

NEOLITHIC CULTURES OF INDIA

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(An Annotated Bibliography)

by

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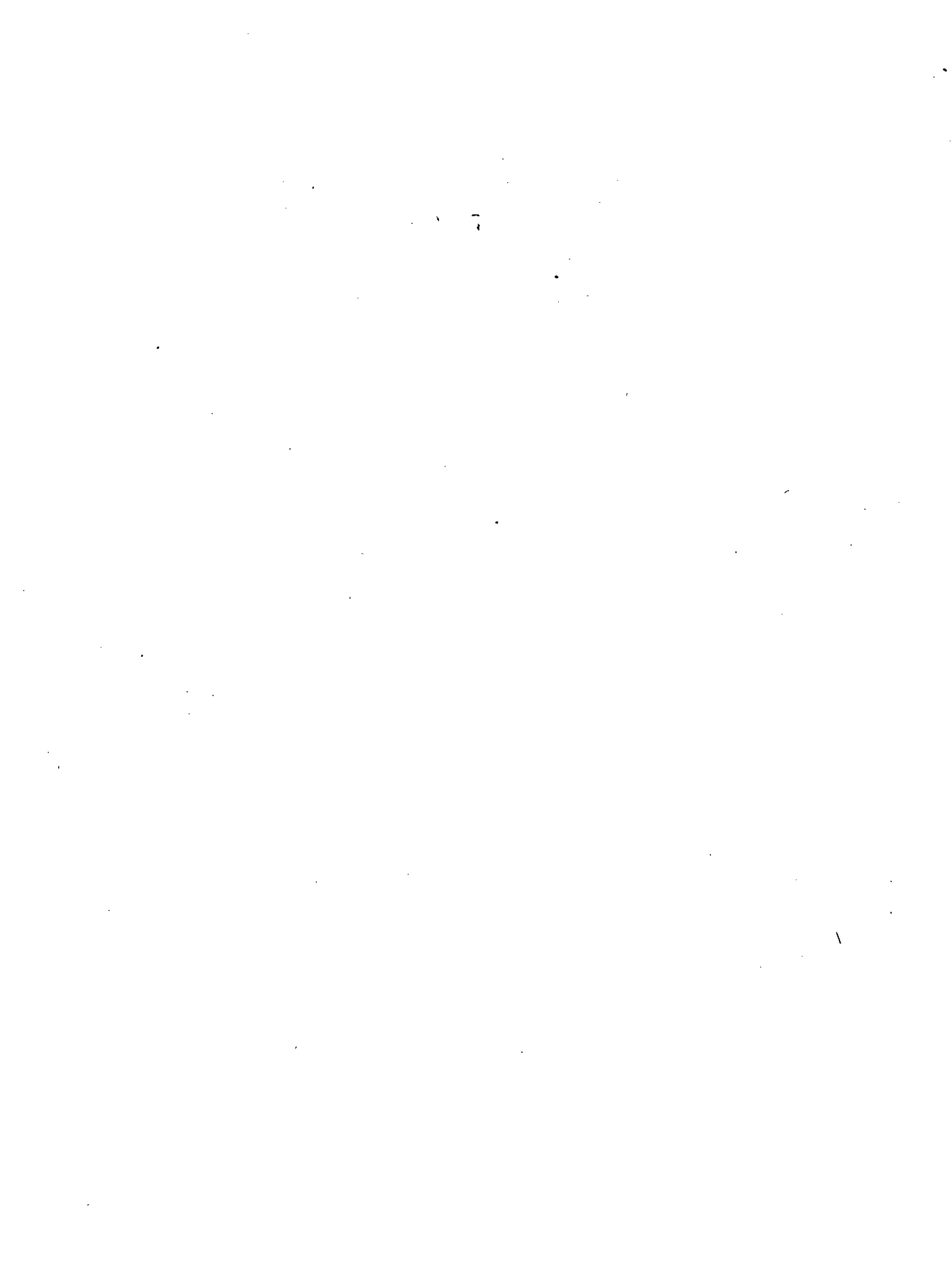
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PREFACE

The Tamil Nadu State Department of Archaeology, is bringing out a series of publications, like Tamilnadu Inscriptions series, monographs on temples, guides to Archaeological monuments, studies based on epigraphs and architecture, Excavation reports, Journals, Translations, popular guides, children's guides. It has so far brought out 71 works and its publications have been well received in the Academic as well as popular levels. An annotated Bibliography on South Indian Megaliths by K. S. Ramachandran was brought out earlier in the series, which proved to be of immense value to Archaeologists, and has received the appreciation of International scholars, and is being made use of extensively by researchers.

Sri K. S. Ramachandran's present work on the Bibliography of Neolithic cultures of India, is another valuable aid to researchers and scholars specialising in pre-historic Archaeology of India. Written with competence and adequate notes, this work places in the hands of scholars, full data about the work so far done on Neolithic India. There are nearly 300 entries in this work which gives us a comprehensive picture of the Neolithic civilization of the country. I thank Mr. K. S. Ramachandran for kindly placing this work at our disposal for publication in the Departmental series. Thiru. Chengalvarayan and other members of the Departmental press deserve special mention for their neat work.

R. Nagaswamy



INTRODUCTION

At the close of the Ice Age Man learnt to control his environment, mainly through cooperating with Nature. This made it possible for him to discard his earlier nomadic existence and to settle down to a sedentary way of life. The dull routine of 'food gathering' gave way to intentional food production in all its consequences. This transformation from simple food gathering stage to that of deliberate 'food production' as a means of subsistence is archaeologically termed as the 'Neolithic Revolution'.

The primary trait of the neolithic culture is the practice of agriculture and stock raising. Other concomittant traits are the use of polished and smoothed stone tools and manufacture of pottery: the last though not an essential feature, yet forms a contributing factor. Absence of metal in archaeological context is a pre requisite. In India three neolithic culture-zones viz., the north-western, southern and the eastern have been recognized.

North-Western Zone: The north-western neolithic culture of India is represented at the type site of Burzahom in the Kashmir valley. Burzahom has been scientifically excavated by the Archaeological Survey of India for over several years. Two phases of the neolithic period have been observed here. The economy and material culture viz., dwellings, agriculture, art, religion, burial practices, etc., represented by this culture are quite unique and interesting.

In the first phase people lived in underground chambers or 'dwelling pits', scooped into the loessic soil. These were circular, oval, square or oblong with a broad bottom, a narrow top and with stems cut into them for easy descent. Walls of these pits were plastered with the same loessic soil. Niches were also noticed in a few pits. In one instance two pits were found interconnected through an arched corridor. Square or oblong dwelling pits were rather more shallow than the circular ones and were

provided with drains on all the four sides. In the centre were ovens or hearths of stones; in the circular pits, however, some hearths were noticed on top as well. Presence of post-holes along the periphery of top openings would lead us to believe that some sort of a thatched roofing protected the inhabitants.

In the second phase residential pattern underwent a radical change. The earlier mode of pit-dwelling was abandoned; pits were filled up, plastered and capped by a thin veneer of red ochre as in the case of floorings. Houses were of mud and mud-bricks. Floors were of the *karewa* soil. Post-holes in regular disposition again indicated a thatched roof supported by wooden posts. In the late levels of this phase, however, a stone structure of slabs and rubble was encountered.

Ceramics of the first phase was a distinctive handmade steel grey ware with mat impressions. Wheel-thrown pottery was not known. Chaff and grass in the clay indicate their use as tempering materials. Decorations were mainly incised and notched designs. Besides, buff and brown wares were also encountered. In the second phase a black burnished ware makes its appearance. However, ceramics of the previous phase did continue. New types and forms were seen in this phase. But the distinguishing feature of this second phase was the use of potter's wheel in the manufacture of pottery.

Tool-types included polished stone axes of the pointed butt variety, harvesters, polishers, pounders, chisels, mace-heads, etc. Bone tools were awls, needles, points, chisels and harpoons. In the second phase, the bone tools were better manufactured and in finish and polish excelled those of the previous phase. Further the tool assemblage showed a marked increase in frequency in the second phase. A copper arrow-head found in the late levels of the second phase would attest the knowledge of this metal.

Evidence for cultivation is lacking. Querns and other grinding equipments are also absent. Pounders and mace-heads do not

prove conclusively that agriculture was practiced. Yet 'harvesters' and charred hay would suggest some sort of agricultural operations. The bone-tool assemblage, particularly points and harpoons are strongly suggestive of a predominantly hunting economy. Proof for domestication of animals is also lacking. *Barasingha* and ibex seem to have been hunted for meat.

Mat impressions on the base of pots bear witness to the knowledge of weaving. Needles suggest manufacture of clothing, perhaps of animals skins. Awls, pins and chisels were carpenter's tools. There is no direct evidence for woven cloth.

Personal ornaments were beads of carnelian strung together to make a necklace. Besides, beads of paste and a soapstone disc (pendent ?) were also found.

The mode of disposal of the dead in the first phase remains obscure; no burials of this phase were encountered in actual excavations. In the second phase however, both human and animal interments were met with. Human beings were buried in oval pits, mostly dug beneath floors. Filling was mainly ash, stone pieces and potsherds. The sides of the pits were plastered with *chunam*. Both articulated and fractional modes of interment were practiced. Most of the skeletons in the articulated interments were disposed in an embryonic posture; supine position with head towards the south-west was an exception. Bones were smeared with a coat of red ochre. Trepanning of the skull was also noticed. In the case of secondary burials skull and long bones were preferred. Along with human bones those of dogs, goats, etc., were also found. In the late levels ochre washing of the bones was discontinued and a change in the orientation of skeletons was also noticed. In one instance, the pit was also lined with stones. The human burials have parallels in Catal Huyuk, Tepe Hissar, Sialk, etc.

A peculiar feature of the neolithic complex Burzahom is the ritual burial of animals in the second phase. Animals, like the

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humans, were buried in oval pits with their inner sides plastered with chunam. These pits, like the dwelling pits, were narrow at the top and broad at the bottom and were filled with clay and stone pieces. Most of the animals were buried in sitting-at-ease or resting on right or left position. Skeletons were found at all the levels. Here too the supine position was an exception. The animals found in the burials were wolf, wild dog, ibex, etc. Burials were both articulated and fractional.

Religious beliefs of these people can best be surmised from the burials. The fact that bones were given a coat of red ochre, a widely prevalent practice in contemporary societies, would suggest the colour of the blood being used for magico-religious resurrection. Pet animals, particularly dogs, were sacrificed and buried along with human body. A religious feast of edible animals at the time of the interment is suggested by their bones also being present in human burials. A striking feature is that these animal bones too, like human bones, were given an ochre wash. Besides separate animal burials, particularly the wild dog and wolf, would make us believe these were totemic animals of some group of people. Trepanning, also a world wide custom, would indicate a magico-medical belief.

A solitary example of neolithic art is evidenced in the form of a stele engraved on a slab forming part of a structure. This engraving portrays a hunting scene: a stag being hunted from both sides, from the front by a bow and arrow and by a spear from the rear. The operation lasted for two days as evidenced by the double sun represented. A dog is also seen accompanying the party. The scene is realistically portrayed. This also has a religious significance—the cult of the sun and fertility—perhaps as a form of sympathetic magic.

The neolithic culture of the Kashmir region stands aloof from the rest of India. The dwelling pits, bone tools, the harvester, are all alien to Indian tradition. However, these traits are noticed in the neolithic culture of north China. The bone-tool

assemblage including the harpoon is found in north Chinese sites as well. Dog burials recall those of the Ang-Ang-Hse Culture of Manchuria. The stone tools exhibit affinities with Manchurian counterparts. The burial customs are similar to north and north-western Chinese and Central Asian burials of comparable age. Yet in ceramics and in the pointed butt and variety of axes, the neolithic of north-western India shows affinities with the peninsular neolithic culture. But this point can hardly be stressed much because of the spatial gap between these two regions. This factor gains ground especially when we see that the adjacent and contemporary urban Harappan civilization has in no way affected the neolithic tradition of the Kashmir valley, although incipient infiltration is seen in Ceramics.

Eastern Zone: The neolithic culture of eastern India falls into two broad groups: the Bengal, Bihar, Orissa complex and the Assam complex. The first is assessed from the excavations at Barudih in Singhbhum District, Chirand in Saran District, Kuchai in the Mayurbhanj District and Pandurajar-dhibi in Burdwan District. The second group is assessed from the excavations at Daojali Hading and Selbalgiri in Assam.

In Assam, excavations were of a limited nature and consequently did not yield any assessable evidence for the reconstruction of residential patterns.

Neolithic pottery from Assam comprised cord-marked, incised, stamped and plain red varieties; the first two are predominantly grey, the third chocolate brown and the last brick red in colour. These wares, excepting the plain red, are ill-fired, coarse, kiln-burnt and handmade. The plain red ware is of thin section and appears to have been turned on a slow wheel out of fine clay. At Selbalgiri-2, apart from the coarse gritty ware, gray to brown and dull brown wares were found; these were also handmade. The cord-marked pottery, which incidentally, denotes the mode of manufacture rather than a decoration, happens to be the predominant ceramic industry associated with neolithic tools, including the

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shouldered axe/adze. The Assam plain red ware besides exhibiting some affinities with recalls comparable red wares from the Huang Ho Valley and its southern extension upto Szchwan.

Basket impression on the base of vessels were also observed. Incision and stamping were the techniques of decorating the pottery.

Surface collection of tools from Assam region comprised the faceted and shouldered hoes, splayed axe, round-butted type of axes, axe with broad cutting edge, tanged axe, wedge blade and grooved hammer. From the regular excavations tool-semblage consisted of quadrangular adzes, small axes, with rectangular cross section, axes of sandstone, shouldered adzes, grinders, mullers, pestles, etc. These were of several varieties viz., crudely flaked all over and those ground at the edges only.

Apart from the knowledge of tool-making, the technological background of the Assam neolithic folk appear to be rather primitive. The technique of making pots in the coil and ring and dabber and pad method was most prevalent. Several types of dabbers with incised patterns were used.

No conclusive proof is available for the practice of agriculture, domestication of animals, burial customs, religious beliefs and art: the reason being the limited nature of the dig. Yet grinders, mullers, pestles would suggest corn grinding operations.

Tool types of this complex, particularly the round butted axes and shouldered hoes, have definite links with the Chinese and the South East Asian tool repertoire. In ceramics too, a certain degree of affinity can be traced in cities around Hongkong. Again an early and late neolithic phase can be discerned here; the latter with indisputable links with South China and South East Asia.

The Orissan neolithic presents a different picture. At Kunchai, the only scientifically excavated site in this region over a microlithic sub-stratum represented by blades, lunates, scrapers, etc., the true neolithic culture begins. The excavation, here too, being

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of a vertical nature with the primary purpose to ascertain the cultural sequence, evidence for dwellings, burial customs, etc., were not forthcoming.

The ceramic industry associated with the neolithic tool repertoire was a coarse grit-tempered red ware, occasionally slipped and sometimes embellished with incised or finger tip decorations. Fabric was medium to thin and medium to thick. Sand, mica and quartz particles and sometimes vegetable matter were found in the makeup of the body clay. It appears that the thick ware was handmade while the thin variety was perhaps turned on a slow wheel. Major pot forms were bowls and vases.

Tools from the dig were round-butt axes, faceted hoes, chisels, pounders and mace-heads; no shouldered axe adze were, however, encountered. Yet these were available from surface exploration. Pounders and grinders, generally utilized for corn grinding, are perhaps indicative of incipient agricultural operations.

In Bihar results of excavations at Barudih and Chirand are worth considering. These two sites again present differing pictures.

At Barudih over a microlith bearing stratum to neolithic culture is observed.

Handmade and wheel-turned pottery, grey, orange-brown and black in colour were obtained from the digs. Shapes were bowls and dishes.

Tool repertoire comprised axes and adzes and were mostly chipped, smoothed and of the round-butt variety.

Throughout the habitational accumulation, charcoal and animal bones were encountered. Co-occurrence of animal bones and charcoal would warrant a postulation of an economy based mainly on hunting. Evidence for agriculture and domestication of animals is lacking.

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The earliest culture at Chirand in the Ganga plains commences with the neolithic culture. Here vestiges of residences in the form of floors, below the ground level in the early phase and above ground level in later phase, were noticed. Circular floors indicating circular residences were observed in late levels. In one semi-circular hut several ovens were observed. Reed walls plastered over with mud and burnt earth flooring are the traits of the late phase.

Pottery was both handmade and turned on slow wheel: the latter was rare. Red, grey-black, black and black-and-red were the representative Wares. Burnishing with shining surface was seen on some pottery. Spouted vessels, lipped, perforated and footed bowls, bowls with stand, channel spouted vessels, spoons, ladles miniature pots, etc., were some of pot forms. Applied designs in the neck region, graffiti marks and mat impressions were also noticed. Powdered quartz and mica were found in the body clay. Post firing red ochre paintings like bands on rims, lip, spout, etc., linear criss-cross, concentric circles/semi-circles, etc., were observed on pottery.

