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By Courtesy Government Museum, Madras.

5. A Century of Prehistoric Research in India

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In the year nineteen hundred and sixty-three, we celebrate the hundredth anniversary of the discovery of the first palæolithic find which laid the foundation of prehistoric research in the subcontinent of India. Robert Bruce Foote¹ of the Geological Survey of India discovered a palæolith (Cleaver) from the debris of a pit dug in the lateritic gravel at Pallavaram near Madras on the 13 May 1863 and continued that line of research for the next forty years with unique persistency and undiminished interest. He is truly called the father of Indian Prehistory, not because he planted the sapling but because he looked after it for a pretty long time with unrivalled enthusiasm.

In the following pages is presented the history of prehistoric research in India and the progress so far made in connection with exploration and excavation in this realm of palæo-anthropological enquiry; with an attempt to piece together the evidences so far collected in constructing the picture of different prehistoric cultures and their links with Africa and Southeast Asia on both the sides of the subcontinent.

HISTORICAL

The Stone Age research as a branch of palæo-anthropology commenced in 1847 when Boucher de Perthes, the French Customs Officer, shocked the conventional world with his daring assertion that the chipped pieces of flint discovered by him in the old terrace deposits of the river Somme at Abbeville in association with the extinct mammalian fauna, were actually the product of human workmanship. He won at last his case, after, of course, teething opposition and constant ridicule, which without exception accompanies new discoveries, when three important English geologists in the persons of Joseph Prestwich, Johan Evans and Hugh Falconer lent him their unqualified support at one of the meetings of the Royal Society of London. This happened in 1859 which was incidentally the year when Darwin's *Origin of Species* was published. Lyell, only four years after this important event published his *Geological Evidence of the Antiquity of Man*.

These developments in Europe had their due impact on India through British personnel who were controlling the political destiny of the subcontinent at that time. They were in touch with the stirrings in the intellectual sphere at home and

¹ Robert Bruce Foote was born in 1834 and died in 1912 at the age of 78 in Calcutta. He joined the Geological Survey of India in September 1858 and after thirty-three years of service retired as Senior Superintendent in 1891, having spent most of his service life in South India. After retirement he served the princely states of Baroda and Mysore as State Geologist and as Director of the Geological Department respectively. He discovered in all, 459 sites, 42 of which belong to the Palæolithic, 252 to the Neolithic, 17 to early Iron Age and remaining 5 undetermined (Foote 1916).

were on the lookout for such remains in the vast territory of India. And after 16 years of Boucher de Perthes's discovery, Robert Bruce Foote during one of his geological tours struck at last the first man-made artifact in Madras and recognized what it was. Soon after this, identical artifacts were discovered by him and William King (his colleague in the Geological Survey of India) in large numbers in the valleys of Kortalayer and Naranavaram in Madras state, followed by other chance finds from the Godavari and the Narmada (or Narbada) in the upper peninsular region. In 1865, A. B. Wynne found an agate flake in the Godavari alluvium near Paithan (Wynne 1866) and C. Hacket (H. B. Medlicott 1873), in 1873, discovered a quartzite 'boucher' embedded in the red clay at Bhutra near Gadawara in the Narmada valley.

But it was Bruce Foote again who continued this activity of gathering together prehistoric artifacts from different parts of India, in the south and in Kathiawar and

