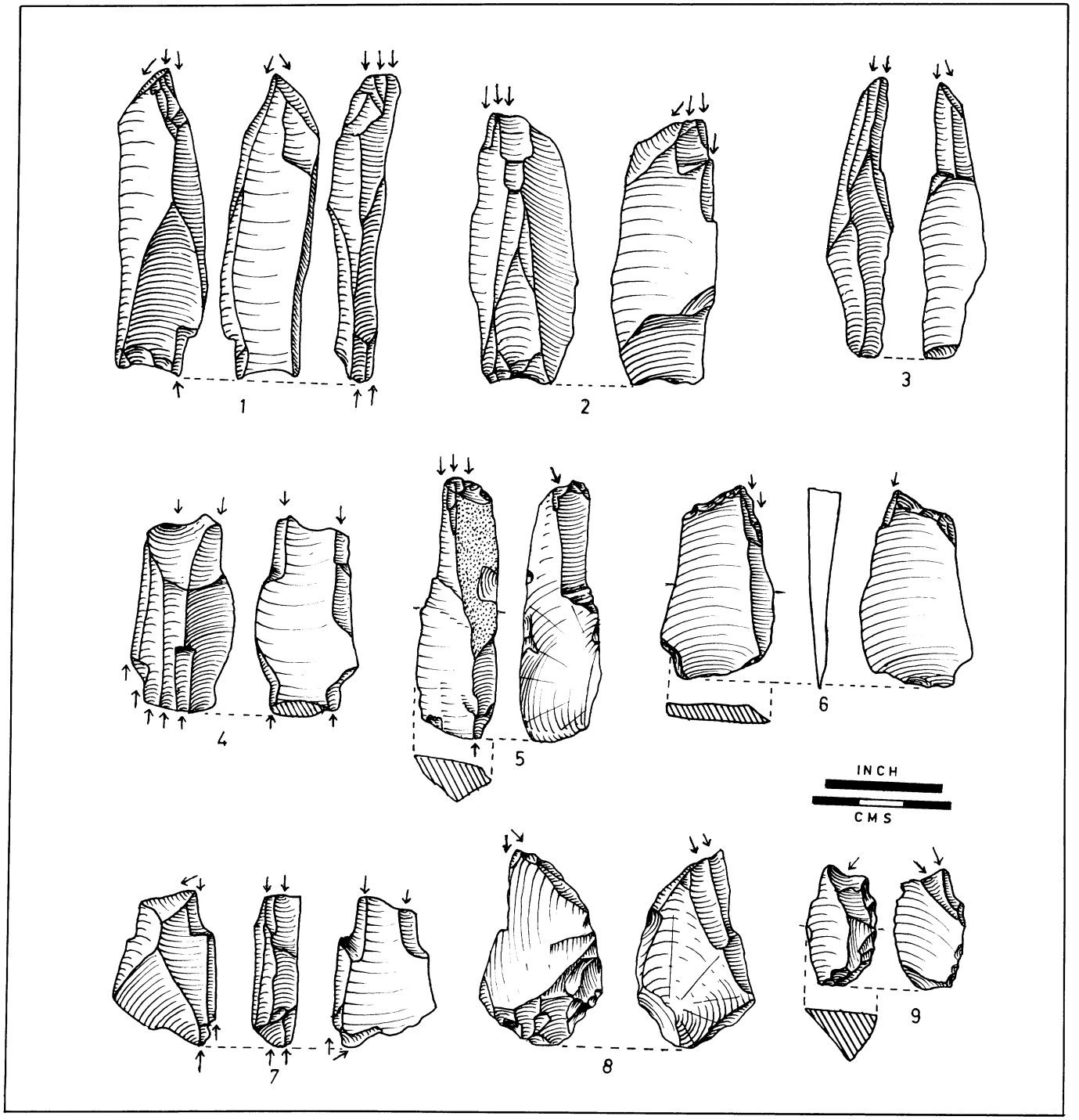

Figure 5. Artifacts of blade and burin industry from Renigunta. 1-9, burins.

with an increasing tendency towards microlithisation, and with the burin element becoming less marked at Rachapalli, better known as Pedda Raju Palli (Cuddapah district). These characteristics indicate localized variants in the blade and burin complex in this geographical zone traversed by the Eastern Hill ranges. Another noteworthy feature is that in all these industries, excepting at Pedda Raju Palli in the Gunjan valley (on the right bank of the Patagunjan river), the chief raw material is fine grained quartzite. In the Gun-

jan valley, lydianite and quartzite form the two major raw materials. The southernmost limit of this blade and burin complex extends to the Korttalair valley in Tamil Nadu. The tendency towards microlithisation in the artifact forms at Pedda Raju Palli, which might imply a younger date, may ultimately help (when more data becomes available) in understanding the origins of Mesolithic in this culture area. The available details on this grouping are furnished in Table 3.