Stone and bone tools formed part of the cultural *milieu*. Stone tools comprised celts, hammers, pestles, balls, etc. Tools made of bone were celts, scrapers, shaft straightener, pin, styli and arrow-head-both plain and tanged varieties. The bone tools are quite different from the Burzahom assemblage. Besides, microliths viz., parallel-sided blades, points, lunates, borers, etc., were co-existent. Microliths were of chert, chalcedony, jasper and agate.

There is no direct evidence for agriculture. But from the presence of charred rice and *masoor* it may be inferred that some sort of cultivation was obtaining. Pestles perhaps used for grinding purposes would be an additional evidence in this direction. Meat also formed part of the dietary habits. Elephant, rhino, buffalo, ox, stag and deer were some of the animals known. The economy appears to be predominantly of the hunting type.

Pendants, ear-rings, bangles, discs and combs were some of the personal ornaments. Tortoise shell and ivory were worked into bangles. Beads of semi-precious stones of a variety of shapes and sizes were strung into necklaces.

Mat impressions and bamboo screens would testify to their knowledge of weaving. There is, however, no direct evidence for cloth weaving.

Pot making, mat weaving, manufacture of personal ornaments and tool making would indicate the availability of knowledgeable craftsmen.

Humped bulls, decorated objects mounted on wheels, etc., of terracotta were children's playthings.

In Bengal, surface explorations have yielded neolithic tools in the Districts of Midnapore, Bankura, Darjeeling and Burdwan. But in actual excavations very few tools have been found. At Pandu-rajardhibi, Period II represents the neolithic (neolithic-chalcolithic) culture.

Residential vestiges were the continuation of the previous period and were in the form of floors of 'pellety' laterite.

Black-and-red ware (both and painted varieties), bright red, chocolate, a buffish ware painted in creamish white and black burnished Wares were the ceramic industries. Painted designs comprised horizontal bands, solid triangles, chevrons, criss-crosses, wavy lines occasionally enclosed in parallel lines, star fish, etc. Besides, ceramics of the earlier period viz., ill-fired, handmade pale red, grey or black and black and red wares continued. Pot-forms were lipped, channel-spouted and shallow bowls, knobbed lips, pedestal cup, etc.

Tools obtained from the excavations were of round butted variety. Bone tools and microliths were also found. Frequency of stone axes was extremely limited. Flakes, cores, scrapers, etc.,

were the microlithic tools. Points and arrow-heads were representative tools of bone.

Beads of semi-precious stones, discs and rings and bangles of copper were some of the articles of personal ornaments. Copper nail paper was an article of toiletry.

The find of charred rice would lead to the surmise that agriculture was practiced.

Burial customs differed widely. Extended inhumation, fractional interment and urn-burials were the prevalent modes.

The neolithic sites in Bihar and Bengal can be divided into two: (i) sites in the Ganga plains and (ii) those in the hilly regions and Chotanagpur plateau. Sites in the Ganga plains show a definite link with the chalcolithic cultures and hence should be termed as neolithi-chalcolithic. At Chirand however, in spite of the absence of metal in earlier phase, other traits viz., microliths, black-and-red Ware, circular huts and reed plastered walls, all recall chalcolithic affinities.

Apart from these three groups, surface explorations in Mirzapur and Banda districts have brought to light neolithic tools, particularly the pointed-butt variety of the southern tradition. No neolithic site has, however, been excavated here and hence the cultural *milieu*, their character and affinities with other neolithic regions remains dark.

Southern Zone: The southern neolithic complex encompassing the Deccan, Karnatak and part of the region down below has been studied extensively. Brahmagiri, Piklihal, Utnur, Kodekal, Paiyampalli, Hallur, Sanganakallu, Tekkalakotta, etc., are some of the major sites excavated. Among these Sanganakallu stands out prominently. Recent excavations here revealed that the neolithic culture was preceded by a people using microliths and flakes on trap: the flakes were highly patinated.

People of the Lower neolithic culture were not resourceful enough to build houses. Mostly they lived in natural caverns, often levelling a required area on hill-tops to construct platforms and terraces as appurtenances to the rock-shelters. It is only in the Upper neolithic levels that houses were built which were mostly circular on plan or circular enclosures containing rectangular rooms with walls of plastered bamboo screens. Floors were usually plastered with lime.

Some of the floors were made of stone chips. From the disposition of post-holes, plans of houses could be reconstructed. It may also be surmised that the superstructure was of perishable materials. Inside the houses storage bins were provided.

Ceramics of the Lower neolithic phase were handmade and consisted of burnished and unburnished grey, black, chocolate red and brown-ochre coloured Wares. On some of the burnished grey, black-buff Wares, a post-firing ochre painting was seen. Besides painted designs incised decorations were also noticed. The design repertoire comprised finger grooves, applied bands of finger tips, etc. Single and complex lines, circles, bands with cross hatchings, criss-cross and comb were the decorative patterns found among the painted pottery. Pot-forms worth mentioning are globular jars and legged stands. Pottery of the Upper neolithic, besides the earlier wares being continued, comprised a grey to buff mottled ware and the one with rusticated and roughened surface. Both burnished and unburnished varieties were present. However, new introduction was the wheel-thrown pottery which was absent in the Lower neolithic. To sum up, the pottery of this period comprised burnished grey, both plain and painted, black burnished, buff, brown-and-black, coarse dull and a painted black-on-red Wares; the last found at Hallur and exhibiting similarities with Jorwe Ware. Further specialized shapes, particularly spouted vessels, globular vessels with funnel shaped rims and bowls with plain and pinched lips were manufactured.

Tool repertoire consisted of polished stone axes, adzes, chisels, querns, rubbing stones, pallets, hammerstones, pounders, etc. The type fossil is the pointed butt end variety. Microliths were also available which were fashioned mainly out of chalcedony and chert. Tool types were blades and lunates. While the Lower neolithic was free from metal the Upper witnessed the use of copper tools viz, flat axes, pokers, fish-hooks, wire, etc. In the Upper neolithic frequency of stone axes is greater.

People of the Lower neolithic were pastoralists ; cattle raising being the primary occupation. Hunting and gathering was also practiced to a great extent. In the Upper neolithic evidence for cultivation and the practice of agriculture is abundant. Horse gram (*khulti*), *raji*, and such other millets were grown. Querns and pounders would suggest that corn was ground to paste before being cooked. Fish hooks of copper would bear witness to their angling efforts. Cattle, sheep, pig and fowl were domesticated. Deer, squirrel, etc., were hunted for their meat. Bones of cattle show cut marks ; possibly cut open for extracting marrow. Charred bones indicate that roasted meat was a delicacy. Further a study of bones of cattle reveal that these were used as draught animals suggesting the utilization of animal power for agricultural operations as well. Most interesting is the find of bones of horse at Hallur. Therefore, from the foregoing it would appear that the economy of the people of the Lower neolithic was essentially pastoral in character while those in the Upper neolithic practiced mixed farming, a combination of hunting and gathering and agriculture and domestication of animals.

Personal ornaments were beads of semi-precious stones, magnesite, shell, steatite, etc. A cylindrical bead with a copper wire inside was also found. Copper ring and ornaments of gold were also in vogue.

Burials of Lower neolithic were not available. In the Upper neolithic levels both extended and fractional burials in multiple urns or in pits were noticed. Children were buried in urns under the

floors. Orientation of the extended burial was north-south. Physical features of the neolithic folk, as evidenced from the skeletal remains from Tekkalakotta reveal a people of medium to tall, sturdy with large cranial capacity and a long head. Ethnically, they show similarities with Mediterranean and an autochthonous proto-Australoid. This feature is also noticed in the skeletal remains from Brahmagiri, Piklihal, Nevasa, Chandoli, Mohenjo-daro, Harappa (R 37), Lothal, Nal, etc.

There is not much evidence for the religious beliefs and practices of these people. However, we may surmise that since these people were mainly pastoralists and since the cattle formed the mainstay of their economy they might have practiced some sort of festival like the *Pongal* of the modern Tamils, connected with cattle and fertility.

Artistic talents of these people are revealed in paintings and peckings on rock surface at Kuppal, Maski, Piklihal, etc. All the paintings perhaps do not belong to the neolithic age. Some are attributable to the preceding Late Stone Age while others to the succeeding Iron Age as well. Paintings are mostly sketches. Principal colours used are red and white; the former being the predominant pigment. The theme of the paintings revolve round cattle in single or in groups. Horns of some of the cattle are adorned with festive decorations. Animals portrayed are the long horned humped bulls (*Bos indicus*), deer, tiger, elephants, occasionally with riders, horses, etc. Human representations are also seen. Some are with axes and spears while others are seen riding horses.

In rock-peckings also cattle forms the primary theme. Though peckings continued till the present day, a stylistic variation through the ages could easily be discerned. The bulls of the neolithic times resemble those represented in paintings and the terracotta figurines from comparable levels.

Figurines of humped bulls, birds and male human figurines represent terracotta art.

Ash-mounds or 'cinder mounds' as Foote calls them are a unique feature of the southern neolithic culture. These have been excavated at Utnur, Kodekal, Palvoy, etc. Excavations at the first site have proved that these ash-mounds are actually cattle pens of the neolithic folk and the mounds are formed due to successive intentional burning of accumulated dung. The burning of cattle pens/stockade at regular intervals was a necessity. This enabled making the ground for fresh stockade by disposing off the decayed structure as also to drain of the marshy nature of the cattle refuse.

Excavation, as also observation of exposed sections of these mounds, exhibit a general similarity in stratification. Also they show a conformity in the layout in general; thus they belong to the same culture-complex. It appears that there is close relationship between number of burning as represented by ashy deposite and the number of occupational phases. The distribution pattern of the ashmounds fall into two groups those which are in or close proximity to the neolithic settlements and others which are considerably removed from such habitations. Fifty percent fall in the first category. From this we may surmise a seasonal migration of the neolithic pastoralists and these were in all probability linked with important agricultural and other cognate festivals. *Pongal*, *holi*, *divali* are modern festivals in which we find a distant echo of the pastoral celebrations.

In the southern neolithic complex, particularly in the Karnataka region, certain similarities with outside region are traceable. According to Allchin, the burnished grey ware with post-firing ochre paintings recall Burzahom counterparts, as also the pottery from Daimbad in Maharashtra. Again, there is a distant echo of the grey wares from Tepe Hissar, Turang Tepe, Shah Tepe, etc. The red black painted wares have links with the wares of the

village communities of Baluchistan. The polished stone axes are reminiscent of Burzhom counterparts. The blade industries, particularly of the early phase are the legacy of the Late Stone industries. *Bos indicus* would point to an influence from North-west. In the second phase there appears to be more extensive contact with contemporary chalcolithic cultures. Hence, according to Allchin, 'the southern neolithic originates as a result of movements of peoples and cultures into the sub-continent from the east.'

On the other hand, Krishnaswami postulates an autochthonous theory for the neolithic of the Karnataka. He opines that the stone axe culture had its origin in the post-paleolithic flake industry and in course of time incorporated in its fold several traits of of the chalcolithic cultures, particularly the parallel-sided blade industry of the adjacent region. The eastern origin for this culture is also discounted by him.

It is quite reasonable to assume that Krishnaswami is nearer the truth. For, in the chalcolithic of northern Deccan and Maharashtra, several traits are akin to the Upper neolithic of Karnataka and southern India while the earlier remains unaffected. The chalcolithic impact could easily be discerned in house plans, burial customs and ceramics. The fact that in the lower levels of chalcolithic sites neoliths occur in less numbers and that too with copper would suggest that these were imports from the neighbouring primary neolithic sites. Likewise, metal tools found in the essentially neolithic settlements of Karnataka are imports. Hence it would be proper to postulate that the neolithic of Karnataka which grew on the soil come into contact with the later neighbouring chalcolithic cultures through trade and other mutual contacts, borrowed and assimilated some trait elements. This was a two-way traffic.

In ceramics too, in later phase several strains in fabric paintings, etc., viz. the Savalda Ware, Maski fabric, the Brahmagiri fabric, painted black-and-red wares, reminiscences of the Jorwe

Ware, etc., have been noted by a few scholars. How far these strains are due to folk movements and how much these have affected the culture itself remains to be determined.

Chronology: Thanks to the radiocarbon dating method we can, with a certain amount of exactness, date the neolithic cultures of India. Thus the Kashmir or the north-western complex can be said to have begun in the latter half of the third millennium B.C. (like the Kashmir neolithic) while the Upper neolithic ranged from the last quarter of the second millennium B.C. to about the fourth century B.C. The eastern complex can be dated between the last quarter of the second millennium B.C. to the fifth-fourth centuries B.C.

K. S. RAMACHANDRAN

ABBREVIATIONS

<i>ABIA</i>	<i>Annual Bibliography of Indian Archaeology</i> , Kern Institute, Leiden.
<i>ACSP</i>	<i>Archaeological Congress and Seminar Papers</i> , (Ed.) S. B. Deo, Papers presented at the 4th Annual Congress of the Indian Archaeological Society and the Seminars held at Nagpur on the 10th, 11th and 12th November, 1970, Nagpur.
<i>AI</i>	<i>Ancient India</i> , Bulletin of the Archaeological Survey of India, New Delhi.
<i>ANTIQUITY</i>	<i>Antiquity</i> , A Quarterly Review of Archaeology, Cambridge, England.
<i>AP</i>	<i>Asian Perspectives</i> , Bulletin of Far Eastern Prehistory Association, Hong Kong/Honolulu.
<i>ARADN</i>	<i>Annual Report of the Archaeological Department of H.E.H. the Nizam's Dominion</i> .
<i>ARASI</i>	<i>Annual Report of the Archaeological Survey of India</i> , New Delhi.
<i>ARASMC</i>	<i>Annual Report of the Archaeological Survey of Madras and Coorg</i> , Madras.
<i>BDCRI</i>	<i>Bulletin of the Deccan College Research Institute</i> , Poona.
<i>Bharati</i>	<i>Bharati</i> , Bulletin of the College of Indology, Varanasi.
<i>BSOAS</i>	<i>Bulletin of the School of Oriental and African Studies</i> , London.
<i>IA</i>	<i>Indian Archaeology—A Review</i> , New Delhi.
<i>ICAA</i>	International Conference on Asian Archaeology, Summaries of Papers, New Delhi, December 1961.
<i>Ind. Ant.</i>	The Indian Antiquary, Bombay.
<i>Indica</i>	<i>Indica</i> , Organ of the Heras Institute of Indian History and Culture, Bombay.
<i>ISCA</i>	The Indian Science Congress Association, Calcutta.
<i>JAI</i>	Journal of the Anthropological Institute, London.
<i>JARS</i>	Journal of the Assam Research Institute.
<i>JAS (Bom)</i>	Journal of the Asiatic Society, Bombay.

<i>JASB</i>	Journal of the Asiatic Society of Bengal, Calcutta.
<i>JBORS</i>	Journal of the Bihar and Orissa Research Society, Patna.
<i>JBRS</i>	Journal of the Bihar Research Society, Patna.
<i>JIAS</i>	Journal of the Indian Anthropological Society, Calcutta.
<i>JIH</i>	Journal of the Indian History, Trivandrum.
<i>JKU</i>	Journal of the Karnatak University, Social Science, Dharwar.
<i>JOIB</i>	Journal of the Oriental Research Institute, Baroda.
<i>J and PASB</i>	Journal and Proceedings of the Asiatic Society of Bengal, Calcutta.
<i>JRAS</i>	Journal of the Royal Asiatic Society of Great Britain and Ireland, London.
<i>JUB</i>	Journal of the University of Bombay, Bombay,
<i>JUG</i>	Journal of the University of Gauhati, Gauhati.
<i>MI</i>	Man in India, Ranchi.
<i>Man</i>	Man, a monthly record of Anthropological Science, London.
<i>PASB</i>	Proceedings of the Asiatic Society of Bengal, Calcutta.
<i>Puratattva</i>	Puratattva, Bulletin of the Archaeological Society of India, Varanasi/New Delhi.
<i>RBAST</i>	Report of the British Association for Advancement of Science-Transactions, London.
<i>SC</i>	Science and Culture, Calcutta.

NEOLITHIC CULTURES OF INDIA

(AN ANNOTATED BIBLIOGRAPHY)

1. AHMAD, Khwaja Muhammad

'Note on the Excavation and Survey of Pre-historic sites in the Raichur District, Hyderabad); *ARADN 1345 (1935-36)*, Appendix D, pp. 28-31.

Twenty-four sites of which seventeen are important, is listed. In almost all the sites neolithic implements i.e., stone axes, hammers, flakes of chalcedony and chert and cores were discovered.