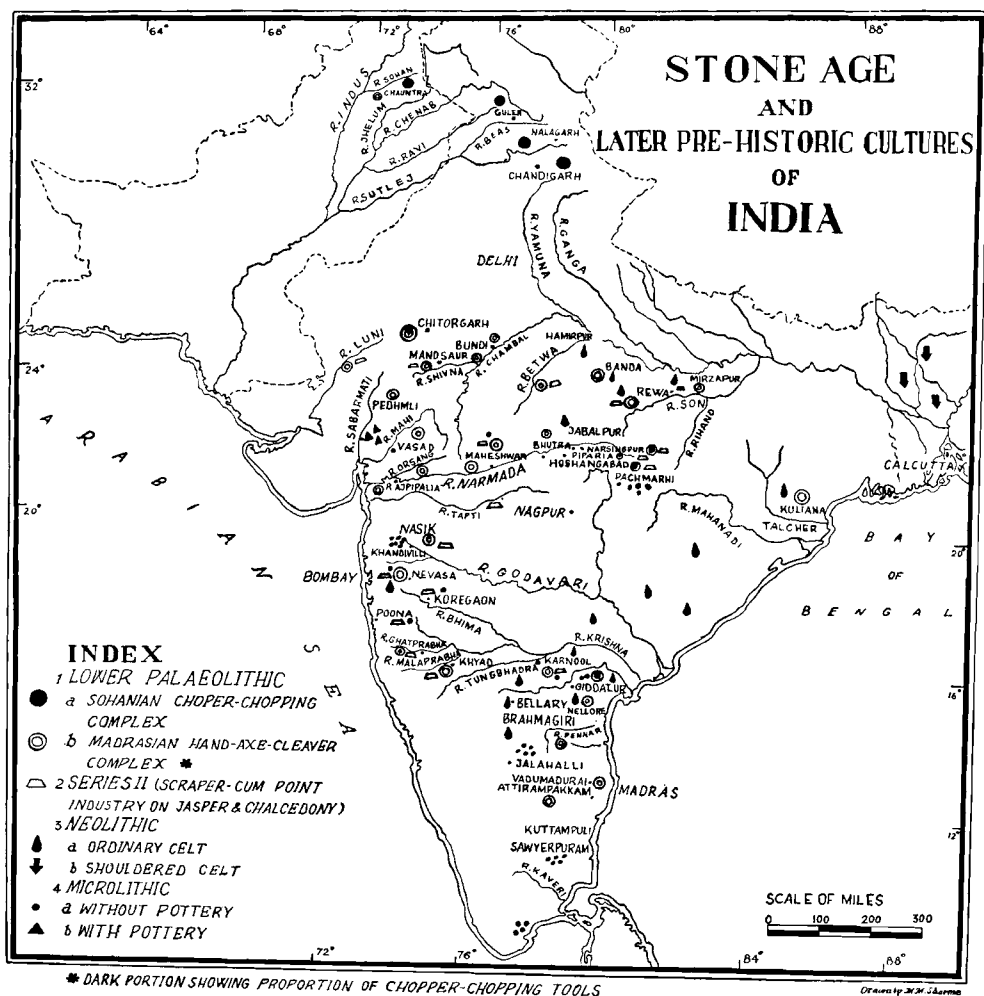


FIG. 1. Stone Age and Later Prehistoric Cultures of India.

Gujarat. During this process he made an excellent collection which was subsequently purchased by the Government Museum, Madras, at the cost of over 30,000 rupees.

Palæolithic studies by Burkitt, Richards and Cammiade. For nearly thirty years after Foote's last pick of implements, there was a complete lull till 1930 when Mr Miles Burkitt of Cambridge University, England, published an account, jointly with L. A. Cammiade, of a large collection of lithic artifacts from the Krishna basin gathered together by the latter. He arranged this material in chronological sequence, fitting them in climatic cycles following the African pattern of prehistoric studies. Two years later another paper was published by F. J. Richards, L. A. Cammiade and Burkitt on the same subject. These two publications were the first attempt in piecing together the Stone Age of India against the background of changing climatology.

The Yale-Cambridge Expedition. Then came the Yale-Cambridge team led by Dr Helmut de Terra together with Père P. Teilhard de Chardin, a noted French palæontologist, and Dr T. T. Paterson to investigate the glacial cycles in Kashmir and the associated human remains in the periglacial area known as Potwar in the West Punjab, which after the partition of the country has gone to the newly-created political state of Pakistan.

The stray finds of palæolithic artifacts had been reported from the Sohan valley as long back as 1880. D. N. Wadia of the Geological Survey of India observed them in 1928 to occur there in profusion. De Terra himself found many stray artifacts in the Kargil and Salt range, south to the Potwar plateau in 1932 and had examined also the collection of Lt. K. R. U. Todd, made in 1930, at Pindi Gheb in the Sohan valley. As a result of all this he led the Yale-Cambridge expedition to investigate the problems of Stone Age and quaternary ice ages. And the areas he chose were the Kashmir valley across the range of Pir Punjal and Poonch region to the Salt range region between the Indus and the Jhelum.

REGIONAL SURVEYS AND EXPLORATIONS

So far the prehistoric research was the concern of foreigners but after the Yale-Cambridge Expeditions, Indians started realizing that in their own land at least, they should not lose initiative in carrying out such investigations. The two Indian associates of the Yale-Cambridge Expeditions, viz. Mr V. D. Krishnaswami and Mr D. Sen had already some basic training in the subject and they continued their study of Stone Age cultures in their chosen area of research. Meanwhile Dr H. D. Sankalia returned from England after obtaining his Ph.D. from London University and joined the Deccan College Postgraduate and Research Institute as Professor of Ancient Indian History. All these three form the first band of Indian workers in Prehistory who took upon themselves to continue the work initiated and advanced by Foote and de Terra. Dharani Sen had distinguished himself as a teacher, Krishnaswami as a synthesizer and Sankalia as a researcher and a top-class excavator. All the three have different academic background: D. Sen a social anthropologist, Krishnaswami, a geologist, and Sankalia, a historian—a fact, which is reflected in their writings. Dr Sankalia besides engaging himself constantly in field researches has made an everlasting and an important contribution by training

a band of researchers. They worked under him for their doctorates and started covering the whole of India by region-wise surveys thus establishing the flourishing Poona School of Archæology. Sankalia himself concentrated on the Sabarmati in Gujarat and on the Godavari-Parvara basin in Maharashtra, while his students like Drs Joshi (1955) worked on the Malaprabha basin in Karnatak, Khatri (1958a) on the Chambal valley and its tributaries in Malwa (Central India), Mohapatra (1960) in the Orissa region, Issac (1960) in Kurnool (Andhra Pradesh), Misra (1961) in the Luni valley (Rajasthan). Besides these field surveys, the students of Deccan College Research Institute like Subbarao worked on the Neoliths of Bellary (Andhra), and K. D. Bannerji (1957) on the Series II material from the Parvara and the Godavari collected by Sankalia and his students, and on the palæolithic collection of Ghataprabha made in 1956 by himself, Khatri, Sheikh, Mate and S. K. Aggarwal.