Diagnostic Traits of the Lithic Industries

To clarify the diagnostic traits of the lithic industries under discussion here, a comparison with the Indian Middle and Late Stone Ages (referred to here as Middle Palaeolithic and Mesolithic)[16] may be helpful.

The Indian Middle Palaeolithic lithic industry, as elsewhere, is basically an expression of the flake element. Nonetheless, implements on cores, flake-blades, and occassional blades do occur, though infrequently. The flake blanks were those detached by direct percussion either from irregular cores or Levallois cores and none of the finished forms discloses the use of blunting methods in secondary retouch. Moreover, the typological attributes of the Middle Palaeolithic do not indicate their possible use as composite tools.

The flake-blade, blade-tool, and blade and burin industries are entirely different. They do comprise the flake element but are distinguished by the development of blade-tool technology. Although blades are found in the Middle Palaeolithic levels (for that matter they are known also from Acheulian levels at sites like Bhimbetka in Madhya Pradesh and Gudiyam cave in Tamil Nadu), the fact that their occurrence in these levels is strictly at random cannot be overemphasized. There is also no evidence that finished forms on blade blanks, if any, in the Middle Palaeolithic and Acheulian represent a significant technological trait. What is more, the functional prerequisites of some of the components of flake-blade, blade-tool, and blade and burin groupings presuppose the making of composite tools, which apparently was not the case in the preceding phases. Coming to the temporal aspect, there is unmistakable evidence in different parts of the country that these industries postdate the Middle Palaeolithic and predate the Mesolithic (see below, under "Chronology"). All these features thus qualify the flake-blade, blade-tool, and blade and burin industries as a different technological stage with regional variations, distinct from the Middle Palaeolithic.

The distinctive qualities of these industries can further be highlighted by comparing them with the Indian Mesolithic. The overall types of the Mesolithic (both non-geometric and geometric), which are purely of microlithic composition, are parallel-sided blades; backed-blade variants: "pen knives," lunates, triangles, (scalene, isosceles, equilateral, etc.), trapezes; scrapers: side, hollow, steep, round, thumb-nail, etc.; burins; and occasional choppers; unifacial, bifacial, and tanged points.[17] But the tool types of most common occurrence in all regions are backed points, lunates, and the scraper variants. As the Upper Palaeolithic and Mesolithic are based on fluted-core technology (which has attained more technological perfection in the latter) and in the use of blunting as one of the methods of secondary retouch, they display parallels in the blade and backed-blade element (especially the backed points). But no precise morphological analogies in the scraper variants and other forms, including burins, can be discerned. The parallels between the Upper Palaeolithic and Mesolithic, at any rate, are more of a technological nature and the great difference in the artifactual size of the respective industries is a striking feature. For example, at Renigunta[18] artifacts in the length-index group of 11-30 mm. represent 23.95% of the blade and burin industry, whereas in the Mesolithic they amount to 89.23%; and those belonging to the 31-60 mm. length-index group constitute 66.85% of the blade and burin industry, but in the Mesolithic they are only 10.67%. In the Mesolithic there are no artifact forms measuring greater than 60 mm., whereas the maximum length for the blade and burin industry is 180 mm. The variation in the length index between the blade-tool and Mesolithic industries at sites in the Bijapur district, Karnataka, is equally striking.[19]

16. In the first conference on Asian Archaeology held in 1961 in New Delhi, it was decided to term the Indian lithic industries as Early Stone Age (Middle Pleistocene to early Upper Pleistocene Age), Middle Stone Age (Upper Pleistocene age) and Late Stone Age (early Holocene age). In terms of European nomenclature, these are synonymous with Lower and Middle Palaeolithic and Mesolithic, respectively. Owing to the then paucity of evidence, no provision was made for the Stone Age phase equivalent to the Upper Palaeolithic.

17. For various tool types in the Indian Mesolithic and for other details see V. N. Misra, "Mesolithic Phase in the Prehistory of India," in V. N. Misra and M. S. Mate, eds., *Indian Prehistory: 1964* (Poona 1965) 57-85; and Sankalia, op. cit. (in note 8, 1974) 231-78.

18. Murty, op. cit. (in note 13, 1970) 122-24. Note also that fine grained quartzite and milky quartz, respectively, form the raw materials for the blade and burin, and Mesolithic industries at Renigunta. That the raw material alone is not the deciding factor for artifact size is borne out by the occurrence of tools of microlithic proportions on fine grained quartzite, although meagre (1.65% falling in the length group of 11-15 mm.) in the blade and burin industry, at least at this site.

19. Paddayya, op. cit. (in note 12) 171.

Table 3. Blade and Burin Industry.