Four of the caves excavated at Maski yielded chert cores, flakes, beads and plain pottery.

The best site seems to be the one lying to the north-east of the hills in a horse-shoe shaped valley. Here besides neoliths, other objects of later date were also available.

The data obtained from the explored sites are dealt under subheadings: stone implements; beads; pottery; terracotta figurines; smelting factories; megalithic tombs and prehistoric paintings.

Summing up the author says:

- (i) the Stone Age in India was followed by Iron Age to which the megalithic tombs belong;
- (ii) neolithic pottery is purely plain devoid of glaze;
- (iii) pottery found in smelting sites sometimes have a polish and are painted with geometric and other designs, besides incised and embossed decorations; and
- (iv) prehistoric paintings belong to early Iron Age.

2. ALLCHIN, B. and F. R.

'A Neolithic pot from Andhra Pradesh', *ANTIQUITY*, XXXVI, 1962, pp. 302-303.

The article deals with a reconstructed pot from the sherds picked up from the thrown up earth from the excavations at Billasurgam caves, Kurnool District. The site is five miles (8 km.) north of Patpadu.

In the earlier excavations, drinking bowls of rough earthen ware below 11 feet (3.35 m.) below surface were reported. These were not modern, and were unglazed. The red glazed (burnished or slipped) ware came from a depth of 10'3" to - 9" (3.1-2.1 m.). Other pottery, bones and shell bangles were from surface layer. In 1957 the authors visiting the site collected some sherds from the heaps of thrown up earth. Closer examination showed that they belonged to a single vessel of neolithic complex. The reconstructed vessel proved to be burnished, with blotchy surface burning to a black brown, green, grey colour and is close to A4 fabric of Piklihal. (upper neolithic). This type of vessel is sometimes spouted. An identical form without spout was obtained from Maski in a neolithic burial. In Iron Age the A4 fabric disappears.

The Patpadu vessel might have been a spouted variety available in the excavations of neolithic settlements. Alternatively it had no spout. The purpose was to carry some liquid, etc. This form is found in neolithic and Iron age contexts. The shape is probably derived from gourd. Parallelism is the use of gourds by the Veddas of Ceylon for collecting honey.

3. ALLCHIN, Bridget and Raymond,
The Birth of Indian Civilization, Harmondsworth, 1968.

Neolithic culture is dealt with in the Chapter 'Neolithic-Chalcolithic settlements of India beyond the Indus system,' (pp. 157 ff)

In a generalized way axes fall into five groups viz., (i) northern group from Kashmir valley, (ii) southern group in the Peninsula, (iii) eastern group including Assam, (iv) central group comprising central India south of the Ganges valley and (v) eastern-central group consisting of Bihar, Orissa and Chotanagpur. These are considered as entities.

The northern group is mainly gleaned from the excavations at Burzahom. Cultural milieu of the several phases of the excavation is recounted. Certain types of bone tools, rectangular perforated stone knife, pit-dwellings, burial of dog along with the dead body are foreign to Indian tradition. These are found in the neolithic cultures of north China. Pottery does not compare with the Chinese neolithic wares. The economy is hunting-based exhibiting relationship with the hunting peoples in the peripheral regions and of north and north-western China and Central-Asia.

In the southern group three phases are distinguished. People of Phase 1 used ground stone axe and had rudimentary flakes or a blade tradition. They domesticated cattle, sheep and goats. Pottery was handmade. Settlements were on top of hills or on levelled terraces. They constructed forest cattle pens. The culture is represented by Utnur, Piklihal (lower neolithic) and Brahmagiri IA. The second phase shows development. Circular huts and mud floors the form residences. Increase in stone axes and blades is observed. In pottery spouts appear now. However, there is a basic continuity from the earlier phase. The culture is represented by Piklihal (Upper Neolithic), Brahmagiri IA and IB Sanganakallu Period I phase I Tekkalakotta I, Hallur IIA. Towards the end of the period metal objects are found. The third phase is to be seen in Tekkalakotta I and Hallur and possibly at Paiyampalli. Stone axe industry and blade industry continue. Increased use of copper/bronze tool is noticed. There is continuity in all the phases. Occupation once established was not shifted. The southern neolithic resulted due to the 'movements of people and cultures into the sub-continent from the east'.

The eastern group is represented by the tools obtained from excavations at Daojaling Hading which exhibit typological similarities with those abundantly found in China and South-East Asia. So also pottery which has more affinities with China and Honkong. Metal was not found in this level. Surface finds from other parts of Assam are similar to Daojaling Hading. In Garo and Naga Hills a semi tanged round shouldered axe is present showing affinities with China, Burma and Yunan. Relationship of the eastern group with Burzahom or southern group is not clearly established.

Tools from Mirzapur, etc, are mostly triangular showing confirmity with southern group. Some proto-types of Assam neolithic tools are also found. In this area the occurrence of primary neolithic culture has not been clearly established.

The last group from Bihar, Bengal and Orissa pertain mainly to evidence from Kuchai, Sanjai Valley and surface collections from Santal parganas.

Summarising, the authors state :

(1) In Kashmir and the Indus system there is no clear evidence so far to show a broad process of diffusion as found in the Baluchistan till post Harappan times.

(2) In the last three regions pre-metal neolithic culture is noticed; which chronologically is later than west.

(3) The first two are pre-Harappan in time scale.

(4) In Kashmir the culture represents a hunting economy. Evidence for agriculture and domestication is yet to come.

(5) Burial customs and furnishings show influence from the neolithic or near neolithic cultures of Central Asia, Siberia and north-western frontiers of China.

(6) Other equipments show distant relationship with the south.

(7) Southern neolithic shows three phases; in the later two steady increase of metal tools is noticed. These are secondary neolithic or chalcolithic.

(8) In Assam there is an 'early' neolithic having some affinities with those of Kashmir region and south, and also south China.

(9) Here there is also a mature neolithic with some connections with south China and South-East Asia.

4. ALLCHIN, F. R.

'The neolithic stone industry of the north Karnataka region', *BSOAS*, XIX, 2, 1957, pp. 321-35.

The paper is an analysis of four unpublished collections from the Bellary region, three of which are housed in the British Museum and the other in the Pitt Rivers Museum, Oxford. The raw material of the implements is indigenous rock-igneous and metamorphic. The fine grained rocks are used for edge tools and the coarse grained ones for rubbers, grinders, hammers, etc. Rocks with jointed planes have been utilized and with advantage for making edge tools. Careful petrological study would reveal the source of manufacture and distribution which may suggest trade from factories. Labour and variety of tools was controlled by the raw material. The real criterion to decide tool is to see for the use of marks.

Describing the processes of manufacture, the author says that pecking was rarely employed for edge tools and was reserved for specimens of particular size or finish. Pecking is common in rubbers and grinders. Overall grinding was for small and well shaped axes. There is no evidence for postulating evolutionary process of tool making technique in this region. All the processes were known.

These were perhaps derived ultimately from the neolithic stone working technique of Middle East and Iran.

In the Karnataka region grinding grooves are rarely found. They are to be found only at the factory site which would emphasise the craft aspect of the industry.

The classification adopted is here functional, then technological and descriptive viz.,

- (i) Edge tools: when there is evidence of the preparation of cutting edge either by grinding or flaking or the use of suitable by-product flake edge;
- (ii) Points: when the point appears to be the main functional point;
- (iii) Rubbers, Grinders: according to functions;
- (iv) Hammers: hammering being the main function.

Tools might have been used for more than one function. No hafts were found so far.

In the first group come axes, adzes, although axes could have used as adzes. Axe and adze are not differentiated here; chisels, wedges, scrapers and by-product flakes are the other tool-types. In the second category are picks, roughly flaked and worked to a point; borers or pointed fabricators. The third group consists of spheroid rubbers, discoid hammers, axe-hammers or pestles. Among the miscellaneous objects bored mace-heads, stone discs, balls, etc., are included. Ground hammerstones are very rare. Fifty-seven percent of the collection represented axes and one seventh was used adzewise.

5. ALLCHIN, F. R.

Piklihal Excavations, Andhra Pradesh Archaeological Series no. 1., Hyderabad, 1960.

The report on the excavation at Piklihal is divided into three parts. Part I deals with Field observations while Parts II and III deal with study of materials and interpretation of chronology and conclusion respectively.

Pottery has been classified on the basis of technology. The classification is as follows;

A1 Lower/Upper Neolithic	Grey, black-buff incised and perforated surface	Handmade and unburnished
Upper Neolithic	roughened surface and rusticated	-do-
A2 Lower/Upper Neolithic	Grey, black-buff, ochre painted	Handmade, burnished. A post-firing red ochre wash is also present
A3 Mainly lower Neolithic	red, black chocolate brown ochre	colours are those of distinctive dressing applied to posts, handmade
"	painted	purple ochre pigment-pre-firing
A3 Upper Neolithic	Grey-buff, mottled	Burnished, turn-table modelled. fused surface.
A5 Upper Neolithic	Grey-buff, mottled	Burnished, turned on a turn-table, approaching red and-black ware.
A5 Intrusion	painted	buff or red slipped wheel thrown, unburnished with purple ochre painted

The cultural sequence can be summed up as under :

The earliest level pertains to Lower Neolithic. Ceramics of this level are A1, A2, and A3. Important are the legged stands in A3 and terracotta bulls. Besides ground stone axes, a blade industry is also associated. Numerous cattle bones were recovered. In the Upper Neolithic A3 ware is absent and the incidence of A4 and A5 increases. Evidence houses and copper/bronze is available. Stone industry continues.

The 'intrusion' level is characterized by the AB wheel thrown painted pottery comparable to Brahmagiri and elsewhere in Maharashtra.

Piklihal Lower neolithic is equated with Brahmagiri IA Sanganakallu Period II, phase 1. Upper neolithic of Piklihal with Brahmagiri IB, Sanganakallu Period II, phase 2 and Maski I. The intrusion level is equated with pottery group B of Brahmagiri and Sanganakallu surface AB.

Comparison of Piklihal with other chalcolithic sites brings out that in Maharashtra and Malwa a few pottery shapes have affinities viz., in Jorwe and Nasik. Similarity in potting technique at Prakash and Bahal is noticed. But in any case these affinities are only in general terms.

In Saurashtra the affinities with Karnataka neolithic is less marked.

The Indus civilization reveals striking links as also contrasts. Similarities are found in blade industry. The bronze tools afford parallels, steatite disc beads afford a link. *Bos indicus* is yet another strengthening tie between the two cultures. But differences are noticed in ceramics and potting techniques. The spout is absent in the Indus valley.

In the Iranian plateau potting tradition is similar to Karnataka neolithic times particularly in the grey ware.

In the northern Karnataka and northern Maharashtra evidence are available to prove a movement of peoples from Maharashtra into Karnataka. Influences from Iran, etc., could have been sometimes later than 2100 B.C.

The Upper Neolithic ended with the appearance of the black-and-red ware. It is likely that the intrusion is linked with the spread of the iron.

The author dates the Lower Neolithic to *circa* 2000-1250 B. C., Upper Neolithic to 1250 B.C. - 650 B.C. and the intrusion to 650-550 B.C.

Dealing with the cultural interpretation the author observes :

The earliest cultural period is Lower Neolithic when people cleared the level spaces on tops of hills. Natural caverns were used for living and they constructed platforms and terraces. The terrace served as habitations, cattle pens and also for cultivation. These people came from elsewhere bringing with them fully evolved neolithic stone industry. Common tool was the axe. Other tools were adze, chisel, querns, rubbing stones, palletes, hammers and pounders. Use of fire is attested by ash and charcoal. Blade industry is based on the technique of neolithic-chalcolithic people. Copper/bronze was not entirely unknown. Pots were mainly hand-made. Basket making, mat making and bone working were known, particularly in Upper Neolithic. The economy was pastoral, cattle being the mainstay. It is not known whether cultivation was practiced but small scale horticulture was surely practiced. Animals were also killed for food. Known animals were wild buffalo, deer, gazelle, etc.

Trade was through barter.

Extended burial in pits with attendant furnishing was the order.

In the Upper Neolithic there is a development in the settlement pattern. Surface of the terrace was levelled. Floors were of mud and cow dung. Post-holes suggested structures of wattle and daub. Stone industry did not change. So also the potter's craft. There was little change in the economy and cattle was still important. Beads of magnesite or shell and of carnelian appear for the first time.

The intrusion was by a new people from north who knew potter's wheel and a painting technique. Burials were away from the habitation.

In conclusion the author observes: the origin of the neolithic folk is connected with the folk movement from Central India who were pastoralists, and who in course of their movement adopted changes on their way to north Karnataka.

The skeletal remains from Piklihal reveal a mixed population. People were tall, sturdy with large cranial capacity and differing head forms. Again 'these could be the authors of a major element of the present mixed so-called Dravidian inhabitants of the Deccan and Southern India.'

6. ALLCHIN, F R.

Utnur Excavations, Andhra Pradesh Government Archaeological Series, no. 5, Hyderabad, 1961.

The report is divided into seven chapters viz., (i) Introduction, (ii) the problem of Ash mounds, (iii) Explorations around Utnur, (iv) the excavations (v) Study of objects, (vi) Interpretation of Excavation and (vii) Conclusions.

Purpose of the excavation was: (i) to investigate Foote's hypothesis (on Ash mounds) as modified by the excavations at Piklihal, (ii) to discover, if possible the nature of the accumulations, (iii) to study the duration and frequency of repetition of cycles of accumulations and burning, and (iv) to search for the *raison d'être* of the ash accumulations.

The study of pottery is on the lines of Piklihal and is dealt as follows: (i) body clay, (ii) forming, (iii) surface treatment classification on

functional basis as also comparative and morphological analysis of A1 and A2 wares. From a study of the pottery of Utnur its relative position in the neolithic chalcolithic sequence can be established.

The neolithic blade industry compares well with that of Maski and Piklihal. Cores, blades, backed blades, lunates, flakes, used pieces were some of the types obtained from the excavations. Surface collection included blade cores, blades, retouched blades, lunates, discoids, scrapers on flakes, micro-burins (?), flakes, guide flakes, used pieces, worked quartz crystals, pebble hammer stones, etc. Summarising the author remarks that the materials used were mainly water worn pebbles of chert, chalcedony or crystal, probably from the banks of the Tungabhadra. Typology and general standards of technical accomplishment recall similar industry from other sites.

Ground and pecked stone industry of Utnur compares both technologically and typologically with those of Bellary and Piklihal and it conforms to the general pattern revealed in the other categories of find. The difference is noticeable in raw materials. Absence of basalt is marked. Many tools are of a grey gneiss or a dark green horn blende-schist, both are of local origin. Otherwise usual admixture of granite gneiss and diorites is the order. Technology is also distinctive. Very few axes are seen and show comparative lack of fineness. There is a proportional increase in ground and pecked tools. It would seem that Utnur lagged behind in stone working craftsmanship.

Nearly all the Utnur tools from excavation or surface collection are crudely made, very highly worn and were ultimately broken into fragments.

Tool types are: edge tools--axe group, by-product flakes, rubbers, grinders, and hammers.

There is an absence of main varieties of axes and adzes, chisels, picks, and bores. Lack of perforation in hammers-stones presumably indicates the specialized nature of Bellary as a factory site and the absence of a specialized stone working industry at Utnur. One fragment of bovine bone ground at one end to form a flattened chisel-like blade was found.

The vast majority of animals represented by animal remains are cattle, and a small number of deer and goat.

Radiocarbon dating of a sample reads 4243 ± 155 B.P. i.e., 2293 ± 155 B.C.

Climatic conditions or natural cover when the Utnur site was first occupied cannot be authenticated but sometime before 2293 ± 155 B.C. the first settlers migrated here with their herds of cattle (*Bos Indicus*), sheep and goat. Culturally they belonged to the Neolithic of the Deccan whose origins has been traced to north-eastern Iran moving down into Peninsular India in a series of waves.

Periods I to III with their sub divisions and IV are neolithic.

Stockades and cattle pens are evidenced by successive levelling, burning and presence of post-holes. There is a strong suggestion supported by the pottery and other finds that the ash mound was abandoned for a considerable period of time before the early historic activity.

Concluding the author observes :

Two kinds of neolithic settlement, one near cinder mounds and the other removed and isolated can be discerned. The ash-mound may preserve the evidence of seasonal migration. The size of mound, the size of cattle pen are the index to the number of the heads of cattle. From the depth of dried dung and ash accumulation a minimum time limit of five years between each burning and building activity is suggested.

Absolute chronology of Utnur is rather vague. Occupation ended before 1250 B.C. There is no Upper Neolithic at Utnur.

Discarding the many theories regarding the formation of ash mounds the author agrees with Foote that these mounds were cattle pens where dung was accumulated but feels that the firing was deliberate and intentional for practical reasons.