In the Archæological Survey Mr V. D. Krishnaswami studied the prehistory of Singrauli basin together with his student Soundrarajan, and explored megaliths in South India. Mr K. V. Soundararajan worked on the Stone Age of Giddalur and Nagarjunakonda and Dr R. V. Joshi on the Damoh and Sagar region. Mr B. B. Lal of the same Department excavated the Birbhanpur microlithic site in West Bengal (1958) and studied the palæoliths from Banganga (1956).

The Anthropology Department of the Calcutta University—the first institution outside the Government-controlled Archæology Department which took initiative of doing prehistoric research and teaching—did palæolithic excavation in Mayurbhanj in Orissa under N. K. Bose and D. Sen. They continue to work in that region and have extended their field activity to southern Bihar recently.

The Archæology Department of Baroda University, under Dr B. Subbarao, is active in Mahi valley, in Central Gujarat and in Bombay. The University of London, Archæology Department under Prof. F. E. Zeuner, produced two doctoral theses, prepared by Seshadri (1956) and Dani (1955) on the Mysore and East Indian prehistory respectively.

EXPLORATION FOR FOSSIL MAN SPONSORED BY THE CSIR

No recent account of progress in Prehistory would be complete without a reference to the contributions made by the research programmes conducted under the auspices of the Indian Council of Scientific and Industrial Research. There are two schemes which are working at present under the aegis of the afore-mentioned organization to find the Fossil Man in India. These are 'Explorations for the Remains of Early Man in India' under Dr M. R. Sahni, President of the Palæontological Society of India, sanctioned in 1957 and 'Investigation of the Pleistocene deposits in the valleys of Chambal, Narmada and Godavari', sanctioned to the present writer recently. Khatri conducted investigation in the Shiwaliks, in Bilaspur (Himachal Pradesh), in the Narmada valley in Central India and Kurnool caves in Andhra-Pradesh in South India under the first mentioned scheme. In Shiwaliks, an almost complete mandible of a lower primate resembling the present-day *loris* was discovered from the reddish sandy deposits belonging to the Nagri zone (middle Shiwaliks) in Haritalyangar, a twin village north-west of Bilaspur (Himachal Pradesh).

In the Narmada, the investigations of the fossiliferous and implement-bearing deposits were conducted in the ancient alluvium of the Narmada. And for this, about 200 miles of the river flowing in Hoshangabad and Narshinghpur districts of Madhya Pradesh was surveyed, resulting in the discovery of nearly 70 sites which are either fossiliferous or implementiferous. A very large collection of fossils and lithic tools was made during the survey.

In Andhra Pradesh, the Kurnool caves, known for their fossiliferous contents since the last century, were explored; some test-trenches were dug but without getting any fossils. Anyway, a few new caves were found in the Neelakoya valley and one rock-shelter with paintings on the Betamcherla-Kurnool road. Besides this cave exploration, the valleys of Sagilleru and Gundlakamma were also surveyed and a large palæolithic collection was made.

In the recently sanctioned research programme dealing with the investigation of the Pleistocene deposits of the Chambal, Narmada and the Godavari, the field work is being made at important riverine portions known for the occurrence of palæoliths or fossils and endeavour is being made to establish a sort of Pleistocene chronological system for the area covering these rivers. The study of the Pleistocene deposits of these rivers has become an urgency in the sense that with the execution of several multi-purpose hydroelectric projects during the Third Five-year Plan, many of these deposits will be drowned under hundreds of feet of water. They will be no more available for study either to the Pleistocene geologists or to the palæolithic archaeologists and the vertebrate palæontologists.

These two research programmes, dealing with the late Cainozoic period of India and the Stone Age will to some extent, let us hope, fill up the gap in our knowledge about the Pleistocene deposits in India and may one day result in the discovery of the remains of Fossil Man who manufactured these stone tools, which occur in profusion all over the sub-continent.

EARLY STONE AGE

After making a hurried survey of men and events important to Indian prehistory an attempt is here made to see how the final picture of India in the Stone Age develops after piecing together the information we have gathered during the past hundred years.