STATE, District, *Site(s)*	*Mode of occurrence/ features*
ANDHRA PRADESH. Chittoor. *Sites around Renigunta.*	On the ancient aggradational plane of the river Rallkalava, a tributary of the Swarnamukhi: occupation scatters on red sandy silt up to a depth of 20 cm. and on creamy-white concretionary patches on the eroded surfaces. Finished forms (13.20% of the total collection): choppers (3.20% among the finished forms), scrapers (7.56%), burins (16.24%), backed blade variants (67.30%), awls (3.70%), points (2.00%); blades (19.30% of the total collection); and other categories (67.50% of the total collection): primary flakes (2.65% among other categories), flakes (5.45%), core flakes (9.57%), cores (4.70%), and chips (59.20%). Chiefly fine grained quartzite; a few on lydianite.[1]
ANDHRA PRADESH. Guntur. *Nagarjunakonda.*	Surficial occurrence. Blade tools, scrapers, burins, flake-blades, and blades. Flinty chert and jaspery quartzite.[2]
ANDHRA PRADESH. Kurnool. *Giddaluru, Gundla Bhramhesvaram and Nandi-Kanama Pass, all close to each other.*	On surface; in gravel III succeeding Middle Palaeolithic; or on the top of red clay covered by red sandy soil at Nandi-Kanama Pass. Slender blades with blunted backs, a few burins, planning tools and end scrapers. Flintlike material resembling lydianite.[3]
ANDHRA PRADESH. Kurnool. *Thirty-six sites in the Nallamali area and eight sites in the Erramalai area.*	On surface; in the middle somewhat cemented gravels in association with the Middle Palaeolithic; and exclusively in the upper thin loose gravels. Points (28.00%), scrapers (24.90%), axe types (4.00%), borers (2.90%), burins (6.30%), picks (0.91%), crescentic forms (1.53%), trapezoidal (3.00%), flake-blades (3.80%), blades (22.40%), awls (0.78%), and cores (1.44%). Chert and other fine-grained material.[4]
ANDHRA PRADESH. Cuddapah. *Nandipalle.*	Surface occurrence in the Sagileru basin. Scrapers, backed blades, burins, knife edged tools, points, blades, blade-flakes, blade cores, and flake cores. Medium coarse to fine grained quartzite.[5]

1. M. L. K. Murty, "Blade and Burin and Late Stone Age Industries around Renigunta, Chittoor District," *IA* 4:1-4 (1970) 106-28.

2. K. V. Soundara Rajan, "Studies in the Stone Age of Nagarjunakonda and its Neighbourhood," *AI* 4 (1958) 49-113.

3. L. A. Cammidae and M. C. Burkitt, "Fresh Light on the Stone Age in Southeast India," *Antiquity* 4 (1930) 327-39.

4. N. Isaac, "The Stone Age Cultures of Kurnool" (unpublished Ph.D. Thesis, Poona University 1960).

5. K. Thimma Reddy and V. Sudarsen, "Prehistoric Investigations in Sagileru Basin," *Man and Environment* 2 (1978) 32-40.

Table 3. (Continued).

STATE, District, *Site(s)*	*Mode of occurrence/ features*
ANDHRA PRADESH. Cuddapah. *Pedda Raju Palli (Rachapalli).*	Extensive diffuse occupation scatters along the banks of the Gunjan river. Predominantly backed points, other backed blade variants, blades, flake-blades, blade and flake cores, and debitage. Lydianite and fine grained quartzite.[6]
ANDHRA PRADESH. Prakasam. *Kanigiri and Veligandla.*	Surface scatters in the Paleru basin. Scrapers, a few backed blade variants, blades, burins, flakes, flake-blades, blade and flake cores, and debitage. Fine grained quartzite.[7]
ANDHRA PRADESH. Prakasam. *Erragondapalem.*	Surface scatters on the ancient alluvium of the river Rallavagu. Finished tools (22.92% of the total collection): choppers (6.96% among the finished forms), scrapers (58.40%), back blunted blades (12.70%), knife edged blades (4.50%), burins (4.90%), points (11.50%), awls (1.02%); blades (33.82% of the total collection); other categories (33.26% of the total collection): flakes (27.14% among the other categories), core flakes (13.74%), cores (20.74%), and chips (38.65%). Fine grained quartzite.[8]
GUJARAT. Baroda. *Visadi.*	Tools and factory debris contained within the sand accumulated during the active period of dune formation. Micro cores—blade and blade-flake (21.76%), core trimming flakes (macro) (1.18%), macro-blades (3.24%), scrapers (1.18%), burins (6.18%), burin spalls (0.29%), flakes and blade-flakes (46.47%), misc. pieces of raw material (17.06%), and micro-blade cores (0.88%). Predominantly quartz.[9]
MAHARASHTRA. Dhulia. *Bhadne.*	In a stratigraphical context on the Kan river succeeding Middle Palaeolithic and preceding Mesolithic. Fluted cores, a parallel sided blade, a burin, scrapers and flakes. Jasper and chalcedony.[10]

6. D. Ramalinga Raju (Poona University), personal communication.

7. V. V. Madhusudhana Rao (Nagarjuna University, Guntur), personal communication.

8. H. D. Sankalia, *Prehistory and Protohistory of India and Pakistan* (Poona 1974) 213-15.

9. B. Allchin and A. Goudie, "Dunes, Aridity and Early Man in Gujarat," *Man* 6 (1971) 248-65.

10. S. A. Sali, "Quaternary Stratigraphy in the Kan Basin in Bhadne and Yasar," *Journal of the Asiatic Society of Bombay* New Series 39-40 (1967) 157-67.