The author says that neolithic pastoralists were not cut off from the main streams of cattle keeping tradition. The presence of cattle bonfires and needfires are a necessity. Modern *Pongal*, *Holi* and *Diwali* festivals show, besides traits of other culture impact, some traits of the pastoralists.

7. ALLCHIN, F. R.

'The Indian Ground Stone Axe-Relations, Affinities and Origins', *ICAA*, 1961, pp. 22-23.

Divergent opinions as to the origin of stone axes have been expressed.

An eastern origin is favoured by Worman and Wheeler. Allchin and Dani propagate an origin connected with the spread of neolithic/chalcolithic cultures from Middle East and Iran. Krishnaswami's view are different and complex.

Assessment of the evidence-surface and stratigraphic-has helped to distinguish varieties and distribution of tools. South Indian tool-types and surface collections from Banda, Mirzapur and Santal Parganas reveal similarities. Yet distinctive forms as well appear in these districts. In Santal Pargana exotic types with South-East Asian affinities are present. In Assam and East Pakistan (now Bangla Desh) the picture is not clear. But surface collections show an increase in South-East Asian types and a reduction of Indian types. Early Indian neolithic/chalcolithic did not extend in this region.

Stone axes can be compared with those from the Indus valley, and from the digs in the Middle East and Iran. Oversimplified diffusion is hazardous. The essential antecedents of the Indian neolithic/chalcolithic culture is to be found in the West and the Indian stone axe can be connected with them. Precise eastern traits found in Assam, etc., are imports and are late in date. Eastern origin for the Indian neolithic is sadly lacking in supporting evidence. The definite connection of South East Asian axe type with north Chinese neolithic and the absence of such types in early neolithic of India would indicate contact of north-east India with these regions after the wide dispersal of Indian axe types in the sub-continent.

B. ALLCHIN, F.R.

'The Neolithic Stone Industry of the Santal Parganas', *BSOAS*, 2, 1962, pp. 306-30.

This paper deals with the collection of neolithic implements totalling to about 2,620 pieces by Rev. P.O. Bodding. The collection is housed in the University Ethnographic Museum, Oslo. The area from which the tools were collected forms the southern part of the Santal Parganas between Bansloi and Ajai rivers. Raw materials of the tools are coarse grained gneiss, dolerite and basalt: fine grained rocks, quartzite shales and varieties of siliceous rocks. There is a definite relationship between the raw material and the technique of manufacture.

The collection is divided into: (a) neolithic assemblage comprising

axes, celts, adzes and their derivations, rubbers, and hammers including waste and miscellaneous objects and (b) Late Stone Age assemblage consisting of tools and by-products. The neolithic assemblage is further classified into six types (i) Indian axes, (ia) Indian axe-hammers, (ii) small celts, (iia) small celt-hammers, (iii) chisels and rectangular celts, (iiia) rectangular celt-hammers, (iv) shouldered celts, (v) rubbers and grinders and (vi) hammers.

Late Stone Age tools are blade-cores, fragments of cores, blade-flakes, lunates and waste pieces.

The author compares the tool-types with those of Dani (see no. 44). Further he observes :

Type (i a) is entirely below the range of the Indian axes in size. This can be compared with Bellary axes with thin body and having a tendency towards flatness suggesting some sort of adze-hafting. Common side grinding is absent in Bellary. Here a new and common tool type so light and small now occurring in Bellary industry could certainly have been hafted in a suitable sleeve.

Type (ii) is comparable with picks and chisels of Bellary.

Type (iii a) with its rectangular form and other features are foreign to Bellary types.

Type (iv) should be associated with East and South East Asia.

Type (v) and (vi) do not stand in any very special relationship to those of the south Indian neolithic.

The author distinguishes three industrial traditions here. First and second varieties of type (i) type (i a) third variety of (ii); first variety of (iii) and generally by (vi) representing a neolithic tradition closely linked with the peninsula. This is an indigenous tradition. Santal Parganas is the eastern outpost. The second is devnoted by types (ii), third and fourth varieties of type (i) and type (iia).

The author is inclined to regard the tools of this grouping together with the longer 'curvilinear' tool-types which are common in Yunnan but scarcely found in the Santal Parganas as the representatives of a neolithic tradition that is essentially eastern and not occurring at all in India to the west of

the regions mentioned. The third tradition represented by types (iii), second variety of (iiia) and (iv) is foreign to India. These are rare in the collection and, therefore has to be regarded as imports.

Rectangular celts, square shouldered celts are widely distributed in the East and South East Asia. Dani thinks their spread is connected with the Chinese Bronze Age. If it were true a differentiation between the second and third traditions is necessary.

Concluding the author says that all the three industrial traditions were co-existent, although they had probably already retreated into the hills and forest before the rapidly expanding agricultural settlement of the Ganges valley itself.

9. ALLCHIN, F.R.

'Painted pottery from Patpadu, Andhra Pradesh' *ANTIQUITY*, XXXVI, 1962, pp. 221-224.

In 1883 Foote had collected from a 'cache' considerable black-and-red ware pottery with many iron objects. In 1903 some hundred of feet away from the 'cache' fragments of a lipped bowl was found. Later in the fifties the author visited the site along with others and collected pottery from the area.

Foote's and the author's collection fall into two groups: (i) earlier painted pottery of the south Indian neolithic complex and (ii) the later with those from the 'cache' belong to the early phase of south Indian Iron Age. A continuous occupation is inferred. The neolithic pottery is hand-made; of reddish buff colour, outer surface burnished and slipped giving a bright orange red colour after firing. Pigment of the painting is purplish black. Important shape is the lipped bowl, parallels of which have been found recently in other sites. This form is at Brahmagiri in the Upper Neolithic and the Iron Age graves, in black-and-red-ware and also from neolithic levels at Sanganakallu. The shape continued in Iron Age, occurring in the graves at Perumal Hills. Again this form is also available in the neolithic-chalcolithic levels of the peninsula. The other painted variety is from Navdatoli. But Patpadu painted style is still without parallels. Some of the paintings in other bowl forms with their drooping swags are comparable with post-Harappan designs at Rangpur, Nagda, Navdatoli, etc. The lens shaped stopper has its analogue at Nevasa.

Cores, blades and flakes of typical neolithic blade industry as also a ground stone axe were discovered.

A sherd of coarse perforated neolithic pottery was an additional find.

But in all the excavated sites bulk of the pottery is a plain grey or buff ware; red or black slipped ones being rare. The grey ware is completely absent at Patpadu; the dominant red ware recalls the chalcolithic of Maharashtra and Malwa. It may be inferred that Patpadu contains intrusive elements from northern Deccan which needs further confirmation through research.

The black-and-red ware from the 'cache' belongs to the Iron Age.

Patpadu is a factory site as seen from the number of stone blades from within pots in the 'cache' indicating a continuation of the industry into Iron Age. Whether the pit was a burial is interesting suggestion.

10. ALLCHIN, F. R. and B.

'The Archaeology of a rivercrossing,' *Indian Anthropology*, Essays in memory of D. N. Majumdar, Bombay 1962, pp. 52-65.

Certain geographical features seem to control the routes of men through the ages. Crossing of the Godavari at Nasik, the Narmada at Maheshwar, Bheraghat and Jabalpur are some examples around which ancient sites are found in numbers. From these-archaeological field data, historical facts and geographical features, we can produce a culture history of the place. The subject of the paper is a similar crossing in the centre of the Raichur *doab*. The crossing is situated where the road and railway line from Raichur to Gulburga cross the river Kishna 75 miles (120.7 Km.) west of its junction with the Tungabhadra and almost immediately below its junction with the Bhima. The *sangam* is a place of cult importance. Crossing is older than the road or rail bridge-a disused causeway is also seen. On a small outcrop on the south bank, west of the modern road and about 3 furlongs (0.54 Km) from the river is a Middle Stone Age site, the artifacts from which are comparable to those found in the Pleistocene deposits of the Narmada. It is a factory site. The same hillock provides another factory site yielding blades, blade-cores and geometrical forms typical of Late Stone Age culture.

River-bed crossing factory sites should be at crossing places or fords, They should be at a place where highways meet and routes coalesce, which major river crossing would naturally provide.

Tathni crossing provides similar evidence. Krishna river bridge site provides a neolithic site. Across from the river also evidences of neolithic culture are also to be seen. Other confirmatory sites are located nearby-east of Hindupur, near the bund on the track leading to Gudabelam, near Kottapalli, etc. Similar evidences are also available for Iron Age, early historical period and later.

11. ALLCHIN, F. R.

Neolithic Cattle-keepers of South India, Cambridge, 1963.

The study is spread over ten chapters viz., the problem of the ash-mounds, excavations, other ashmounds, objects from the mounds, place-names and traditional evidence, modern pastoralism in India, pastoral elements in folk religion, interpretation of the archaeological evidence and the historical significance of the ashmounds.

Views of various persons, from the first notice by Mackenzie to Zeuner and that of the present author regarding the origin of the ashmounds are embodied in the first chapter. Chapter II and III deal with the author's excavation at Utnur and the study of objects therefrom.

Ashmounds are also found at Kupgal, Sanganakal, Halakundi, Lingadahalli, Kanchagara, Bellagallu, Kurikuppa, Suguru, Kakaballa, Gudikallu, Nimbapuram (Venkatapuram), Kudatini in district Bellary, Hire-Benkal, Chikka-Benkal, Sivapur, Piklihal, Lingsugur, Yergunte, Kurkundi, Wandalli, Gaudur, Manvi, Sirwar, and Budinni in District Raichur; Utnur, Machanpalli land 2 and Talmari-Kutukunru track in District Mahbubnagar; and Benkanhalli, Tahanmandi Thanda, Hanamsagar-Kodekappath, Mallur, Rajan Kallur and Kupi in District Gulbarga.

Objects from these mounds included pottery mainly of A1 and A2 grey and buff wares, stone blades and flakes, backed blades, lunates, points (?) and cores; ground tools viz., edge tools, rubbers, grinders and hammers and a worked bone, chisel. Bones of cattle, sheep, porcupine were also available. An analysis of ash and cinder is incorporated.

Dealing with the place-names, the author postulates a link between the ashmounds and budi place-names. These are initially connected with cattle. A distribution map of these place names show a concentration in Gulbarga, Krishna-Bhima doab mainly in Kannada speaking area.

All the mounds show at the beginning a cattle pen and the resultant, accumulation of dung which is burnt away. In the interior of these pens human occupation was observed. It is assumed that at Utnur pen dung was allowed to accumulate for a period varying from one to 10 years at a time. This accumulation was burnt and the pen reconstructed on original plan itself. This was the work of the same community. Thus Utnur represents an active life of 40 to 100 years.

Chronologically the ashmounds were not entirely either Lower or Upper neolithic but prolonged through them, i. e. 2000 B. C. to 750 B. C.

Culturally the ashmounds belong to the neolithic. In the last chapter the author says that ground stone industry, blade making, pot making without wheel have cultural antecedents in distant Iran in the 3rd millennium B.C. Together with the neolithic settlers came the domestic sheep, goats, humped cattle which was to become their economic-basis. Yet the humped cattle had a magico-religious significance as well. Although there is no direct evidence for agriculture querns, etc; suggest some sort of cultivation. In the same chapter are discussed the purpose of the mounds, pens (cattle pens), the periodical fires and their meaning and significance.

12. ALLCHIN, F. R.

'Pottery Head-rests from Narasipur Sangam', *Studies in Prehistory*, Robert Bruce Foote Memorial Volume, Calcutta, 1966, pp. 58-63.

The site was noticed by Foote who ascribed it to the Iron Age. His collection included among other things an object which he described as neck-rest. The author, in 1958 examined the surface collection from the site by Seshadri which included two fragments of head-rests. His own collection consisted of pottery assignable to the Upper Neolithic of Piklihal, broken ground stone axe, a chert blade and a part of a head-rest.

These four fragments of head rests are illustrated and described. These objects are homogenous, handmade and have a conical base. The

inner side is unburnished while the outer is carefully finished. Upper surface is curved.

Comparable objects have not so far been found in regular excavations. From Chanhudaro in the Jhukar levels occurs a head-rest with a broad oblong base with triangular cuts in it. In the rock peckings at Piklihal-I and in the rocks above site VII at the same place comparable drawings are to be seen. These engravings are heavily patinated and hence are of great antiquity. Surely these belong to the neolithic period.

Ethnographic evidence is also lacking. The use of head-rest, if it were current ought to survive in some group in India. But the evidence is lacking. The Muria use a low wooden bar, the function of which may be compared to that of low stool. If the specimens are really head-rests their use was restricted in space and time.

Head-rests are found in the present day Africa and South East Asia; the latter being a low stool. In Africa there are varieties and some are nearer the Narasipur specimens. Similar types are known from archaeological sources in the Nile valley and ancient Egypt. The African specimens are due to diffusion from Nile Valley over the millennia. In Egypt they date from predynastic times to Roman period. Egyptian hieroglyph for head-rest is similar to the Indian specimen. There is conformity in size as well. Hence the Narasipur ones may be deemed as head-rests. Consequently contact between Karnataka and Egypt during 2nd millennium B.C. is stipulated. Other supporting evidence should confirm this.

13. ANSARI, Zainuddin Dawood and RAO, M. S. Nagaraja, *Excavation at Sanganakallu 1964-65 (Early neolithic house at Bellary)*, Poona, 1969.

The report is divided into: introduction, the culture sequence, the trenches, stratigraphy and structural phases, ground and pecked stone industry, neolithic stone blade industry, bone and shell objects, pottery, etc., together with a note from Alur on the animal remains.

Four cultural periods viz., I, pre-mesolithic with prepared core, flake and large blade culture; II Mesolithic, III, Neolithic and IV, Neolithic. Megalithic, are discerned. In the first phase of Period III three floor levels, with pale grey ware, stone axes and blade industry were observed. The second phase is distinguished by brown-and-black pottery (the major ware), burnished ware, sometimes painted in ochre colour, ground stone

axes and a few copper objects.

Period IV is represented by hand-made neolithic wares together with typical megalithic black-and-red Wares.

There is no evidence of structures in Periods I and II. Perhaps people lived in rock-shelters. In Period III three occupational phases were noticed.

In phase 1 structures were circular/rectangular over a flat surface. Wooden posts supported walls of wattle and bamboo screens. On the muram surface a bedding of white ash (lime?)-about 20 cm thick was noticed. A complete circular structure (a room) was exposed.

Pertaining to phase 3 was a circular enclosure wall of boulders.

Ground and pecked tools fall into: (i) edge tools, (ii) points/pointed tools, (iii) rubbers and grinders and (iv) hammers and pounders.

A true lithic blade industry in chert and chalcedony is associated with ground tools. These, perhaps, were ground as tools mostly by points and a chisel represented in the neolithic period were found.

Hand modelled terracotta figurines of bulls and birds belong to the neolithic period. Face, ears, horns and tails are in applique technique while eyes are incised.

Pottery of phase I of period III consisted of pale grey and burnished wares, both occasionally painted with red ochre and the brown ware. In phase 2 the pale grey ware was less while the burnished variety continued along with a new brown-and black and the black on-red wares.

The entire pottery excepting some painted pottery of phase and the megalithic pottery of Period IV is hand-made.

Decorations comprised applique band of finger impressions, short conical knob and post-firing painted design viz., smear on the spout, neck and shoulder, horizontal and vertical bands.

Vessels are divided into six main types (i) globular vessels and their variants, (ii) bowls-cum-basins (iii) dough plates, (iv) storage jars, (v) fun-

nels and (vi) lids. Spouts were luted to some globular pots and bowls. Some bowls have pinched lips.

C-14 dates are 1595 ± 110 , 1585 ± 105 and 1550 ± 105 B.C.; thus taking the neolithic settlement back to 1600 B.C.

Report on animal remains reveal :

Two breeds of animals, small and big were noticed. The local breed was domesticated and used for agro-economic purposes. The degeneration in cattle is due to breeding and nutritional effects. The larger animals were the hunted ones. The presence of these two breeds suggest hunting and agricultural way of life. Meat and marrow formed part of their diet. Meat was also roasted. Charring roasting and chopping of bones are indicative of the above.

Summarising the animals known from bone remains are cattle, sheep, goats, dog, antelope and rodents.

14. BAJPAI, K.D. and SINGH, U. V.

'Excavation at Eran, District Sagar', *IA* 1964-65, pp. 16-18.

The aim of the fifth season's work was to ascertain: (i) whether there was a revetment to the chalcolithic mud rampart; (ii) to decide the stratigraphic sequence of the rampart; and (iii) to locate entrances into it.

Excavations were carried in trenches ERN 18, 16, 19 and 1.

Neolithic association of Period I was confirmed by the find of two more celts one from the lower levels of the rampart and the other from habitation. Total number of neoliths so far recovered is four. Other finds of the period were microliths, beads of terracotta, stone, steatite, shell and paste; terracotta animal figurines and the characteristic pottery.