1. *Handaxe-cleaver Complex*

Prior to the Yale-Cambridge expedition in the subcontinent, the scientific world knew from the works of Foote, King, Theobald and others that all over India, the hand-axe and cleavers are found in profusion. At some places their abundance is such that a cartload of these artifacts can be carried away after working for an hour or two on the site. It was also known that they are similar to those found in Europe, except that the material often used, in case of Indian artifacts, is quartzite. Burkitt, in 1930, showed that Indian hand-axes and cleavers are more comparable to African specimens and tried to introduce a sort of system in Indian prehistory based on climatic fluctuations in the past. But its fundamental defect was and still, in the majority of cases, is that the working material is composed of surface finds. And when in one or two cases, the tools were found *in situ* in bedded horizons,

then the fossils were missing and the horizons were wrongly described as happened in the Narmada and Godavari finds discovered by Hacket and Wynne. The 'red clay' in which Hacket found the Acheulian hand-axe is actually the pinkish clay belonging to the upper group and the same is the case with the Godavari horizon in which Wynne found the agate flake.

The following major points sum up the main features of the Chelles-Acheul culture of India:

a. The main components of this complex are hand-axes, cleavers, scrapers-on-flakes, obtuse angled flakes, cores, hammer-stones, choppers and chopping-tools.

b. Its distribution is found all over India except the Gangetic valley and Assam where they have not been reported so far. The tools have been described in some detail from Punjab, Rajasthan, Gujarat (Sabarmati and Mahi) Madhya Pradesh (Chambal and Narmada valleys) Maharashtra (Godavari and its tributaries like Bhima and Paravara), Karnatak (Malaprabha and Ghataprabha), Andhra (Gundlakama, Sagilleru and Krishna), Orissa (Bura-Bhalang and Brahmani), and Madras (Pallar and lateritic coast).

c. There is no vertical division between the core and flake industries as found in France and other parts of Western Europe but like Africa hand-axes and cleavers are found to be made on cores as well as flakes.

d. The artifacts have been found *in situ* in bedded gravels, in many river valleys but it is only in the Narmada valley (Hoshangabad-Narsinghpur region) where hand-axes and cleavers and other components of this culture-complex are found in different stratigraphical horizons along with the Pleistocene mammalian fauna showing evolutionary trends from the crude pebble stage to the advanced Acheulian types.

e. Three evolutionary stages have been found so far in the Narmada valley, the basal-most stage consisting mostly of chopper-chopping-tools made of pebbles. This stage has been named 'Mahadevian' and represents the Oldowan culture of India and may belong to the early part of the middle Pleistocene (50,000-70,000 years). The third stage is represented by the Late Acheulian hand-axes found in the yellow sandy layers of the upper group and probably belongs to the late Pleistocene. The second stage consists of Early Acheulian tools and was found in the cemented sandy gravel (group II).

f. The fauna accompanying the industry and found *in situ* with the tools consists of *Elephas namadicus* (antiquus), *Equus namadicus*, *Bos Namadicus*, *Bubalus*, *Bison*, *Hexaprotodon*, *Sus*, etc.

g. The shape of hand-axes generally met with are pear, pick, almond, ovate, double-pointed, lanceolate, triangular and sub-triangular. The cleavers are either U-shaped, V-shaped or rectangular with their cutting edges varying from straight, oblique, convex, concave to flaring types. They are on cores, as well as on side or end-flakes.

h. The raw materials generally used are grey sandstone, fine-grained hæmatic red quartzite, olive coloured fine-grained quartzite, buff and yellow colour medium-grained quartzite, dolerite, trap, quartz, and jasper of various shades and flint too in the Narmada.

i. In certain valleys the tools can be divided into major and miniature varieties, as is the case in the Shivna valley in Malwa.

j. The intensive regional survey has resulted in the discovery of many factory-cum-home sites of prehistoric man in several river valleys. It has also resulted in distinguishing areas which were occupied by different prehistoric communities in different stages of cultural attainment. For example the Shivna palæolithic industry may be said to be of the Acheulian type of fairly advanced stage while the Gambhiri, flowing hardly sixty miles from the Shivna, presents evidences suggesting that it was occupied by those who practised a somewhat inferior culture. This can be ascertained and appreciated only after seeing and handling the material rather than from photographs and drawings.

2. *The Sohanian versus 'Mahadevian'*

As a result of the Yale-Cambridge expedition in 1935 in the Potwar region of West Punjab, a new Stone-Age culture came into existence which is known as Sohanian after the Sohan (Soan) valley. The speciality of the whole complex according to de Terra and Paterson is the occurrence of a large number of pebble tools and of cores made of small pebbles. They further pointed out that these pebble tools exhibit an evolutionary trend from large and heavy tools to smaller and finer specimens just like Chelles-Acheul culture. After the establishment of a separate culture different from the well-known handaxe-cleaver complex, they tried to trace its boundaries of spread. They interpreted the existence of pebble tools occurring together with hand-axes in the peninsular India as an intrusion of the Sohanian element; and the sites and valleys where they were found together as the meeting ground of these two distinct cultures. This thesis of de Terra and Paterson found enthusiastic champions among some of the workers in Indian prehistory, particularly V. D. Krishnaswami who throughout his career had searched for the meeting grounds of these two cultures. He found the Sabarmati valley in Gujarat 'to be a clear meeting-ground of the northern Sohan and the biface Madras industry' (*Ancient India* 3: 32) The Singrauli basin near Mirzapur (U.P.) was also considered by Krishnaswami as a 'pivotal region for revealing a contact between two tool-traditions—the Sohan and the Madras' (*Ancient India* 9: 61) because his collection contained 15% of the pebble tools!