Table 3. (Continued).

STATE, District, *Site(s)*	*Mode of occurrence/ features*
MAHARASHTRA. Jalgaon. *Patne.*	In the central Tapti Basin, in a deposit of fluvial and aeolian origin of 1.5 m. thickness succeeding the Middle Palaeolithic (Phase I) and preceding the Mesolithic (Phase III); the Upper Palaeolithic occurs in five layers (Phases IIA to IIE). Phase IIA: end and side scrapers on blades, backed blades, blades; Phase IIB: backed blades, burins, blades and borers; Phase IIC: relative increase in the number of blades and burins and beginning of reduction in the size of tools; Phase IID: above types continue with further reduction in the size, typical burins and engraved ostrich egg shell fragments; and Phase IIE: along with above artifact types, triangles and trapezes make their first appearance; significant increase in the representation of lunates, points and borers; and engraved ostrich egg shell fragments. *Phase IIE is transitional between the Upper Palaeolithic and Mesolithic.* Jasper in Phase IIA and IIB and chalcedony in others.[11]

11. S. A. Sali, "Upper Palaeolithic Research Since Independence," *Bulletin of the Deccan College Research Institute* 34:1-4 (1974) 154-58.

In general, the artifacts of the flake-blade, blade-tool, and blade and burin groupings are longer, broader, thicker, and sturdier than those of the Mesolithic. The aforementioned considerations make it clear that the industries under discussion have a distinctive status.

Bone-Tool Industries

Bone-tool industries are known to date only from the cave sites in the Kurnool district of Andhra Pradesh. As mentioned earlier, the excavations in the Billa Surgum caves near Betamcherla yielded bone implements[20] in association with Late Pleistocene fauna.[21] The bone artifactual material constituted 1700 specimens of worked and cut bones of which 200 were implements. The implements, some of which were compared to the Magdalenian types by Foote, comprised awls, barbed and unbarbed arrowheads, daggers, scraper-knives, scrapers, chisels, gouge, wedges, axe heads and sockets. Recent excavations of a cave site known as Muchchatla Chintamanu Gavi, also near Betamcherla, disclosed a blade-tool industry (see TABLE 2) along with a bone-tool industry and Late Pleistocene fauna,[22] the latter comprising most of the species identified from the Billa Surgum sediments. The bone-tool industry (FIG. 6) is comprised of scrapers, perforators, chisels, scoops, shouldered points, barbs, spatulae, worked bones, bone blanks, broken-and-cut bones and splinters—the finished forms amounting to 7.60% of the total collection of worked bone. The bone-tool industry on the whole belongs to a crude technology, but then the cave under discussion falls in the category of transit sites, where the possibilities for complete representation of the best artifactual evidence are less likely than in more permanent sites.

The evidence of bone-tool technology, considered in

20. Foote, op. cit. (in note 2, 1885).

21. R. Lydekker, "Preliminary Note on the Mammalia of Kurnool Caves," *RGSI* 19:2 (1886a) 120-22.; idem, "The Fauna of Kurnool Caves," *Palaeontologia Indica* Series X:4:2 (1886b) 22-58.

22. M. L. K. Murty, "A Late Pleistocene Cave Site in Southern India," *ProcPhilSoc* 118:2 (1974) 196-230.; idem, "Late Pleistocene Fauna of Kurnool Caves, South India," in A. T. Clason (ed.), *Archaeozoological Studies* (Amsterdam 1975) 132-38.