15. BALL, V

'Stone implements found in India', *PASB*, 1867, pp. 147-53.

In order to facilitate future research as also to assess the area of distribution, materials so far published have been tabulated giving information

regarding the character, material, locality, position, discoverer, references, etc. A unique feature of the tabulation is the indication where specimens mentioned are housed. The types of stone tools are: (i) cores and flakes (ii) of agate, flint, etc., (ii) chipped axes, etc., chiefly of quartzite; and (iii) polished celts of trap, chert, jade, etc.

16. BALL,

'On an ancient perforated stone found in the Satpura Hills', *PASB* 1874, pp. 96-97.

A water worn stone of basalt with a central perforation would suggest that it was used as a hammer-knuckle duster in encounters with men or animals. Possibly it could have been used for flinging, like a quoit, at small animals.

17. BALL, V

'On some Stone Implements of the Burmese type, found in Pargana Dalbhum; District of Singhbhum, Chota-Nagpur Division, *PASB*, pp. 118-20.

These specimens were collected from a village on the west side of the Subarnika river. Two of them were shouldered adzes, the third one was of the shape of a wedge. The material out of which these are made are dark green hard quartzite, black igneous rock with minute crystalline structure which can easily be scratched with a knife. The source of raw material is to be found in Singhbhum District. But, all the same, similarity of shape with implements from Burma suggest a foreign origin.

Popular belief is that these are thunderbolts which is also the prevailing belief among the Burmese.

18. BALL, V.

'Stone implements from Parsinath, Hill, District Hazaribagh', *PASB*, 1878, p. 125.

Found on the northern slopes of the Parsinath Hill, these two are the usual polished celts. The material is volcanic (trappean) rock. The larger was probably used as a battle-axe while the smaller one could have served the purpose of a scraper for skinning animals.

19. BALL, V. Comment on Jade celt from Assam, *PASB* 1879, p. 268.

Commenting on the jade celt from Assam Mr. Ball says that an implement made of soft shale brought by Medicott is exhibited in the Geological Museum.

A good specimen of celt was discovered on a small hill near the village Buradih south-east of Gomaria in Iamar in Chota Nagpur.

20. BALL, V

'On the Forms and Geographical Distribution of Ancient Stone Implements in India, *RBAST*, 1879, pp. 394-395.

Stone implements falling into three groups occupy independent geographical tracts with a tendency to overlap towards the centre of the Peninsula. Plotted on a map these exhibit some relationship with the distribution of non-Aryan races. Thus the polished celt manufacturers would probably be identical with the Kolerian races, who came to India from north-east and Burma. Those who fashioned flakes, cores of flint chert, etc. were Dravidians entering the peninsula from the north-west.

21. BANERJEE, N. R.

'Review of Explorations and Excavations in India 1944-1953.', *ABIA* for 1948-53, XVI, 1654., pp. xvii-xix.

The change from the Mesolithic to Neolithic period is yet to be traced.

The earliest neolithic or proto-neolithic tools are from Burzahom, Kashmir excavated by De Terra. Giving the sequence the author points out that the neolithic culture is earlier than the Jhankar culture. The author also recounts the cultural sequence at Brahmagiri and Sanganakallu.

The presence of shouldered celts of the Burmese type would suggest a cultural contact from that direction which must have been along the coastline. This is surmised on the evidence of a find in the Godavari basin.

22. BANERJEE, N. R.

'Neolithic Tools from Nepal and Sikkim', *Ancient Nepal*, 9, 1969, pp. 53-58.

Only ten tools were found; of these three come from known provenance.

The tools are described and illustrated. The study of the tools and their provenance revealed:

i. The area of distribution is wide ranging from Bhitari (Mahdesh) to the Central Himalayan belt in Sikkim;

ii. Majority of the tools have affinities with those from Assam and North-east India. One specimen has different affinity. This would perhaps indicate a meeting place of the two strains. The direction of dispersal is perhaps from Assam;

iii. These axes were utilized for breaking lumps of earth for cultivation;

iv. A time bracket 1000-200 B. C. for the neolithic culture here is considered quite in order.

23. BANERJEE, N. R.

'In the trail of Neolithic habitation in Nepal and Sikkim', *JAIS*, 6, 2, Oct. 1971, pp. 145-59.

Stray, undocumented neolithic-polished stone axes have been found in Nepal. Possibility of finding more specimens in stratigraphical context is not ruled out. The author gives, as a backdrop the neolithic pattern of the Indo-Pak sub-continent.

Tools found in Nepal and Sikkim are described. The tools are to be found in an area extending from the Dang Valley in Bhitari (Madhesh) to the Central Himalayan region in Sikkim and the border of Nepal. Excepting the one from Katukisewar all conform to the types of the eastern neolithic complex and typologically distribution shows an infiltration from Assam.

Smaller axes were used for breaking clods for agricultural purposes. Chisels were hafted to handles and used for chiselling wood. Chronological horizon of these tools is not fixed.

These tools are considered to be gifts from heaven possessing magical powers.

24. BANERJI, R. D.

'Neolithic implements from Abor country', *ARASI* 1924-25, p. 102.

One implement, a stone adze in the Abor village was discovered by O' Callaghan, Political Agent of the Sadiya Frontier Tract. The implement made of Abor trap, is similar to those described by Coggin Brown. The Abors used this for curative purposes and not as axes.

25. BARROW. B.S.C.

'Note on Stone implements from the Naga Hills, *JAI*, I, 1872, Appendix 1 xii-1 xiii.

Four celts were obtained locally, of which one was of jade or serpentine and another of a sort of marble or limestone.

26. BLOCHMANN

'Stone implement of the Burmese type' *PASB* 1876, p. 3.

In his letter Sir Phyre has remarked that the language of the Mun race of Pegu is closely connected with that of the Ho or Munda people of the Chotanagpur called Kol. Similarity of the form of the implements from Chota Nagpur recalled by Mr. Ball would indicate racial intercourse in Prehistoric times between the Kols and the Mun of Pegu. The supposed origin of these weapons as thrown to earth in the lightning flash is, as remarked by Mr. Theobald, is prevalent among the Mun People.

27. BODDING, Rev. P.O.

Ancient Stone Implements in the Santhal Pargannas, *JASE*, LXX, pt. III, 1901, pp. 17-22.

The author collected about fifty celts from the Santals, who believe they were thunder bolts and also have medicinal value. Santhal's believe that the house in which a celt is kept is free from lightning. These are said to be effective in labour pain and enable easy delivery. Several curative uses are listed. Some use it as a razor sharpener.

Santhals do not use stone implements. The implements were found while digging or ploughing, in cleft rocks, river bed and on the surface as well and are made of flint, porphyry, basalt and other hard materials. In size they vary. Some of them are wholly polished while others are edge ground. Types are axes, adzes, hammers, arrowheads, etc.

28. BODDING, Rev. P.O.

'Shoulder-headed and other forms of stone implements in the Santal Parganas', *JASB*, LXXIII, pt. iii, 1904, pp. 27-31.

Implements were found in the Dumka sub-division and they are classified into five forms: (i) wedge shaped axes with one (upper) side convex and the other concave; (ii) squarish implements sometimes with parallel-sided edges; (iii) small oblong flat stones with notched (serrated) edges—probably served as a sort of saw; (iv) perforated stones; and (v) shoulder-headed celts.

The implements are compared with axes, and adzes used by the Santals.

The hafting method has several points of similarity with the shoulder-headed axes. These, judging from the shape, could have been used as adzes as well, besides being hoes.

The occurrence of similar types of implements in Chota Nagpur, Santal Parganas and the delta and valley of Irrawady would presuppose identical people living in these area or some sort of intercourse among them through migration or otherwise. If these are found in Assam and Burma it would indicate identical people or the path of communication. The original people might have been the Mon Khmer races or Mundas and others.

29. BOPARDIKAR, B. P.

'Exploration in District Ahmadnagar', *IA* 1960-61, p. 19.

A neolithic was picked up at Vajewade.

30. BRAHMACHARI, U. N. and BRAHMACHARI, S. C.

'Two Neolithic Stone Implements found in a Tank at Jamalpur (Monghyr)', *J and PASB*, XXII, 1926, p. 135.

Two implements were found while digging a tank in 'Nilmony villa', house of Dr. Nilmony Brahmachari. One was found at a depth of 10' (3.048 m.) and the other at a depth of 15' (4.572 m.) The implements are described. The first one has a sharp round cutting edge with the polish restricted to about an inch from the working edge. The second has a slightly curved cutting edge. There is a groove for hafting also. It is

broken at the top. There are patches of calcium carbonate formed on the surface indicative of its antiquity. The material seems to be fine grained schistose phyllite which is available locally at a distance of about two miles (3.2 km.). The implements are in the Indian Museum.

31. BROWN, J. COGGIN

'Grooved Stone hammers from Assam and the Distribution of Similar Forms in Eastern Asia', *J and PASB*, X, 1914, pp. 107-109.

Grooved hammers and axes are rare. One specimen found by Cockbourn at Alwara has been described by Rivett-Carnac who says that it was hafted to handle tied with a ligature; the grooves helping the ligature to keep the handle in place. Some chip marks would indicate the use of metal and a period of transition from stone to metal. This specimen is housed in the British Museum. Common type of hammer without grooves are found in Central India and Uttar Pradesh. Circular indentions perhaps helped to hold the implements in the hand. The Assam specimens made of close grained greyish/bluish/reddish grey quartzite are quite different. The author describes the method of manufacture of Assam specimens. The six specimens found are from Tezpur and are in the Indian Museum. Belted hammerstones are not found in Burma, Malaya, Borneo, Indo-China or Yunnan. One was found in Shag Tun province in China. These are common in North America and are generally distributed in United States of America. This would have evolved independently.

32. BROWN, J. COGGIN

Catalogue Raisonné of the Prehistoric antiquities in the Indian Museum at Calcutta, Calcutta, 1917, pp. 1-55.

Neoliths are dealt under the caption 'The neolithic or polished stone axe'.

Neoliths are spread over a much wider area than palaeoliths and the distribution is controlled by the occurrence of suitable raw materials. Neoliths are rare south of the Cauvery; in Deccan they are abundant because of the availability of trap rocks. In south India, Salem, Anantapur, Bellary districts and in Hyderabad neoliths are found in large numbers. They also occur in the ranges bordering the Gangetic plain and in Bulandkhand in certain parts of Uttar Pradesh, the northern dis-

tracts of Central Provinces in Assam and Naga hills. The highlands of Bengal and Assam also yield implements. The variety of neolithic implements are greater than the paleoliths. A list of tool types which include ground or carved, ground and polished and unpolished is given. In the neolithic tools mealing stones, hammer-stones, flakes are also included. The materials used are granite, gneiss, haematite, quartzite and grits of Dharwar and the Gondwana systems. Pygmy flints, rock paintings in rock shelters (Kaimur Range) the accumulation of prehistoric scoria and some megalithic tombs are assigned to the neolithic age.

A district wise description of neolithic tools in the Indian Museum with an introduction for each district is given from pp. 69-140. Tools from Burma and the Andamans are included in the catalogue.

33. CAMMIADE, L.A.² and BURKITT, M.C.

'Fresh Light on the Stone Ages in Southeast India', *Antiquity*, IV, 1930, pp. 327-39.

Quite a number of series 4 implements viz., crescents, knife-blades, triangles, flakes, cores, core-scrapers, etc., were found on the surface near the Godavari river. A small shouldered celt was also found near the same river, contemporaneity of which with the microliths is doubtful.

34. CAREY, V. J.

'Celts and Perforated stones found on a "Chaboutra" at Jubbalpore', *PASB*, 1866, pp. 135-36.

Four or five celts and two perforated stones were found. The author feels that the perforated stones were mauls or hammers. Commenting on this Mr. Blandford observed that the perforated stones which are found in later Stone Age and Bronze Age in Europe are perhaps spindle whorls.

35. CARTER, G. E. L.

'A few stone implements of India'. *Journal of the Anthropological Society of Bombay*, Vol. XI, 1917-1920 pp. 893-896.

Speaking of the dispersal of neolithic stone implements the author observed that they were brought from the North west. They are found in

Kashmir also. Travelling through east India these found their way to Sopara in the west. Along with the polished stone implements, tumuli, knowledge of geometry also travelled.

36. CHAKLADAR, H. C.

'The prehistoric culture of Bengal, (iv), *MI* 31, 1951, pp. 124-64.

Neoliths have been found in considerable numbers in all the frontiers of Bengal and in the plains too testifying to the spread of this culture all over the country. Shouldered celts are found only sporadically in the highlands of Bengal, Santal Parganas and Chota Nagpur. One small spade celt of polished limestone was found at Tembavati Nagari, 11 miles (17.7 k.m.) north of Chitor in Rajasthan. Since shouldered celts form only insignificant portion of the neoliths from Bengal it would mean that the culture represented by it is only a minor contribution to the culture of area as a whole. The author recounts and discusses Worman's theory.

Certain sections or distinct tribes in the neolithic culture-complex specialised in the manufacture and handling of small flakes i.e., micro-liths. There is no evidence to prove Smith's postulation that the delicate little implements of the pygmy class were the handiwork of women, or their association with neoliths at some sites could be the handiwork of palaeolithic survivors reduced to submission or dependance by advanced races which reached the neolithic stage of incipient civilization.

The finds in Bengal include celts and flakes of stones of various shapes and colours, arrow-heads, ringstones, discs, stones for grinding and polishing, hammering, mealing besides lumps of red earthy haematite and pieces of quartz or rock crystal.

Besides beads, chalcedony, onyx, carnelian, sardonyx, etc. were found in all stages of manufacture. Raw material for the implements were trap, schist, slate or sandstone for flakes, chert, agate or flint. Probably there was an increase in population in the neolithic times, the rarity of flints and pebbles on the surface led neolithic men to mine for them and had got them from far away from their homes.

Axes and chisels were nicely ground, beautifully polished and hafted efficiently. The author traces the stages of evolution from roughly

chipped to finished axes. Other varieties included hammer-stones, ring-stones and discs.

Two distinct neolithic pottery one thick and the other thin was discovered at Baidyapur in Mayurbhanj. In the preparation of the paste paddy husks were used for greater binding strength to the clay. Pottery, agriculture and the archer's crafts are some traits of this culture. Regarding the origin of the chalcolithic culture of Bengal the author discounts local autochthonous development from the palaeolithic to the chalcolithic or what is known as the 'full neolithic', as not probable.

Early civilization, agriculture, pottery domestication of animals and improvised stone tools had originated in the Afrasian zone extending from Egypt to Indus valley. Early elements grew up and developed independently in the three major regions, Egypt, Mesopotamia and Persia and Western India. But for the first birth of this culture we have to look for a single place in these regions.

37. CHAKRAVARTI, S. N.

'The Prehistoric periods in India', *JUB*, X (NS), 1941, pp. 48-60:

The article deals with the paleolithic, neolithic and other subsequent cultures of India. The neolithic period is rather scantily dealt.

38. CHAKRAVARTI, S.N.

'An outline of the Stone Age in India', *JASB* (letters), X, 1944, pp. 81-98.

Dealing with neolithic age in India the author observes that the neolithic people of India were mainly tool-makers. They were culturally inferior to the Egyptians who, besides tool making, practised agriculture, domesticated animals, manufactured pottery and knew textile industry.

39. CHANDA, RAMAPRASAD

'Indian Museum, Calcutta', *ARASI* 1923-24, pp. 100-101.

Three collections of neolithic implements are in the Indian Museum. First was presented by Mr. Hallows. The other two are from Eastern India; one coming from the dried bed of Saraswathi near Rajgir was presented by Mr. Bachi. Mr. P. Acharya presented his collection from

Vaidyapur in the Sadar sub-division of the erstwhile Mayurbhanj State, Orissa. Celts are common to the collection. A single knife blade from Rajgir and a slightly shouldered celt, a prototype of copper celts, are worth noticing.

40. CHAUDHURY, PRATAP

'Neolithic culture in Kamarupa', *JARS* xi, 1944, pp, 44-47.

Pottery making was introduced by the neolithic people who came to India from South East Asia belonging to the Austric race. Besides they manufactured polished stone tools. Dwelling houses, fire, fishing, hunting and domesticating cattle were known to them.

Khasis and Syntengs are the representatives of the people of neolithic age. They are the remnants of the first Mongolian tribes and are also the first Indo-Chinese to enter India through ancient Assam besides being the authors of the neolithic civilization. Among the tools, particularly interesting 'is the find of two shouldered stone implements one in Darrang and the other in Cachar in Burma and Chotanagpur and finds near Viswanath, of as many as six grooved stone hammers which are known to have been common in North America and which are the rarest of the neolithic stone implements recorded in Eastern India'.