Up to 1955, the concept of this two-culture theory was very strong in the minds of Indian prehistorians, leaving of course a few exceptions aside; so much so that the writer also started his investigations in Malwa adjacent to Gujarat region with a view to finding out the meeting ground of these two cultures. But it appeared that the pebble tools are part and parcel of the handaxe-cleaver complex. Further research in the Narmada valley gave additional evidence, supported by faunal accompaniment and stratigraphical data in that connection, which was contrary to the results of the Yale-Cambridge expedition in the valley of the Narmada. Instead of mixed industries in different horizons of the ancient alluvium, it appeared that there had been an evolution of hand-axe industry from the pebble pre-Chellian stage to the advanced Acheulian hand-axes. The basal-most horizon of the greasy red-clay yielded chopper-chopping tools made of heavy, massive pebbles of large size.

There were specimens which suggested the hand-axe forms but on close scrutiny it was found that the actual emergence of the hand-axe took place a little afterwards. This industry was called 'Mahadevian' after its type site (Khatri 1961) and the author assumes that the Sohan pebble tools belong to this stage of the hand-axe evolution rather than representing a separate Stone Age culture.

MIDDLE STONE AGE

Nevasian or Series II Tools

The term 'Nevasian' for this culture has been coined recently after Nevasa, a village on the bank of the Paravara, a tributary of the Godavari in Ahmadnagar district of Maharashtra state. Here it was found to occur next to the handaxe-cleaver yielding stratum and below the overlying layer in which microliths were found. It is also called Series II for convenience sake because of its stratigraphical position between the hand-axe culture below and the microlithic culture above—which are called Series I and Series III respectively.

These tools were being picked up from the time of Bruce Foote, when they were passed as 'big' microliths. In fact, the agate flake discovered by Wynne in 1865 from the Godavari alluvium is also a specimen from this culture. De Terra thought them to be associated with regur or cotton soil and termed them 'proto-neolithic'.

Till recently this culture was a subject of controversy among Indian prehistorians as to its stratigraphical situation; its relationship with the underlying hand-axe culture; and microliths made of chalcedony and chert found in the horizon lying immediately above. The dating was vague in the absence of fossils in the horizon occupied by the industry. However the recent work in the Narmada valley in Central India has cleared up the matter to a large extent because of the discovery of their occurrence *in situ* along with mammalian fossils.

The whole question has been reviewed in some detail recently (Khatri 1962) in the light of valuable data gathered from the Narmada basin. The following are the important points regarding the origin and development of this culture:

a. The Nevasian or Series II culture mainly consists of scrapers-side, hollow or both-points and borers made of semi-precious material like jasper, chalcedony and chert of volcanic origin.

b. Their distribution is wide-spread covering almost the whole of peninsular India. Khatri (1957) had reported them from the Chambal, Shivna and the Narmada in Central India and from Bhima (Maharashtra): Misra (1959-60 *Indian Archaeology—a Review*, p. 39) from Luni in Rajasthan; Sankalia (1945, 1956a) from the Godavari and Parvara; Deo and Ansari (1956-57 *Indian Archaeology—a Review*, p. 11) from the Tapti; Isaac and Khatri (1959-60 *Indian Archaeology—a Review*, p. 11) from Kurnool, and Mohapatra (1960) from Orissa.

c. In the Narmada they occur in cross-bedded sandy layers above the cemented sandy-gravel belonging to group II of the ancient alluvium stratigraphy of the valley.

d. The mammalian fossils of extinct Pleistocene fauna like *Elephas namadicus*, *Bos namadicus*, *Hippopotamus namadicus*, *Equus namadicus*, *Bison*, *Bubalus*, *Sus*, etc. occur in the horizon and are the later survivals of the fauna which became extinct

in other parts of India and the world but managed to survive here because of good surviving conditions assisted by isolation. It is interesting to note that the sub-tropical forests along the bank of the Narmada still teem with the ancient wild life.

e. The cross-bedded sandy horizon besides Series II tools and the aforementioned mammalian fossils also contain late Acheulian hand-axes very finely and neatly made by the wood hammer technique. The material of which the hand-axes are made also changes from the quartzite to jasper, chert and flint which is the effect of Nevasian folk on the Acheulian hand-axe manufacturing community.

f. This culture seems to have flourished in the late Upper Pleistocene and there is a genetical connection between it and the microlithic culture succeeding it.