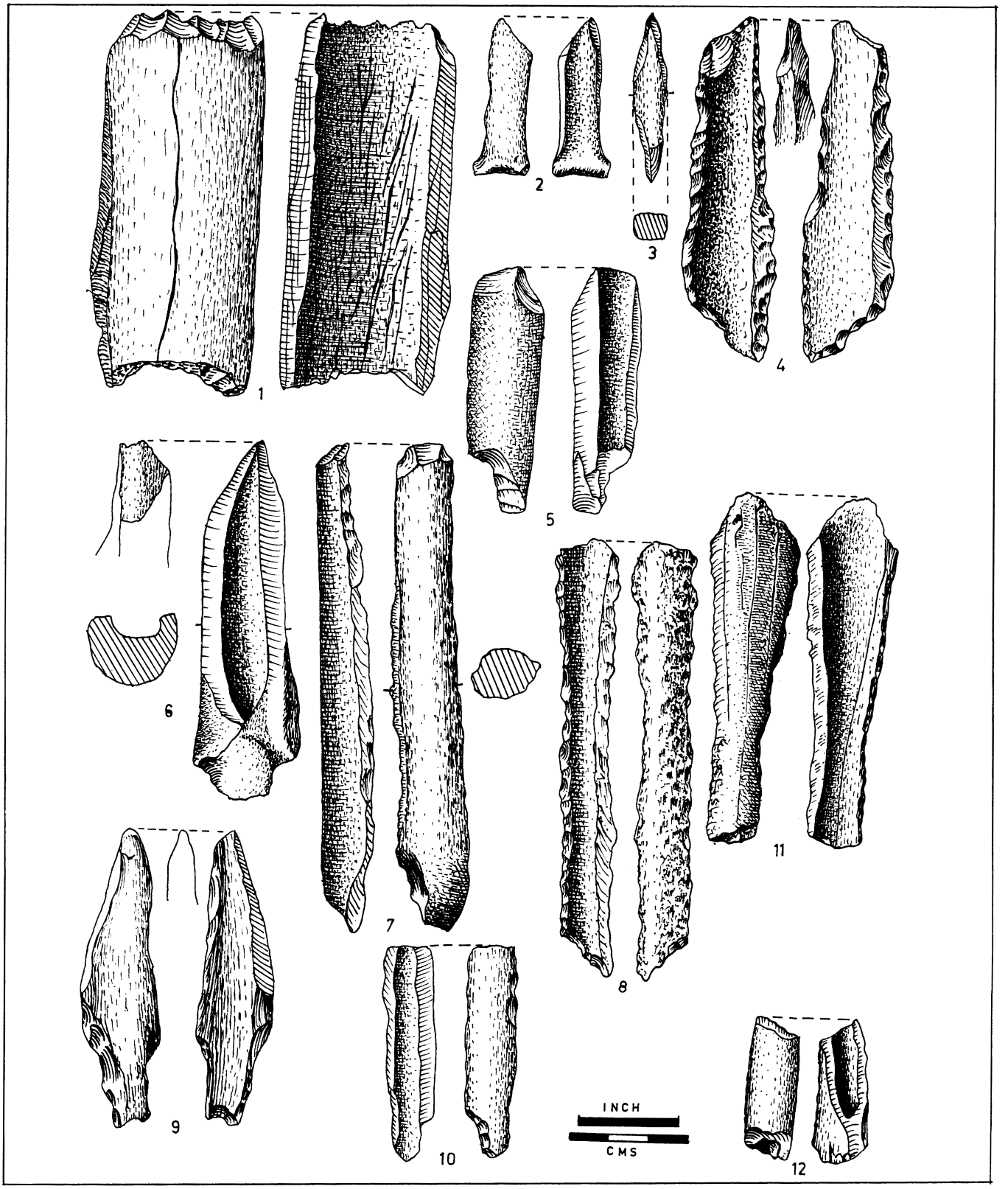

Figure 6. Bone tools from Muchchatla Chintamanu Gavi (a cave site in the Kurnool district). 1, scraper; 2-3, perforators; 4-6, chisels; 7-8, spatulae; 9, tanged point; 10, shouldered point, broken; 11, bone blank; 12, bone with both ends cut and showing the removal of bone blank.

a cultural context, cannot be regarded as an isolated instance confined to cave areas. It must have formed a cultural attribute in different regions associated with blade industries; the non-availability of bone artifactual evidence at the open-air stations might be the result of disintegration under exposed conditions.

Art

Excepting a fragment of an ostrich egg shell with an engraving in a criss-cross pattern found at Patne (Jalagaon district, Maharashtra) and, possibly, a bone object found in a gravel horizon of the river Belan, no other objects indicating *mobile* art have as yet come to light.[23]

Numerous examples of *parietal* art, ranging from the Stone Age to historical times, have been found in several hundred rock shelters and caves in central India. While there is conclusive evidence to ascribe some of the earlier phases of these central Indian cave paintings to the Mesolithic period, there is no evidence that any of them belong to the Upper Palaeolithic period. Notable work among recent scholars on Stone Age *parietal* art is that of V. S. Wakankar[24] who made an exhaustive study of the central Indian rock paintings. Investigations by him as well as by other scholars[25] are in progress to establish the chronology of rock art by associating the different phases of paintings with the archaeological levels, since some of the excavated cave and rock-shelter sites have yielded Stone Age materials, including that of the Upper Palaeolithic.

Chronology

The contextual occurrence of the Upper Palaeolithic groupings as has been observed at the sites in Singhbhum district, the Belan valley, the central Indian cave sites, Patne, and in the river valley sites in Kurnool district prove that they postdate the Middle Palaeolithic and predate the Mesolithic. At Renigunta, undisturbed factory floors are found on the ancient alluvium preceding the quartz microlithic industries, the latter having a wider distribution in southern India.