41. COCKBURN, J.

'Notes on Stone Implements from Khasi Hills, and the Banda and Vellore Districts', *JASB*, XLVIII, pt. ii, no. 3, 1879, pp. 133-43.

Two are from Khasi Hills. One was found *in situ* and other made of slate was obtained from a Khasia near Nangho on the Shillong-Gauhati road. The second specimen resembled those from Yunnan and would be classified as shouldered celt. The utility of these implements is discussed. Stone implements collected from Banda were mostly found under pipal trees, roadside or tank bunds where they were venerated as objects of worship. The author has given a table of the types, their dimensions, find-spot and description. The materials used are diorite, trap and sandstone. The specimens are housed in the geological Museum, Calcutta. He also found a unique stone hammer at Hatwah. There is a deep depression on either side of this specimen which leads the author to think that the depression facilitated firm grip.

The Vellore specimens are similar to Banda specimens. Ten specimens found on a stone table under a tree in the village of Tullet. From the red things on the implements the author feels that these were also derived like the quartzitic palaeoliths from the laterite beds.

42. COCKBURN, J.

'A Diorite plug', *PASB*, 1894, pp. 88-90.

A diorite celt with a hole drilled, found and presented to the Indian Museum sometime in 1880 and which at first led to the conclusion that the hole was functional for hafting a handle was proved by later investigation to be spurious, the hole being drilled latter by a lapidiary.

43. COCKBURN, J.

'On Flint Implements from the Kon ravines of South Mirzapur', *JASB*, LXIII, pt. iii, 1894, pp. 21-27.

Forty-three implements were found in deep ravines near the Kon village. Perfect specimens of neoliths were discovered. The site appears to be a Neolithic rather than palaeolithic. A flat stone bangle, seemingly turned on a lathe was also picked up. Among the implements were many polished celts of diorite. One specimen of the usual lanceolate type with square edges in black basalt is common in England. Another interesting find was a broken object of polished diorite of the shape of glans with a central hole, the use of which was difficult to judge. Paleoliths were also found. The author is of the opinion that palaeoliths and neoliths were co-existent in this locality. The chipped implements are all made of black siliceous material akin to chert. The specimens exhibit similarities with those illustrated in '*Ancient Stone Implements of Great Britain*' by Evans.

44. DANI, Ahmad Hasan.

Prehistory and Protohistory of Eastern India, Calcutta, 1960.

The book is divided into eight chapters dealing with geographical and geological introduction, Palaeolithic industry in Eastern India, Microlithic industry in Eastern India, Neolithic cultures of Assam with an appendix, neolithic cultures of Bengal, Bihar, and Orissa, 'neolithic' cultures of Indo-China, Siam, Malaya and Burma and conclusion. At the end an useful

bibliography is also appended.

Summing up his investigations the author observes that Eastern India is divisible into (i) centrepetal areas of river basins and (ii) refuge areas of Hills and Plateau.

Eastern India is a part of the Indian sub-continent sharing its cultural vicissitudes. In the words of F. J. Richards 'The Eastern frontier is . . . difficult, true the Burmese and Shans have ravaged Assam, and the Arakanese East Bengal; but the flow of Indian influence is eastward, penetrating Indo-China and as far as Borneo. The meeting points of Chinese and Indian cultures are in Turkistan and North Annam'.

The neolithic of this region falls into two groups: (i) the Bihar-Bengal-Orissa complex and (ii) the Assam complex. The first is further divisible into two viz., the Indian types and a mixed one with foreign types known in South-East Asia; the former is earlier. Likewise the Assam complex also falls into indigenous types restricted to several regions of Assam and wholly foreign and common types resembling tools from Yunnan and Burma.

Indian neolithic complex is basically different. In the early stage eastern influence is not present. In later stage intrusion of foreign types occur but in entirely Indian complex. This does not show any cultural affiliation with South East Asia. They at best suggest contact and borrowing from neighbouring areas. Further, these do not link up with Austro-Asiate migrations.

There are two cultural traditions in South East Asia:

(i) a food gathering stage mainly using chipped stones and (ii) a food producing level using ground and sawn tools along with pottery: the latter is really an intrusion. A complete transformation from the first to the second stage of economy with unconnected cultural milieu could have happened only through an intrusion from outside.

The Somrongsen has links with Hongkong Culture of South China. Malaya also falls into step. But some distinct types are retained in Malaya which link Indonesia. In Yunnan, Laos and Burma some typological similarities are seen in Somrongsen and Malaya. Shouldered adze and gouge-adze are not seen in Yunnan but are found in Laos and Burma providing connection with Malaya and Siam, suggesting

overland infiltration. Most of the tools are absent in Assam. Shouldered tools are not found in other parts of India. Splayed axe and faceted tools are limited to Eastern India. It is not possible to isolate a single tool-type viz., shouldered adze from the cultural group of South East Asia and connect it with the Austro-asiatic. These tools indicate a special technique in manufacture, and were copied from metal prototypes which are available from Anyang (1300-1028 B. C.). Faceted tools also hail from the same area. This type has travelled from South East Asia and China. A date of 2nd half of the first Millennium B.C. is plausible. The foreign types available in India are through a secondary source in Burma, Yunnan and Malaya and hence are later they fall within the historical period.

45. DASGUPTA, H. C.

'On Two Shouldered Stone Implements from Assam',
J & PASB (NS), IX, 1913, pp. 291-93.

The tools are described. The author is of the opinion that these were locally manufactured and are similar to the Burmese types. The distribution of these types of tools in places along the routs of Khasia migration would tend to confirm the possible relationship between the Khasis of Assam and some ancient tribes of Burma. The Mon races of Burma and the Mundas of Chhota Nagpur are linked on the basis of the prevalence of common tool types.

46. DAS GUPTA, H. C.

'On a peculiar polished hammerstone from Singhbhum, Chhota Nagpur, India', *Ind. Ant.*, XLVII, 1918, pp. 135-36.

The implements were obtained from different localities-Nadup or Ladup and from the workings of Cape Copper Company, Matigara in Dalbhum and presented to Geological Department, Presidency College, Calcutta by Mr. Biswas. The hammer was picked up at the mouth of ancient copper workings. The material of the implements is different from that which is locally available and hence could have been brought from elsewhere. The broken implement has a thick head and flattish body. It is surmised that the hammer could have been used for breaking copper ores. The author opines that it was double headed hammer. The collection also includes one pounder and two arrow-heads.

47. DASGUPTA, P. C.

'Excavation at Pandu-rajardhibi, District Burdwan', *IA* 1962-63, pp. 43-46.

Four occupational periods were observed. In period II a doubtful neolith was found. Ceramics of this Period comprised painted and plain black-and-red, black painted lustrous red and chocolate wares. Pottery of Period I viz., black-and-red, grey and pale red wares mostly handmade-continued. Interesting shape in pottery of Period II is the channel spouted bowl. Other finds were microliths and copper objects. The succeeding period is distinguished by the occurrence of microliths, polished stone axes, and all the ceramic wares of the previous Period. A black burnished ware with incised decoration is an addition. Minor antiquities were objects of copper, ivory comb, terracotta Mother Goddess and iron objects.

48. DASGUPTA, P. C., CHAKRAVARTI, D. K. and MUKHERJEE, S. C.
'Exploration at Susunia, District Bankura', *IA* 1965-66 (Cyclostyled).

During the exploration, ring-stones, large and small, triangular celts and a small celt on white agate with purple and red veins were found.

49. DASGUPTA, P. C. *et al.*

'Exploration in Districts Birbhum, Burdwan, Malda, Midnapore, Purulia, 24-Parganas, and West Dinajpur', *IA* 1964-65 p. 46.

At Potanda near Purandarpur, black-and-red ware and other characteristic pottery, flakes and four neolithic celts of the pointed but variety were found.

50. DASGUPTA, P. C. *et al.*

'Explorations in District Bankura, Burdwan, Midnapore, Purulia and 24-Parganas; *IA*, 1968-69, pp. 41-42.

In the uplands flanked by the Suvarnarekha explorations yielded backed and parallel-sided blades, fluted cores, shouldered celts, adzes and triangular celts.

51. DETERRA, H and PATERSON, T. T.

Studies in the Ice Age in India and Associated Human Culture, Washington, 1939.

In pages 233-34 cultural sequence as gleaned from a trial excavation at Burzahom is given. At Burzahom surface collection of flakes led to the surmise that they were waste flakes of hoes, pestles and polished celts. These were found at a depth between 2' (0.6 m.) and 10' (3.04 m).

A trench was dug to a depth of 11'8" (3.55 m.) without reaching the *Karewa* silt. Throughout potsherds-grey in colour, with mat and rope designs and finger nail or thumb impressed decorations were found. At a depth of 7' (2.1 m.) a hearth with charcoal, polished celts, bone awls, cooking pots came to light. The neolithic here seems to be coeval with the soil formation; the 'neolithic soil' being a loess of post-glacial times.

52. DEO, S. b. *et al*

'Prehistoric and other sites, District Pune', *IA* 1957-58, p. 67.

At Chandoli, a chalcolithic site, a polished stone axe and hammer stones were found.

53. DEO, Dr. S. B. *et al.*

'Excavation at Nevasa, District Ahmadnagar', *IA* 1959-60, pp. 25-28.

Polished celts and an adze were found in period III. These could have been manufactured locally, as evidenced from the vestiges-anvils and partially prepared tools, etc.

54. DEO, S. B. *et al.*

'Excavation at Songaon, District Pune', *IA* 1964-65, pp. 26-28.

In Period I Jorwe and burnished grey ware together with a few Malwa were the dominating ceramics. Structures of the period are divided into three subperiods viz. IA, IB and IC.

In-sub Period IB floors were of lime and rammed brown earth. Post-holes, though present did not indicate any sensible plan. Besides urn-

burials were similar to those found at Nevasa and Chandoli. Stone querns and stone tools were also found.

Shapes in pottery of Period I were spouted pots, globular vessels and carinated bowls in Jorwe Ware; globular pots with flared and-sub-spherical bowls in Malwa ware; burial urns, knobbed lids, *kundās* and perforated pot with plenty of lime inside in grey ware; and storage jars, rectangular bowls on stands and dough plates in red ware.

Microliths, mainly of chalcedony, consisted of lunates penknife blades, fluted cores, trapezes, parallel-sided flakes, etc. Ground stone tools were of dolerite. Pounders and rubbers and mace-heads were also available. No copper was found.

55. EEO, Shantaram Bhalachandra and MUJUMDAR, Ganesh Gangadhar
Songaon Excavation 1965, Poona, 1969.

The Report is dealt under several headings viz., The site, Excavation Organization, the Cuttings, Stratigraphy, Flooring and Structures, Chronology, the Burials, Blade industry, Pottery, Stone Implements, Terracotta Objects, Metal Objects and Retrospect with an appendix 'Chalcolithic Environment at Songaon: A pedological study' by Mujumdar.

Layers 1 to 3 were red in colour while 4 to 6 were whitish brown. In the first group burnt debris of clay walls and bamboo strips were found. In the second many occupational levels were encountered.

Structure of Period I were represented by two pits. In IIA and IIB several floors of lime and clay and debris of walls were seen. Walls were made of bamboo screens plastered with mud on both sides. Charred wheat from a floor level sealed by layer 5 provided a C-14 determination of B.C. 1245. On this floor also were found bones of cattle, fragmentary querns, etc. Structures of Period III were radically different from the previous periods. They were well-planned and built on foundations alternate with rubble and clay. On plan they were rectangular.

In fixing the chronology here, both C-14 determinations and ceramic sequence were resorted to. Thus Period I is dated to 1465 B.C. Period II 1245 B.C. and Period III to first millennium B.C.

Four child burials pertaining to IIA and IIB were exposed. All were urns-single, double and treble-burials similar to Nevasa, Jorwe, etc.

Orientation (north-south) was consistent. Adult burials were laid on the floor. Some of the skeletal remains show evidence of charring. Pots and shell beads were the attendant furnishings.

Tools of chalcolithic blade industry totalling 314, comprised cores (most with cortex), crested ridge blades, used and fresh, parallel sided flakes, plunging flakes, blunted-backed blades, penknife blades, lunates, trapezes, points and serrated blades.

In Period I a coarse red, smooth orange slipped red, coarse grey, burnished grey and red ochre painted grey wares were available. Shapes were hand-made jar and lid, globular pot, *kunda*, bowl, etc.

In Period IIA coarse red and the blotchy grey of the earlier period continued. Other wares were the Jorwe, the Malwa and a brown red slipped and burnished ware as at Chandoli. A variety had a dull snuff coloured slip over which paintings were done in dull black; designs were slanting lines, horizontal zig zag and diamonds.

The Malwa ware was the least in number and as compared with Navdatoli, was inferior in fabric and paintings were less artistic. Shapes consisted of pot with flaring mouth, goblet, shallow pan and deep bowl.

Red ware was the most available pottery and showed several variations in potting. Shapes were *kunda*, globular pot, pot with elongated body, dough plate, spout, rimless bowl, with perforated base, spherical pot, storage jar, etc.

In the grey ware also variations in colour and potting were observed. Both red and the grey show typological similarities. Shapes included storage jar, perforated bowl, lid, square bowl-on-stand, spouted pot, *kunda* etc.

In Period IIB preponderance in Jorwe ware was noticed; the Malwa ware became almost nil and was represented only by a few sherds. Spouted vessels are maximum in the Jorwe ware and a single channel spout was noticed in the Malwa ware. The mechanically slipped red ware has several shapes and has parallels at Piklihal. Grey ware dwindled while in the coarse red a variety of shapes are seen.

Only in this period animal motifs are painted in the Jorwe ware. The motifs are wavy horned antelope and cranes.

The pottery of Period III consisted of black-and-red ware appearing for the first time and were of the plain variety without paintings but some showed signs of burnishing. The Malwa Ware had disappeared and the Jorwe ware had degenerated into a coarse surfaced variety; the sturdy fabrics of the ware was absent. Besides, red slipped, burnished red wares appeared on the scene. The cream slipped ware continued.

Fifty seven stone tools were unearthed. The types represented are: edge tools (five axes and one adze), rubbers, querns, hammers, anvil, ring-stone and sling balls. Materials of these are basalt, delerite, granite pebble of chert and quartz and quartzite.

Metal was completely absent in this site.

Pedological study of the ancient environment revealed:

(i) The pre-chalcolithic black soil was formed by the weathering of riverine silt deposited in the Pleistocene or at the beginning of the Holocene.

(ii) The chalcolithic soil belonged to the chestnut Brown type of the great soil groups of the world. In chalcolithic times a better vegetation cover and congenial climate is eradicted. However there is no data for drastic variation in climate from the present.

(iii) Practice of agriculture is indicated. This is proved by the availability of charred cereals in chalcolithic sites of the Deccan.

(iv) Soil got modified to attain an equilibrium with changing environment of the present day.

(v) Climatic changes or the interference due to human activity is not possible to assess.

(vi) Fossil soil of Songaon compares well with that of Nevasa, indicating similarity of conditions over a wider area.

56. DEPARTMENT OF ANCIENT HISTORY AND ARCHAEOLOGY, University of Madras

'Exploration in District South Arcot', IA 1961-62, p. 26

At Sengamedu a finely polished celt was found.

57. DEPARTMENT OF ANCIENT HISTORY AND ARCHAEOLOGY, University of Madras

'Exploration in District Salem', *IA* 1962-63, p. 13.

Neolithic sites were located at Bargur and Mulavi; the former in Krishnagiri Taluk and the latter in the Shevaroy Hills.

58. DEPARTMENT OF ARCHAEOLOGY, University of Calcutta

'Exploration in District Singhbhum', *IA* 1968-69 p. 6.

A large number of chipped and ground celts and sherds of hand-made pots were found at Barudih.

59. DEPARTMENT OF ARCHAEOLOGY, Government of Andhra Pradesh

'Exploration in District Guntur', *IA* 1962-63, p. 1.

An ash-mound was discovered at Mallepadu.

60. DEPARTMENT OF ARCHAEOLOGY, Government of Andhra Pradesh

'Exploration in District Anantapur', *IA* 1964-65, p. 1.

A disturbed mound near Timmapuram, 8 km. from Guntakal railway station yielded ground celts of the neolithic complex.

61. DEPARTMENT OF ARCHAEOLOGY, Government of Mysore,

'Excavation at T'Narsipur, District Mysore' *IA* 1959-60, p. 38.

The lowest layers representing the neolithic deposits yielded large quantities of burnished grey and coarse thick grey wares. Incised decorations were, coarses, straight or oblique lines or herring bone patterns.

62. DEPARTMENT OF ARCHAEOLOGY, Mysore State,

'Exploration in District Dharwar', *IA* 1967-68, p. 36

Neolithic implements were found at Wargund and Gudisagar in Nargund and Navalgund Taluks respectively.