LATE STONE AGE

The Microlithic Industries

The microliths in India seem to cover a long range of time—from the beginning of the Holocene to the very recent times, say 17–18th century A.D. Their spatial distribution is India-wide and their occurrence is found alone, with pottery, with neoliths, with megaliths and sometimes with all of them occurring together, in addition to copper and iron objects. Some of the microlithic sites are associated with waterfalls and springs like Chitrakoot in Bastar district, Patal Pani near Indore, both in Madhya Pradesh and Ellora near Aurangabad. They are found as well on the top of the loessic mounds (known as *timbas*) as is the case in northern and central Gujarat.

In the coastal plains of Madras their sites occur in association with fossil sand-dunes (*teris*). In Pachmerhi hills, at Adamgarh (Hoshangabad) and in Ajaigarh area in Madhya Pradesh they are found in rock shelters which also have paintings and engravings on their walls. In the area of Mirzapur, Banda, Bundelkhand in Uttar Pradesh and in Kurnool (Andhra Pradesh) the case is the same. In southern Bihar the microliths follow the copper belt which starts a few miles north of Chakradharpur and continues through Kharasawan and Serai Kela and across Dalbhum to Rakha mines and Ghatsila on the Savaranarekha (Gordon 1950). At Admagarh, microliths were also made of bottle glass, besides chalcedony and jasper which indicates that they continued to be used by primitive tribals in their *cul de sac* areas, far from the centres of urbanized populations. Todd (1932) recorded a similar case of microliths on glass in the Bhil areas of Bombay.

The microliths in India have attracted the attention of a few observers but such studies are very few and far between. The beginning was made by Robert Bruce Foote (1916) who, besides discovering numerous microlithic sites all over South and Western India, came to the conclusion that in India there occurs a big gap or hiatus between the palæolithic hand-axes and neolithic polished and grounded celts. He supported his theory by a Sabarmati section. In advancing this theory he was actually following the footsteps of Sir Johan Evans who was also of the opinion that a similar hiatus occurred in Western Europe too (Foote 1961: 15). This theory is no more valid in Europe nor in India in the light of recent information. Incidentally, to prove or to discard this theory, an expedition to Gujarat was sponsored in

1941 with H. D. Sankalia, V. D. Krishnaswami and B. K. Chatterjee as members. Further studies on the Gujarat microliths were carried out by Sankalia (1946, 1956b) and Zeuner (1950, 1952). During the excavation on the loessic mound at Langhnaj four skeletons of microlith-makers (3 male and 1 female) were also found, the preliminary study of which was done by Mrs Irawati Karve (Sankalia and Irawati Karve 1949).

Lt. K. R. U. Todd (1932, 1939, 1950) worked on the microlithic industries of Bombay, D. H. Gordon (1936, 1938, 1950) in Central India, A. Aiyappan (1945) and F. E. Zeuner (1956) on the *teri* sites of the Madras coastal plain, M. Seshadri in Mysore (1958) and B. B. Lal (1958) in Birbhanpur, West Bengal.

The typology of Indian microliths is generally composed of fluted cores, scrapers, points, borers, flakes, blades and geometric elements like triangles, lunates, crescents and trapezes. The raw material generally used is chert, chalcedony, jasper of various colours and in some cases quartz. Burins and micro-burins have been reported but their mention in recent literature of Indian prehistory should be taken with caution, since the majority of the workers are not properly acquainted with European material and are not well-versed with the typology, to say nothing of their knowledge of the recent views and opinions of leading workers of prehistory in France and other parts of the continent. But one has but to believe, Zeuner and Bridget Allchin (1956: 11) who recorded micro-burins from Sawyerpuram, a *teri* site in the Tinnevely district of Madras, and Todd (1950: 6) who recorded five micro-burins from the site of Salsette Island after showing one of them to Prof. J. G. D. Clark. Todd also mentions the finds of polyhedral and *bec-de-flûte* burins. Seshadri found five burins in the Jalalahi assemblage, three on quartz and two made on rock crystals besides ten *petits tranchets* which are also very rare in India.

IMPORTANT MICROLITHIC SITES

To give an idea of regional variance in the pattern of microlithic distribution a short account of some of the better studied areas is given below:

1. Langhnaj Microlithic Industry, Gujarat

(Sankalia 1946, 1956b; Zeuner 1950, 1952, Sankalia and Karve 1949)

This is the only microlithic site in India where skeletons of *Homo sapiens*, supposed to be the authors of the microlithic culture have been excavated in the 'pure' microlithic zone at Langhnaj from the loessic mounds or *timbas*. The quality of the microliths is poor since 'rather fewer than one in 100 artifacts can be regarded as tool' (Zeuner 1952: 1). The raw material used is grey, pink and brown cherts, vein quartz and jasper of various colours. The typology is made up of fluted cores with flat base and conical or truncated top, scrapers—core, oblique, thumb-end or side variety, borers, crescents, lunates, triangles (scalene or isosceles or both), trapezes, trapezoids, sub-triangular points with retouched backs, asymmetrical points, notched flakes, parallel-sided flakes and so on. There are irregular cores of polyhedral type too. The faunal remains, which are much calcified, are found in company with microliths and represent the game animals according to Prof. Zeuner

(1952). They include Indian rhinoceros (*Rhinoceros unicornis*), the hog deer (*Hoylephus porcinus*. Zimm) and wild Indian buffalo, and Nilgai (*Boselephas traco-camelus* Pall.) etc. The lack of domesticated animals show that people subsisted on the hunting type of economy in the earlier stages, but later on seems to have changed to agriculture as indicated by the presence of pottery sherds in the upper layers.