Geomorphological investigations conducted by Rajaguru[26] in the Deccan (especially in the northern Deccan) have shown that the stratigraphical units of the ancient alluvium, which are associated with the Middle Palaeolithic of the Godavari, the Krishna, and the Bhima river systems, belong to an initial phase of the aggradation that succeeded a major rejuvenation of these rivers. The known radiocarbon dates supported by biostratigraphic evidence in the upper Godavari valley[27] for this phase are suggestive that the Middle Palaeolithic is older than ca. 40,000 B.P. and its upper limit cannot be later than ca. 20,000 B.P. There is yet another radiocarbon date from Nandipalle, a site in the Sagileru basin on the SE coast.[28] Here, the stratigraphic units constitute three gravels, each sealed by a deposit of silt/clay. A radiocarbon date for the silt/clay horizon overlying the Middle Palaeolithic gravel suggests that the Middle Palaeolithic on the SE coast also ends before ca. 23,000 B.P. Coming back to the evidence in the northern Deccan, the sediments that are either directly associated with the Upper Palaeolithic, as at Inamgaon, or that display comparable lithological and geomorphological features, as at Ghargaon and Asla, belong to the later period of that aggradation (referred to above), the sediments of the initial phases of which are associated with the Middle Palaeolithic. The available radiocarbon dates for this later phase of aggradation fall in the range of ca. 20,000 to 10,000 B.P. Radiocarbon dates for the Upper Palaeolithic phase at Patne and in the Belan valley also fall more-or-less in the same period.

Some of the radiocarbon dates important for Upper Palaeolithic chronology are given in Table 4.

The foregoing considerations based on radiocarbon dates make it clear that the Upper Palaeolithic phase in India, as elsewhere, falls well within the range of the Late Pleistocene and that it can be reasonably ascribed to ca. 20,000 to 10,000 B.P. This dating is also supported by the Late Pleistocene fauna found in association with the blade-tool industry at Inamgaon[29] and with blade and bone-tool industries in the Kurnool caves.[30] While

23. S. A. Sali, "Upper Palaeolithic Research Since Independence," *Bulletin of the Deccan College Research Institute* 34:1-4 (1974) 147-60.; G. R. Sharma, in *IAR* (1970-71) 36, Pl. LIX. A few other undecorated fragments of ostrich egg shells have been found (TABLE 3).

24. V. S. Wakankar, "Painted Rock Shelters of India," unpublished Ph.D. thesis (Poona University 1973); V. S. Wakankar and R. R. R. Brooks, *Stone Age Paintings in India* (Bombay 1976).

25. Y. Mathpal, "Rock Art of India," *Journal of Indian History* 54:1 (1976) 27-51.; idem, "Prehistoric Rock Paintings of Bhimbetka," unpublished Ph.D. thesis (Poona University 1978).

26. S. N. Rajaguru, "Studies in the Late Pleistocene of the Mula-Mutha Valley," unpublished Ph.D. thesis (Poona University 1970).

27. R. V. Joshi et al., "Late Pleistocene History of the Upper Godavari Valley" (manuscript).

28. K. Thimma Reddy and V. Sudarsen, "Prehistoric Investigations in Sagileru Basin," *Man and Environment* 2 (1978) 32-40.

29. M. D. Kajale, G. L. Badam and S. N. Rajaguru, "Late Quaternary History of the Ghod Valley, Maharashtra," *Geophytology* 6:1 (1976) 122-32.

30. Lydekker, op. cit. (in note 21, 1886b); Murty, op. cit. (in note 22, 1975).

Table 4. Examples of radiocarbon dates for the Upper Palaeolithic in India.

Site	^{14}C Date B.P. (half-life 5730 ± 40 years)
Nandipalle[1]	PRL 293, 24,360 + 660 -710
Patne[2]	GRN 7200, 25,000 ± 200
Belan valley[3]	TF 1245, 19,160 ± 330
Inamgaon[4]	TF 1003, 21,725 + 630 -585
	TF 1177, 19,290 ± 360
Ghargaon[5]	TF 1111, 10,310 ± 155
Asla[6]	TF 1178, 10,035 ± 125

1. Ibid. 40.

2. S.A. Sali, personal communication. This date is obtained from ostrich egg shell fragments. According to Dr. W. G. Mook, who dated this sample, the age is somewhat older than expected. There is a chance that the age is apparently increased by the incorporation of ^{14}C-less carbon by the ostrich. The apparent increase, however, is definitely not more than 5,000 years. Therefore, the real age should lie between *20,000 and 25,000 years* B.P.

3. D. P. Agrawal and S. Kusumgar, "Tata Institute Radiocarbon Date List 11," *Radiocarbon* 17:2 (1975a) 219-25.

4. D. P. Agrawal and S. Kusumgar, "Radiocarbon Dates of some Late Quaternary Samples," *Current Science* 44:5 (1975b) 149-51.

5. Ibid.

6. Ibid.

it is hazardous to conjecture that the flake-blade, blade-tool, and blade and burin groupings suggest a relative antiquity of these industries in that order, it may not be unreasonable to presume that they represent specific culture area variants heralding the post-Middle Palaeolithic culture change. All the same, some groups of the blade and burin complex such as Phase IID and IIE at Patne (see TABLE 3) and Pedda Raju Palli, with an increasing tendency towards microlithisation, must be younger and probably are of the nature of Epi-palaeolithic.