63. DEPARTMENT OF ARCHAEOLOGY, Government of West Bengal

'Neoliths and early pottery, District 24-Parganas', *IA 1960-61*, p. 68.

Besides other finds a polished stone celt was picked up at Harinara-yanpur.

64. DEPARTMENT OF ARCHAEOLOGY, Government of West Bengal,

'Expioration in District, Bankura, Birbhum, Aurdwan, Hooghly Jalpaiguri and Midnapur, *IA 1961-62*, p. 59.

From Khunkrakhopi and Organda, District Midnapur a few ring stones were collected.

65. DEPARTMENT OF ARCHAEOLOGY, Government of West Bengal

'Exploration in Districts Birbhum, Burdwan, Darjeeling, Malda, Midnapore, Purulia, 24-Parganas and West Dinajpur, *IA 1962-63*, p. 43.

Neolithic sites were found at Dungra-Busti and Sindibong near Kalimpong in District Darjeeling and Bagridihi in District Midnapore.

66. DESHPANDE, M. N.

'Tamluk, District Midnapur', *IA 1954-55*, pp. 19-20.

Excavations at seven different places in Tamluk brought to light a culture sequence ranging from the neolithic to modern times.

Period I, sparsely represented, was characterized by neolithic celts and ill-fired pottery.

67. DESHPANDE, M. N.

'Excavation at Daimabad, District Ahmadnadar', *IA 1958-59*, pp. 15-18.

From the surface microliths, cores, stone axes, pottery, etc., were collected.

Excavation here revealed that phase I was distinguished by a thick coarse grey ware comparable to that found in Brahmagiri. Shapes were large globular urn with flared rim, sub-spherical bowl, stemmed lid, etc. Rim and lip were usually treated with red ochre, pot forms in the hand-made variety were trough, platter and storage jar with incised decorations. Tool types in microliths were parallel aided blades, and penknife blades. Material used was chalcedony. Beads of terracotta and semi-precious stones were also found.

Burial of this phase was in the habitation itself and was the extended inhumation type.

68. DESIKAN, V. N. SRINIVASA

'Exploration in District Coimbatore', *IA* 1957-58, p. 38.

A celt of triangular outline and oblong transverse section and a hammer stone were found at Sircarsamakkulam.

69. DESIKAN, V. N. SRINIVASA

'Exploration in District Coimbatore', *IA* 1960-61, p. 18.

At Pushpattur, a neolithic was picked from the bank of the river Amara-vati.

70. FOOTE, R. B.

'Notes on some recent Neolithic and Palaeolithic Finds in South', *JASB* LVI, 2, 1887, pp. 259-82.

Neolithic implements were discovered on the Shevaroy Hills, Salem District and in the Nellore, Bellary, Kurnool and Anantapur Districts. Peacock Hill or Kuppugallu is an interesting site. Traces of manufacture of tools and residence were observed here. Residential vestiges very numerous and formed small terraces rivetted with rough stone-walls. Huge accumulation of made up ground full of ashes and broken pottery and containing many implements of all sorts of which a large proportion were damaged was also observed. The ashy made up mound contained fragments of cattle bones. Small tanks were constructed by damming up the little stream which drained the northern side of the ridge. Large blocks of local granite gneiss had holes cut, purpose of which is not

known. But as they were in the proximity to the structures these might have served for mixing some kind of dough. These are found both in the open and in the shelters as well. Some of these might have been mealing troughs as well. Mealing stones and corn crushers were also found.

Kapgal (Kuppugal) appears to be a factory site. Variety in size and shapes in celts and chisels to suit special purpose were found. The author narrates the stages of manufacture of tools stage by stage; the final shape being polishing. In some other sites grinding grooves are numerous and occur in groups. Some of these grooves are found well-protected under the cover of great rock-shelters or in small caves where perfect shade was available during the heat of the day.

In frequency, the order is: strikers and corn crushers; mealing stones; celts and chisels (rather rare), scrapers core and core-flakes are also found. Material of which these are manufactured are agate, chert, jasper, lydian stone and quartz of different kinds. Flakes are also found.

Due to the lack of positive evidence of the dwellings it is presumed that they were of perishable material.

Location of the settlements show that they had decided preference for occupying commanding positions which were defensible against enemies. All these settlements are on granite hills; none being found on non-granite hills. The reason being

(1) The isolation of the granite hills was well suited for defence than the continuous ridges of schistose rocks. Some of the granite-gneiss hills offer perfect castellation by the disposition of the rock masses.

(2) Rock shelters and comfortable terraces are found in numbers in these hills rather than on schistose hills.

(3) Collection of rain water and its storage would, from the nature of the ground be much easier on the average granitoid rock than on the schistose.

(4) A schistose hill surrounded by heavy broad talus was unsuitable for agriculture. Granatoid hills are the opposite.

Regarding the mound of slaggy cinder-Budikanma pass 16 miles west of

Bellary Foote observes:

The mound is not the product of one huge burning. Cinder occurs in distinct layers of 2'-4' (0.6-1.2 m) thick with thin layers of made ground between them. Celts, corn crushers, mealing stones were found washed down from these. No other traces of habitation was observed. Bones of animals, particularly bovine, occur frequently.

Fragments of pottery were also found. Many of the bones were broken for extracting marrow.

Catalogue of tool - types and a chart of raw material preferred for each tool type is also given. The neolithic pottery, is wheel-made, well decorated and comprise many shapes.

71. FOOTE, R. B.

The Foote Collection of Indian Prehistoric and Proto historic antiquities - Notes on their ages and distribution Madras, 1916, pp. 1-246.

The neolithic age saw great advances in civilization. Improved tools, pottery, domestication of animals were known. Remains of bovine animals, traces of horses and sheep were found. The neolithic folk used convenient rock-shelters on the granite hills as residences. Houses in all probability were of perishable materials. Disposal of the dead was perhaps by cremation.

Change of raw material in the manufacture of weapons was due the superior toughness and tenacity of the trappean rocks as compared with quartzite. Variety of implements and tools of the neolithic folk was greater than that of the palaeolithic people. Seventy-eight distinct artifacts are mentioned of which forty-one belong to the ground and polished variety. Rest are unpolished. Among the celts and chisels several variations are present.

The first appearance of vessels and other objects made of earthen ware occurs in the neolithic age. A list of sites where pottery is found is given. Fairly typical neolithic pottery will turn out to be dull coloured and rough surfaced with but little decoration.

Dealing with the distribution of prehistoric people the extreme rarity of trap dykes in south of the peninsula may have been the *veera cause* for

the rarity of neolithic remains in the regions south of the Cauvery. In the northern parts of the Deccan plateau where neolithic remains most abound, dykes of basaltic, dioritic and diabasic traps, are plentifully distributed.

For ordinary domestic implements-mealing stones, corn crushers, hammerstones and flakes the material was granite, green gneiss, pistacite, banded haematitic jasper and jasper breccia, conglomerates and grits of both Dharwar and Upper Gondwana systems, hornblende trappoid agate and chert. Quartzite was used mainly by palaeolithic people and is almost unknown among the neolithic people.

A district wise analysis of antiquities, etc., is given. Main interest lies in the Salem, Bellary, Anantapur, Kurnool districts and in the Mysore State.

72. FOX, LANE, A.

'Stone celts', *JAI*, II, 1873, pp. 348-50.

Seven stone celts procured by Col. Pearse from the Shevaroy Hills were exhibited by Col. Fox. Some of them are triangular while some other are wedge shaped. The material seems to be dark coloured trap and the tools are weathered.

73. GHOSH, A and KHAZANCHI, T. N.

'Dwelling-pits, Srinagar', *IA* 1962-63, p. 98.

At a distance of about 10 km. south-west of Srinagar on the Damodar Karewa was located a dwelling-pit site. Some of the pits recall Burzahom counter parts

74. GHOSH, A. K.

'Exploration in Districts Bankura, Birbhum, Burdwan, Hooghly, Jalpaiguri and Midnapur', *IA* 1961-62, p. 59.

Neolithic implements, viz., celts, pounders, ring-stones, etc., were the surface collections from the near abouts of Belphari, District Midnapur.

75. GHOSH, A. K.

'Discovery of Prehistoric stone implements from Northwest Midnapur, West Bengal', *SC*, XXVIII, 7, 1962 pp. 338-39.

North-west Midnapur, the meeting place of the prehistoric cultures of Singhbhum, Manbhum, Bankura and Midnapur is highly significant. Implements from several places-Astajuri, Bhedasin, Bamanoih, Nynagara, Labari, Simlupal-were collected. These include palaeoliths and neoliths. Of the latter only six were available. Neoliths included pounder, ring-stone celts, etc. Material out of which these were fashioned is epidiorite.

Some rock-shelters were also found.

76. GHOSH, N. C.

'On the neolithic pottery of Eastern India, *JOIB*, XIX, 4, 1970, pp. 333-339.

Pottery from Kuchai, Chirand, Sanjay valley and Daojali Hading has been dealt with.

Neolithic pottery from Buchai is divisible into two fabrics, medium to thick and medium to thin; the first being predominant. It is a coarse grit-tempered red ware. Sand, mica and quartz particles are found in the body clay. Pitted exterior surface indicates the use of vegetable matter as degreasant. The thick wares are hand-made, while the thin ones are made on the turn table or slow wheel. Main shapes are bowls and vases. Most of the pottery bear a red slip. Shapes in the thin ware are bowls and basins and are slipped inside also. They bear finger tip incised patterns. Similar pottery is found at Baidyapur and Kiching also and are analogous to the neolithic pottery of Kuchai.

A neolithic site was noticed at Kurkutia. Parasnath and Chida are sites noticed earlier but no pottery was reported from here. Three celts and a ring-stone were the tool-collection, of which two celts had the polished on the working edge, triangular in form and roughly oblong in transverse section. Material of the tools was phyllite. Mace-head had a circular cross section. Pottery collected from the surface was coarse grit tempered and weathered. Some showed traces of slip. This has strong generic affinity with those from Kuchai. Shape was mainly bowl. This ware is not reported anywhere in the valley of Kasai, Kumari and Jan.

In the Sanjai valley the stone tools from the excavation at Sini, were similar to Kuchai. Celts, chisels, saddle querns and ring stones were the types. Pottery from here is both wheel-turned and handmade and broadly fall into (i) grey-black and (ii) brown to red. Similarity of tool-types and the contiguity of area with Orissa would connect the pottery also with Kachai pottery.

At Chirand Period IA yielded handmade pottery, grit-tempered and red in colour with mica and quartz in the made up. Pot-forms are vases, shallow bowls, spouted vessels, basins, etc. Pottery of the succeeding Period IB ceramics consisted of grey, red and a few black ware sherds. This pottery was both handmade and wheel-turned. Clay was better levigated. Shapes were bowls, basins, high and narrow necked jars and variants with ring base, pedestalled bowls, dished and lipped bowls. Pots were burnished on the exterior or interior or on both sides. The grey ware bore post-firing paintings in ochre colour. Designs were lines, criss-cross, concentric circles and simple bands. Generally spoutes, mouth of spouts and lips were painted. Punctured decorations were also found on dull grey ware, while red ware bore applied rope and notch designs. Associated neoliths were celts, hammers, fabricators and balls. Microliths, an integral part, comprised parallel sided blades, scrapers, tanged arrow-heads, points, lunates and borers. Seventy-five percent of the microliths were blades. Materials of the tools were chalcedony, chert, jasper and agate. Crested guiding ridge technique was not known. Bone tools were also found. This level was devoid of metal.

The red ware of Chirand IA is related to the Kuchai red ware.

At Daojaling Hading along with the neoliths pottery was also found. It consisted of grey and red wares; the grey ware being handmade and the red turned on slow wheel. Grey ware falls under (i) cord-marked, (ii) stamped and (iii) incised; the first denoting the mode of manufacture while others are decorations. Basket impressions on potsherds were also seen. Grey ware was not well levigated and contained quartz, sand and vegetable matter as degraisant. It was thick and ill-fired. Red ware was of well levigated clay and free from extraneous ingredients and also well-fired. The grey ware has East Asian neolithic affinities. Red ware is perhaps related to the Yansho red pottery extending south up to Szechwan.

At Selbalgiri - 2 along with geomertic and non-geometric microliths pottery was found; it being handmade, coarse grit tempered, plain grey-

brown or dull brown ware. The grey ware found in microlithic level continued in neolithic levels as well where no shouldered celts were seen. The new strain in this level are cord-method of pot-making and decorations.

The wheel made red ware of Assam to be an extension of Kuchai neolithic ware rather than from Sezchewan.

Summing up the author observes:

(i) Five main traditions of ware including the stone wares of Kurkutia are the red ware, both handmade and wheel turned; plain grey, hand made cord marked grey and burnished grey. The area of concentration is Orissa, south-west Bengal and Bihar, Garo Hills in Assam; Assam and western Bihar respectively. From the area of concentration stone ware is excluded.

77. GODWIN-AUSTIN, Maj.

'Celt found in the Khasi Hills', *PASB*, 1875, pp. 158-59.

A celt was found at Shillong from surface. Material is hard slate found near Maoflang and ground into shape. The implement is similar to that found by Mr. Medlicott at Dibrugarh. Celts were used as hoes. Till recently the Kukis of Cachar Hills used stones set into a wooden handle as hoes for turning soil, especially after rains. Such tools are found in Manipur also.

78. GORDON, D. H.

'The Stone Industries of the Holocene in India and Pakistan', *AI* 6, 1950, pp. 64-90.

The portion dealing with microliths, stone axes and the advent of metal is of interest.

Presence of polished stone axes is considered to be one of the factors of the neolithic age. It is doubtful whether this is true of India.

It has been observed that microliths disappear when chalcolithic culture begins.

Brahmagiri and Maski have yielded polished stone axes. Pottery sequence at both sites are almost similar and the chalcolithic phase continued till the intrusion of iron. An interesting point is that at both the sites while flakes of chert agate and chalcedony are found no microliths were available. Stone axes from Maski are all of the pointed butt type. Some are ground and polished all over while others are chipped and edge ground. Stone axes are associated with flake-blades. An interesting tool from Brahmagiri, a flat square sided axe, has affinities with north-eastern type is very rare in south India.

Pointed butt axes found in Burzahom are similar to those of Brahmagiri and Maski. The author dates the Burzahom culture to C. 1200 to 2nd or 3rd century B. C.

With the advent of the urban Harappan culture less imaginative stone technique was adopted giving rise to flakes which continued in the chalcolithic of Brahmagiri and Maski.

Patpad a site in the erstwhile Madras State appears to show an overlap phase between Neolithic and Iron Age culture.

In conclusion the author observes:

(i) Microlithic tools continued to be used along with pottery well into the neolithic;

(ii) in the absence of ground stone axes these tools survived as the tool-type together with bone tools and some copper; -

(iii) in urbanized sites microliths lost their identity surviving only in the form of flakes and blades;

(iv) the pointed butt ground and polished stone axe from north-east appeared on the scene later than the flat copper axes from the west;

(v) most of the area of peninsular India was and continued to be in a microlith using mesolithic or neolithic stage while the chalcolithic urban or semi-urban cultures spread in the great river valleys of the north; the proof for this is the chalcolithic culture of Brahmagiri.

79. GOSWAMI, M. C.

'A note on the magico-medicinal use of celts in Assam, *JUG*, XII, 2, 1961, pp. 17-24.

80. GOSWAMI, M. C.

'Exploration in District Garo Hills', *IA* 1963-64 p. 4.

Pieces of ring-stones and seventy-five celts of a variety of shapes were found near Rongram.

81. GOSWAMI, M. C.

'Exploration in District Garo Hills', *IA* 1964-65, p. 4.

The region covered was Rongram hill area bounded by Chitra streamlet and Chitra abri hill, Dipu abri and Rongram Chimbima. Two hundred and ninety-four implements viz., celts, axes, hoes, including the shouldered variety, adzes, hammerstones and chisels were collected in an area of 7.77 sq. km.

82. GOSWAMI, M. C.

'Exploration in District Garo Hills', *IA* 1965-66, (Cyclostyled).

Among the important neolithic sites discovered were Rangigiri, Selbalgiri and Thusekgiri in the Arbela range. About eight hundred tools were collected. Chipped implements of dolerite from the last site are important. The implements are weathered and show typological affinity with Hoabinian of South-East Asia. Other tool types are flattish axes of lenticular cross section and with the undersurface of working-end ground; crudely shouldered axes and nearly cylinder shaped chisels. Material of the tools is dolerite. A spear-head from Salbalgiri is noteworthy.

83. GOSWAMI, M. C. and BHAGABATI, A. C.

'A Typological Study of Shouldered Celts from Renghengiri (Garo Hills)', *JUG*, Science, X, 2, 1959, pp. 105-122.

84. GOSWAMI, M. C. and BHAGABATI, A. C.

'A preliminary Report on a collection of neolithic tool types from Western Assam', *MI* 39, 1959, pp. 312-24.