As regard the age of the microlithic industry nothing can be said except that the microliths from the lowermost level appear to be fairly ancient.

2. *The Microliths from the West Coast of Bombay Region*

Todd records important observations on microliths from Khandivli (1932) and Salsette island (1950) near Bombay. His Khandivli section is a matter of controversy now, wherein he records a blade and burin industry from the top of the uppermost gravel.

The Salsette island (1950) microliths are made of indurated shell with pebbles of agate, chalcedony, cornelian and chert; their typology consists of lunates, triangles, trapezes, oblique and straight-side blunted microliths produced with single blow, polyhedral and *bec-de-flûte* burins and micro-burins, cores and scrapers. Beads are also found sometimes. Todd dates this industry prior to 200 B.C. or may be 500 B.C. but subsequent to the blade and burin horizon of Khandivli.

3. *The Microliths from Mysore Plateau*

Seshadri (1953) classified the microlithic industries of Mysore plateau into three types: *a.* The Jalahalli hunting type; *b.* Brahmagiri pre-I type; *c.* Brahmagiri IA and IB urban or village type.

The Jalahalli industry seems to be the oldest among the three and is made exclusively of quartz and rock crystal. The name Jalahalli is taken from a village 10 miles north-west of Bangalore where this type of microliths were gathered together. The typology is composed of fluted cores—pointed, cylindrical, conical flat-based and chisel-ended type, asymmetrical point with completely blunted back (most typical of the industry) triangles, lunates, *petit tranchets*, burins and scrapers. The presence of *petit tranchets* and burins, though smaller in number, are of particular interest to note where they are very rare. Like Gujarat, the Jalahalli microliths are also of 'hunting' type.

Here also the question of age remains unsolved but relatively speaking, these microliths are earlier than Brahmagiri IA–IB which is dated between *c.* 1000 B.C. and *c.* 300 B.C.

The Brahmagiri Pre-I category of microliths was created by Seshadri to fit in a surface collection which could not be adjusted in the Brahmagiri sequence and may be that on further field studies it may be abolished. Microliths are made of chert, jasper and opal. Typologically it is comparable to the microliths of Sanganakallu phase I which are the crude type of artifacts associated with heavily patinated trap and sand-stone flakes.

The Brahmagiri IA, IB, microlithic industry consists of slender blades and is associated with polished stone axes. The blades are retouched and a few of them have blunted backs.

4. *Tinnevelly Microlithic Industry* (Zeuner and Allchin 1952)

This industry, associated with fossil red dune-sands is regarded to be of great antiquity among the Indian microliths. This is of the 'hunting' type and is made of quartz and chert and is characterized by geometric elements like lunates, triangles besides simple and asymmetrical points, transverse arrowheads, blades, micro-burins, scrapers and fluted cores. According to Zeuner (1952: 8) it is estimated to be as old as 6,000 years.

THE NEOLITHIC CULTURAL COMPLEX

Though the neoliths were the first² among the Stone Age tools to be discovered in India, their study has not advanced much. The subject has of course a few theories but they are amorphous and without any support of concrete field data. The recent noteworthy studies on the neoliths have been done by B. Subbarao (1948), E. C. Worman (1949), A. H. Dani (1955), Kanti Pakrasi (1956), F. R. Allchin (1957) and V. D. Krishnaswami (1959).

Subbarao's work is a report on the two trench-excavation of habitational-*cum*-factory site on the top of the Sannarassamma hill in the village of Sanganakallu (or Sangankall) near the town of Bellary, South India. From the same site the present writer made a very large, fresh collection in 1960 to restudy the neoliths, the result of which is to be published soon. Subbarao's excavation confirmed Wheeler's results obtained at Brahmagiri, a site 40 miles south-west of Bellary in the Molkalmarru taluk of Mysore state. On the top of the Brahmagiri mound was found an Andhra culture which flourished in the early part of the first century A.D. It was characterized by imported or imitated rouletted ware in association with red slipped pottery with criss-cross yellow paintings. Below this was a megalithic phase which continued to be practised for about three centuries and was over B.C. The important characteristic of this culture was the stone-cist and stone-circle burials together with highly polished red and black ware.

The lowermost horizon was occupied by the neolithic people. In the deep stratified deposit were found polished celts, burials in crude hand-made urns and microliths of quartz, agate together with a few pieces of bronze and copper.