Palaeoecology

Some aspects of the Late Pleistocene ecosystems can be worked out for some of the geographical zones such as the Deccan, whose faunal histories are relatively well known. The faunal remains recovered from Late Pleistocene sediments at Inamgaon comprise *Hexaprotodon palaeindicus, Equus namadicus, Elephas* sp., *Bos* sp., *Bubalus* sp., *Cervus* sp., etc. The Kurnool cave fauna include several species belonging to the orders Primates, Carnivora, Insectivora, Chiroptera, Rodentia, Perissodactyla, Artiodactyla, Crocodilia, etc. Some of the mammalian species, especially the herd animals belonging to the orders Perissodactyla and Artiodactyla, indicate, being their favoured habitats, a forested and grassland ecosystem with a continuous source of water. What is more, the occurrence of *Hexaprotodon palaeindicus* in the northern Deccan and *Rhinoceros kurnuliensis* (in the Kurnool caves) in the southern Deccan during Late Pleistocene times point to the presence of perennial pools and swamps in the riverine and hilly and forested zones. While the species like *Hexaprotodon* and *Rhinoceros* became totally extinct during recent times in the Deccan, most of the other wild species survive in the dry deciduous zones of the higher mountain ranges. The existence even of elephants in the Mamandur forest (Cuddapah dist.) in the Eastern Hill ranges in the 17th century A.C. was recorded by a French traveller Baptist Travenierk in his diary dated 27th August 1652 and it is also reported that elephant capturing operations were in vogue in these forests till the middle of the 18th century A.C.[31]

The disappearance of such a varied wild life in recent times is the direct result of degeneration of forest cover, for which two factors have to be considered. First, there can be little doubt that the gradual expansion of the agricultural system, over-grazing, and also, to some extent, felling of trees for fuel contributed in no little degree to a large-scale clearance of the vegetation cover. Second, the role of palaeoclimatic variations, if any, from Late Pleistocene to early Holocene times cannot be overlooked. Regarding the early Holocene climatic regimes there is a general consensus that they were characteristic of the monsoonal semi-arid tropics; unfortunately, palynological data to substantiate the sedimentological and geomorphic inferences about the late Pleistocene climates are lacking. But investigations conducted in the desert and sand dune areas of Rajasthan and Gujarat,[32] on the one hand, seem to indicate semi-arid conditions in that region during late Pleistocene. The faunal and geomorphic histories of the Deccan, on the other hand, indicate relatively more humid or perhumid conditions in this region during the late Pleistocene than in the early Holocene.[33] For in-

31. G. H. Lakshmipathy, *Revised Working Plan for the Forests of Chittoor East Division 1973-74 to 1987-88* (cyclostyled copy Part II) 390.

32. B. Allchin, K. T. M. Hegde and A. Goudie, "Prehistory and Environmental Change in Western India: A Note on the Budh Pushkar Basin, Rajasthan," *Man* 7:4 (1972) 541-64.

33. In this connection, it is interesting to note the observations made by Pascoe. Even today, on several isolated hill ranges such as the

stance, the geomorphic histories of the river systems in the northern Deccan, as observed by Rajaguru, are characterized by fan deposits in the upper reaches and alluviation along the whole course of the river systems suggesting accelerated fluvial activity and strong, as well as more frequent monsoonal floods, thus indicating a high intensity of rainfall, although it is difficult to determine whether or not the mean annual rainfall was higher than today. Studies conducted in the Belan valley also indicated more-or-less similar conditions.[34]

Even assuming that the Late Pleistocene climates for the whole of Peninsular India were of semi-arid type, the forest formations, including evergreen, deciduous, woodland, and savannah woodland, must have had extensive coverage and provided ideal niches in varied topographical settings with plentiful game, avifauna, aquatic fauna and vegetable foods for the Late Pleistocene hunter-gatherers. Extensive diffuse occupation scatters (with artifactual counts running into thousands) at the sites on the SE coast, situated along the courses of braided runnels or in proximity to streams within a walkable distance of forested hill ranges, suggest prolonged occupations conditioned to restricted wandering and home-base activity in this geographical area. If the ethnological data are any guide, it can be surmised that the subsistence patterns of the Late Pleistocene hunter-gatherers were geared to a dry-season/wet-season cycle of exploitation of plant and animal foods.[35]

Conclusions

The Upper Palaeolithic lithic industries in India can be subdivided into flake-blade, blade-tool, and blade and burin groupings. These are based purely on typo-technological criteria and only indicate regional variations in the patterning of blade-tool complexes; they do not reveal any subcultural sequential developments. Some of the excavated sites in the Kurnool area have, in association with the lithic industries, yielded bone tool evidence. It seems plausible that bone-tool technology might have been supplementary to the lithic in different regions, but the non-availability of bone artifactual and other organic remains at the open-air sites, in all likelihood, may be a result of unfavourable conditions for their preservation.

Radiocarbon dates and the associated faunal remains found at some sites ascribe this phase to Late Pleistocene. This seems to have been a time of semi-arid conditions for the desert and sand-dune regions of Rajasthan and Gujarat and relatively humid or perhumid conditions for the Deccan.

The distribution of Upper Palaeolithic sites indicates that habitats as varied as the desert areas, forested hilly and cave areas, and riverine zones in the plateau country were inhabited by these hunter-gatherers. Taking

Nilgiris and the Annamalai in the southern peninsula, is found, in wild form, a carpine species *Hemitragus hylocrius* Obilgy 1838. What is more, on these hill ranges and disconnected plateaux in southern India and on the mountains of Ceylon lives a temperate fauna and flora. For instance, both the Nilgiris and the mountains of Ceylon are inhabited by a species of the Himalayan carnivore, *Martes gwatkinsi* Horsfield 1851 (south Indian yellow throated marten), as well as the Himalayan plant *Rhododendron arboreum*. These (and also a few more species) are related to the temperate fauna and flora of the Himalayas, the Shillong plateau (Garo and Khasi Hills), the Naga Hills, and the mountains of Malaysia and Java; and they do not exist in the low plains of the southern peninsula. Considering the fact that many forms peculiar to the higher ranges in the Indian hills are represented by the allied species at lower elevations in the damp Malay peninsula and archipelago, and also that some of the hill forms are even found in the damp forests of Malabar coast (SW coast of India), Pascoe has concluded that the range in elevation of the temperate fauna and flora of the Orient in general appears to depend more on humidity than on temperature. He further opines, however, that the plains of India experienced sufficiently low temperatures in the past, allowing the migration of some of the plants and animals from the Himalayas to the south. See E. H. Pascoe, *A Manual of the Geology of India and Burma* 3 (Delhi 1964) 1918-1920.

34. G. G. Majumdar and S. N. Rajaguru, "Investigations of the Pleistocene Sediments from the Belan Valley, U.P.," *IA* 4:1-4 (1970) 96-105.

35. To this day, the primitive hunter-gatherer tribes like *Yerukulas* and *Yanadis* subsist on (to mention a few): fruits of *Glycosmis pentaphylla, Cordia myxa, Zizyphus onoplia, Zizyphus xyloperus, Zizyphus jujuba, Strychonos nuxvomica, Capparis sepparia, Carissa spinarum, Givotia rottleriformis, Diospyros melanoxylon, Prosopis spicegera, Opuntia dillenii,* (the jelly-like pyrenes inside the fruit of) *Borassus flabellifer,* (fruits and apical meristem of) *Phoenix sylvestris,* etc. (there are not less than 45 species yielding edible fruits, seeds, tubers, leaves, and gums). They also trap and snare birds such as *Phlacrocorax niger* (little cormorant), *Ardeola grayii* (pond heron), *Francolinus pondicerianus* (grey partridge), *Pendicula asiatica* (jungle bush quail), *Gallus sonneratii* (jungle fowl), *Pavo cristatus* (pea fowl), *Choriotis nigriceps* (bustard), *Treron phoenicoptera* (grey pigeon), *Bubo bubo* (grey horned owl), *Corvus macrorhynchos* (jungle crow), *Acridotheres fuscus* (jungle myna) etc.; reptiles such as *Demochelys coriacea* (leathery turtle), *Geomyda trijuga* (three keeled land terrapin), *Varanus monitor* (common monitor) etc.; trap and catch fishes such as *Labeo flimbriatus* (carp), *Labeo calbasu* (carp), *Cirrhina mrigal* (carp), *Tor tor* (mahaseer), *Wallago attu* (cat fish), *Mystus seenghala* (cat fish), *Mystus aor* (cat fish), *Channa striatus,* etc.; trap, snare, and hunt small and big (whenever encountered) game; and collect honey. They use a variety of cast nets, noose traps, spring traps, gravity traps, etc. Attention to the food sources of these communities (on the SE coast) is drawn to emphasise the fact that the availability of these must have been in much greater abundance not only in Pleistocene and early Holocene times but even in the historical period.

into account the hunting and food gathering habits of the existing primitive tribes and the faunal associations in the Kurnool caves, it can be postulated that they subsisted on such animals as ox, bison, nilgai (antelope), chinkara gazelle, blackbuck antelope, sambar (deer), spotted deer, wild boar, porcupine, hare; a variety of birds; and tortoises and fishes; and on honey and plant foods like tubers, fruits, roots, seeds and leaves.

Not much evidence, other than a couple of examples, is yet available for *mobile* art. Work is still in progress in the painting-rich cave and rock-shelter sites of central India to ascertain whether some of the early phases of paintings belong to this period.

Acknowledgements

The author expresses his thanks to Drs. H. D. Sankalia (Professor Emeritus), R. V. Joshi (Professor in Prehistory), and S. N. Rajaguru (Reader in Environmental Archaeology) of the Department of Archaeology, Deccan College, for their valuable suggestions. Thanks are also due to the University Grants Commission, Government of India, for a grant, which supported a part of the investigations of the author on the SE coast.

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