At Sanganakallu, the sequence starts with the megalithic complex (Phase III), at the top it coexists with the last phase of the neolithic culture as is the case at Brahmagiri. Below the megalithic comes the neolithic phase (Phase II) characterized by celts, coarse brown and black, and pale-grey pottery, and a microlithic industry on quartz. Next comes a substratum in which were found heavily patinated flakes

² H. P. Le Mesurier, Chief Engineer East Indian Railway, found neoliths in large number in the Tonse valley in January 1860. This he communicated to A. Grote, Esq., the President of the Asiatic Society of Bengal, in a letter which appeared in the *Proceedings* of the Society in February 1861.

of trap and sandstone along with a crude quartz microlithic industry (Phase I). This layer was separated from that lying immediately above by a thin sterile layer.

Both the excavations show that the neoliths and microliths were in use together from the beginning and continued to be practised by the megalithic people which came into existence near 400 B.C.

The typology of the Bellary neolithic culture complex is composed of several varieties of axes, chisels, picks, fabricators, rounders, grooved hammer-stones, sling stones, discs and Acheulian handaxe-like cores. The axes have been classified into various categories on the basis of their transverse section, such as ellipsoidal or oval, flat oval or lenticular, circular, semi-rectangular, blunt butted, shoe-last celt or axe, axe-hammer, adze and thin flat celt, and so on.

Worman (1949) studied the neolithic problem of India from the distributional point of view of various categories of celts. He based his classification on the technique of their manufacture. His *Kulture Kreise* approach led him to formulate the viewpoint that the neolithic in India is of eastern origin. His broad generalizations have been challenged by Allchin (1957: 22); his theory of eastern origin of Indian neolithic complex is questioned by Krishnaswami (1959: 25).

A. H. Dani (1955) has studied the neolithic cultural complex of Eastern India in relation to Southeast Asia and has arrived at the conclusion that the neolithic culture was imported to India in several migrational waves through the corridor of Burma and Assam.

Kanti Pakrasi (1956) described the Assamese neolithic collection made by J. P. Mills from Negaland (22), by C. R. Pawsey from Mokokchang, Naga Hills (5), and by D. K. Bhattacharjya and M. C. Goswami (22) from Sarania hills in Gauhati and from Tura in Garo hills. Since Assam is an important area from the neolithic point of view, any attempt to present the information will be welcome.

F. R. Allchin (1957) contributed a study of four surface collections made from Bellary region by Hubert Knox, W. E. Jardine, Henry Gompertz and F. J. Richards in the last century. The first three are placed in the British Museum and that of Richards in the Pitt-Rivers Museum, Oxford. The paper attempts to 'provide a standard for comparison with the earlier typologies'. Many other important collections of Indian neoliths were taken to foreign museums during British days; but they are, without any exception, devoid of stratigraphical context, though their typological study is worthwhile.

Krishnaswami's presidential address (1959) entitled 'The Neolithic pattern of India', delivered to the section of Anthropology and Archaeology of the 46th session of the Indian Science Congress, is a bold attempt to synthesize and piece together the different evidences of the Neolithic cultures in India.

He distinguishes four regional Neolithic cultures representing diverse patterns and designates them by letters A, B, C, and D.

A: Includes chalcolithic cultures of Madhya Pradesh and Western India roughly occupying the Deccan trap region. These cultures are characterized by red and black pottery, parallel-sided ribbon blades and geometric microliths like triangle, trapezium, lunates, etc.

B: Confined to South India especially Karnatak region. The pointed-butt type is the most characteristic symbol of this type of pattern.

C: Eastern India (Assam, Bengal, Bihar and Orissa) is covered by this neolithic complex where three phases overlap each other.

The first phase is represented by rounded butt-axe in which three processes of chipping, grinding and polishing are employed and has no connection with the earlier microlithic culture as is the case in A and B regional patterns.

The second phase is distinguished by the faceted and square-cut tools involving metallic technique of manufacture.

The third phase is concerned with the copper hoards of the Gangetic basin accompanying by the tools of the second phase.

The rounded-butt axe of the first phase has been shown to be of great antiquity in Southeast Asia and might have therefore come to Chota Nagpur from there.

The faceted square-cut tools of the second phase are irregularly distributed. In Assam we get the Malaya variety of faceted tools and in Bengal, Bihar and Orissa are found the shouldered-hoe, the bar celt, and the rectangular chisel with quadrangular section (familiar in Malaya) showing a maritime influence and suggesting the possibility of introduction of the plough for rice cultivation in India.

The third phase is post-Aryan and is estimated to be of the 4th century B.C. The copper hoards are the copy of the tools in stone including the bar celt found in Chota Nagpur.

D: Kashmir comes under this category. De Terra (1939) and recently Khazanchi (1960-61 *Indian Archaeology*—a Review, p. 11) excavated the neolithic sites at Burzahom in Kashmir and found pointed butt-axes with hand-made buff and grey ware together. This North Indian polished stone-axe culture preceeds the Jhangar phase of the Indus civilization, and may be of greater antiquity than South Karnatak neoliths which remained uninfluenced by the East Indian neolithic culture.

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