The article deals with tools collected at Rongram, Rombhagiri, Rengchengiri, Tura, Rongchugata and Phulbari in Garo hills District and Rani and Kamakhya in District Kamarupa. Of the 132 tools collected 68 were obtained from local population. The rest, 64 were surface finds from Rongram, a hilly area. Tools were from lateritic surface.

The Kamarupa specimens are on slaty shale, clay and shale and exhibit no conspicuous patination. Tools from the Garo Hills are made on diorite quartzite and fine grained granite and exhibit deep ferruginous and reddish brown patination. The tools fall into shouldered and non shouldered celts. Forty-one specimens representing 31.06 are of the shouldered variety. Rest 91 forming 68.94 are trapezoidal, triangular and rectangular forms of celts. Shouldered celts are important in the series for various reasons. Curvilinear forms predominate over rectilinear ones. No tools having angular bevelling were found. Hence typical shouldered adze are absent.

The author doubts whether the shouldered axes were hafted adze wise.

Of the non-shouldered types 45 are typical axes while 15 are adzes, 8 are typical neolithic cold chisels with thick hammering facets at pole ends. Particular mention may be made of a small hammer-stone and a shouldered lance-head.

The technique of manufacture is recounted.

Concluding the author says that it is not possible to arrive at a conclusion as to the presence of neolithic culture in Assam in the absence of the primary traits of the culture. A short description of the tools is given.

85. GOSWAMI, M. C. and SMARMA, T. C.

'A Brief Report on the Investigation into the Prehistoric Archaeology of North Cachar Hills, Assam', *JUG*, XIII, 2 Science, 1962, pp. 63-66.

The polished stone using culture of Assam was not true neolithic, since the essential characteristics of neolithic viz., agriculture, domestication of

animals, pottery and weaving are absent.

Exploration of the region between Langting and Maibong was planned. As a preliminary step the study of the stratigraphical sequence of the celt-bearing layer of Daojali parbat was taken up. The region is dotted with low hillocks, dense forests and tiny streams. The important rivers are Langting and the Mahur. Dimacha, a section of the Bodo group of people inhabit the area now. They practice a crude form of agriculture with hoe. The neoliths are considered by these people 'charapthai' thunder stone and is used for magico-medicinal purposes.

The neolithic site at Daojali parbat is situated near erosion gully caused by two nullahs. The stratigraphy of trial trench dug to a depth of 5' (1.5 m.) revealed three layers. Layer 1 dark brown earth 3' - 3½' (0.9-1.06 m.) thick; layer 2 yellowish brown sticky earth mixed with some gravel 9" (0.22.) in thickness; and layer 3 yellowish and partially exposed. The neoliths etc. were found in layer 1 at a depth of 20" to 30". The finds included polished celts of slaty shale, sandstone and fossil wood, polishing stones or bones of sandstone and two fragments of potsherds. Other layers did not yield anything.

86. GOSWAMI, M. C. and SHARMA, T. C.

'On the Neoliths from Garo Hills, Assam', *JUG*, XIII, 2, Science, 1962, pp. 67-73.

The present population of Garo Hills are economically primitive and practise a form of shifting cultivation. Neoliths collected previously are in the Pitt-Rivers Museum, England and have been studied by Dani. The author collected a dozen implements in an area of nine square miles (23.309 sq. km) around Rengchengiri. The material of the tools is fine grained granite. Patination on them is of reddish brown and greyish brown colour which is due to association with the lateritic soil. The implements vary from crudely chipped to finely polished ones. Chipped variety of axes without polish would probably represent an earlier phase of neolithic culture. Some are partly chipped and partly ground. Only one specimen of polished tool was found. Tools with lenticular, plano-convex, ovoid and biconvex cross section occur. Only one specimen with rectilinear cross section was found. The types represented are trapezoidal hoe-blade, rounded-butt axe with broad cutting edge and chisels.

87. GOSWAMI, M. C. and SHARMA T. C.

'Excavation at Daojali-Hading, United District of Mikir and North Cachar Hills', *IA* 1962-63, p. 3

Four trenches, one each on the eastern and western slopes and two on top of the small hillock were laid. The trench on the eastern slope yielded fruitful results revealing a 45cm. thick deposit. The site seems to be a single culture site. Neolithic implements and coarse, ill-fired types were celts including one of the shouldered type, bones, corn-grinders, mullers, pestles, etc. Pottery was grey in colour, often with basket and cord impressions on the outside. Majority was kiln baked while those with pale cream core were sun baked. A bar celt of iron similar to the faceted stone celt was a surface find on the western slope.

88. GOSWAMI, M. C. and SHARMA, T. C.

'Excavation at Daojali-Hading, United District of Mikir and North Cachar Hills', *IA* 1963-64, pp. 4-5.

Excavation was conducted in the Mupa Reserve Forest near Langting. Neolithic tools, bones and pottery reveal the sequence of the Neolithic culture of the Jhum cultivators.

89. GOSWAMI, M. C. and SHARMA, T. C.

'Further report on the investigation into the Prehistoric Archaeology of the North Cachar Hills, Assam', *JUG*, XIV, 2, 1963, pp. 45-47.

90. GOSWAMI, M. C. and SHARMA T. C.

'Exploration in District Garo Hills', *IA* 1967-68, pp. 7-8.

The northern face of the Arbella range around Rongram Development Block was explored.

The area is characterized by slopy ridges, narrow valley with thick vegetation and rivers cutting deep into the bedrock.

A pebble tool, forty-seven chipped celts, twelve scrapers, seven points, three borers, one awl, three spear-heads, twelve shouldered celts, fifteen cores and a hammer were picked up at Chitra Abri.

To the east of Rongram Development Block, two sites Selbalgiri-1 and Selbalgiri-2 were located.

Six stone axes and large number of potsherds were picked up at Selbalgiri-1.

At Selbalgiri-2 besides pottery five hand-axes, two picks, five discs, one hundred and fifty-eight chipped celts, one hundred fifty-two ground celts, thirty-two shouldered celts, twenty borers, sixty-six blades, twenty-six large knives, seven knife blades, one hundred and forty-one points, twelve spear-heads, thirty arrowheads, one fabricator, two wedges on hinge-flake, two chisels, fifty-three cores, twenty-seven hammerstones, twenty-two microliths, one thousand and seven hundred and twenty-two waste flakes were picked up. Tools can be divided into (i) highly developed flake-blade industry, (ii) tools associated with primitive microlithic industry, and (iii) primitive tools, viz., handaxes, discs, picks, etc., betraying palaeolithic tradition.

91. GOSWAMI, M. C. and SHARMA, T. C.

'Excavation at Selbalgiri-2, District Garo Hills', *IA* 1967-68, p. 8.

As a sequel to the exploration, excavations were conducted at this site. During the excavation three layers were encountered. Layer 1 about 22 cm. thick of reddish earth and quartz gravel, yielded six stone axes, both chipped and ground variety, one scraper and a large number of potsherds.

Layer 2, 2.20 m. thick, of reddish brown earth with large quantity of quartzite gravel, yielded a core, four hammers and small flakes and pottery.

Layer 3, 35 cm. thick yellowish in colour and containing less gravel, yielded numerous microliths-geometric and non-geometric and pottery. Geometric microliths were 13 lunates, and 4 trapezes. Points and arrowheads were also found. The raw material of the tools was dolerite.

Tools were heavily patinated and weathered. Pottery was handmade, coarse and of gritty fabric. grey, grey-brown and dull brown in colour. No decorations were observed on the pottery.

92. GUPTA, S. P.

'The Mountainous Neolithic Cultures of Central Asia and Northern India', *The Anthropologist*, XIV, 2, 1967, pp. 125-36.

The Pamirs and the Himalayas form part of the same chain of hills with almost similar ecological conditions. Hence the similarity between the Kangra Neolithic and Gissar Neolithic of Tadjikistan has far reaching significance.

The Soviet Central Asian neolithic culture can be grouped into: (i) Djeitun, (ii) Keltminar and (iii) Gissar Cultures. The first is similar to Jarmo, Mersin Sialk, etc. C-14 date for this culture is c 6000 B.C. The second has several regional variations and is concentrated near the Aral sea and date to c. 3000 B.C. The Gissar or Hissar culture derives its name from the type-site of the same name. Sites are found always in the mountainous regions in Tadjikistan and Uzbekistan. The geographical distribution coincides with that of the Chopper-Chopping tool complex of the Old Stone Age. Important sites are Tut-kaul, Aktanga, Kui-bulion, Kukhna Bai and Gissar in Tadjikistan and cave of Amir Tamir and open-air station near Kohjikent in Uzbekistan. Most important site is Tut-kaul which was also excavated. Sequence at this site is given. Level II here is neolithic, comprising fluted cores, blades and non-geometric microliths, points, knives and lunates. Scrapers of the pebble chopper-chopping variety is also seen. Together with this assemblage pointed and round butted polished stone axes were noticed. Material is nephryrite similar to those of the Sinkiang neolithic axes. This neolithic culture is devoid of pottery, cereals, and mud or mud brick structures. Economically this culture belongs to the hunting and collecting stage. But blades show signs of use marks suggesting harvesting. From the animal-bone remains it may be surmised domestication of cattle. Evidence of hearths, floors of stones, and post holes at Kui-bulion (late levels) are indicative of habitations.

Total picture presents a neolithic rather than a mesolithic culture. The Gissar assemblage is near to Karim Shahr in Zagros. This seems to be the earliest neolithic culture.

In the Kangra valley between Ror and Dibber on T4 neoliths were found. Material of the tools was soft shale. Similar tools were available at Dehragopipur. Besides scrapers on pebbles were also found. Mohapatra divides this into two - polished tools and chopper-chopping

and flake tools. Hence a portion is palaeolithic and not neolithic.

But change in raw material from quartzite to greyish chert for flake tools and chopper-scrapers would indicate a change in industry and also in Period. At present no connection between Kashmir neolithic and Kangra valley neolithic Age can be postulated. But just as Kashmir neolithic, this has to be given an independent status.

In conclusion the author observes:

- (i) Parallels between Gissar and Kangra neolithic culture are striking.
- (ii) It is premature to postulate any relationship between them.
- (iii) In Kangra valley there is no need to separate the chopper-chopping complex and the neolithic complex. They can co-exist and might form assemblage of a single complex.

93. HAIMENDORF, FURER VON C.

'Notes on the Stone Age in India', *MI*, 28, 1948, pp. 197-208.

Neolithic techniques did not originate in India, but more or less developed neolithic industries infiltrated into India at a time when the subcontinent was still inhabited by the Old Stone Age men. Earliest neolithic stone implements found on Indian soil are axes with pointed butts and an oval cross section. This type found in Africa, western Europe, Indo-China etc., is invariably connected with early forms of agriculture and there is every reason to believe that the users of this type of axes were at least in some countries, the first to introduce cultivation of plants.

The neolithic axe of oval cross section may be derived from the pebble-axe of the Late Capignian. At what time this appeared in India is open to speculation. It could not have occurred before 3000 B. C. which would hardly leave anytime between the proto-neolithic and the Indus Valley culture. Considering the Brahmagiri evidence he says that a chalcolithic polished axe culture survived in the Deccan long after the Aryan invasion of the north. The association of microliths with polished stone axes of oval cross section is common in the Deccan and this neolithic-microlithic should not be confused with those of Upper Palaeolithic tools.

In eastern India, an entirely different neolithic pattern, which did not evolve out of a proto-neolithic is seen. The rectangular form of axe type found here is due to the immigration of neolithic people from the East. So also the shouldered type. This type is associated with the language groups. He further observes that the bearers of this culture could not have crossed the Brahmaputra-Ganga plain when it was inhabited by a thick population of advanced civilization. We may, therefore, assume that it reached Bihar and the Orissan hill tracts not later than the beginning of the first millennium B. C. and possibly later.

Concluding the author remarks that it is a phenomenon peculiar to India that throughout the Ages civilization have risen and matured without obliterating or absorbing all that has gone before. Palaeolithic and neolithic stone industries have become obsolete but the ways of life and economic pattern of both the older and younger Stone ages still persist in aboriginal tribes of India.

94. HAIMENDORF, FURER VON C.

'Culture strata in the Deccan', *Man* XLVIII, 1948, Art no. 99.

Older more static cultures of India gave way not by disintegrating but by seeking refuge in remote areas, uncongenial to cultivation based on an advanced agricultural economy. Aborigines represent comparatively old and primitive culture. Study of primitive culture type would convince that such correlation is possible, and parallels in prehistoric and contemporary civilizations can throw light on archaeological and anthropological problems. The author says that the Reddis of the Deccan and the Gadabas and Bondos of Eastern India are survivors of the earlier neolithic folk. Axe is an indispensable implement for effective cultivation and domestic economy. Recounting the domestic economy and agricultural practices of the Reddis the author is of the opinion that they are midway between the semi-nomadic food gatherers and settled peasants. The agricultural practices of the Reddis could have been followed by neolithic folks possessing stone axes. In domesticating animals, pig breeding, poultry keeping, etc., they may be compared to the neolithic folk. The author is of the opinion that if any living culture can be associated with this proto-neolithic industry - manufacture of wooden domestic articles, pig breeding, etc., it is that of such primitive shifting cultivators as the Reddis.

Recapitulating the socio-economic aspects the Munda-speaking Bondos

and Gadabas, the author says that their general culture is in many aspects comparable to late neolithic civilizations. He links the advanced agricultural civilization of these two tribes with the sporadic finds of highly polished celts of quadrangular cross section which resemble the Burmese and Indonesian types and which extended up to Godavari

In the absence of conclusive evidence through excavations we have to assume that a late neolithic civilization with eastern affinities and associated with Munda speaking people exerting considerable influence on the older populations of the Deccan.

95. HUTTON, J. H.

'Two celts from Naga Hills', *Man*, 24, 1924 Art. 15

One is a shouldered celt, the other smaller is nearly square in shape. The second was perhaps hafted to a crook with cane rope in the fashion of hafting a hammer. The material of the second is a white stone with pale green veins and resembles serpentine. The first type forms a link between Mon Khmer implements of the Malay Peninsula with Chota Nagapur. These were found for the first time in the Naga Hills.

This is compared with an iron hoe from Naga country and with a slate hoe from Malay. He also opines that some branches of the Mon Khmer race inhabited or passed through Naga Hills before learning the use of iron.

96. HUTTON, J. H.

'A Naga Hill Celt', *J and PASB* XXII, 1926, p. 133.

Mr. G. Heseldin discovered, while marking a road, a neolithic adze slightly shouldered, at Nichuguard at the foot of the Naga hills. It is rather a unique find since it had been fashioned out of fossilized wood which is found in the Dimapur area. Hence it could have been manufactured locally. Usually the neoliths of Naga hills are of Indian jade, olivine, serpentine and other similar materials.

97. HUTTON, J. H.

'Prehistory of Assam', *MI*, 8, 4, 1928. pp. 228-32.

This is a summary of a lecture delivered in Indian Museum in August 1928.

Materials other than stone perish in Assam due to climatic condition and hence evidence is scanty. The stone tools are divided into axes and adzes. They are further divided into (i) long and narrow and shaped like an isosceles triangle, (ii) rectangular and (iii) shouldered ones. First type is more or less identical with those from the dolmen-graves of south India. The second is rare. Perhaps hafted in the Polynesian way between two layers of wood lashed together. Common type is the slightly shouldered types derived from the Irrawady valley and was perhaps brought by the emigrants from the east.

Narrow celts and megaliths are found in South India. Similarly narrow celts are found in Assam. Megaliths and dolmen burials associated with pot burials are found in central India. Pot burials are found in the Naga Hills but without dolmens.

98. ISAAC, N.

'Neolithic site in District Nellore', *IA* 1959-60, pp. 67.

Kurichedu is a neolithic site with vestiges of a habitation of early historical period characterised by the Red Polished Ware.

99. JENA, H. N.

'Neolithic tools, Aaripur, District Mayurbhanj', *IA* 1961-62, p. 102.

At Haripur, a neolith was found. Also a curious polished stone with a pointed butt end, splayed out and thickened head along with a polished oblong object were picked up.

100. JOSHI, Dr. R.V. and SINGH, Dr. R. C. Prasad

'Exploration in District Mongyr', *IA* 1965-66 (Cyclostyled).

Exploring the Bhimabandh area near the guards hut in the area locally known as Reha, seven mace-heads and a celt made on phyllite were found. Pottery was absent.

101. JOSHI, R. V. *et al.*

'Explorations in Districts Kangra and Mandi', *IA* 1967-68, pp. 22-23.

The only site at Kuthman, on the Gaj Khad, exhibited distant affinities with the neolithic culture.

102. KHATRI, Dr. A. P.

'Exploration in District Kurnool', *IA* 1959-60, pp. 11-12.

Pottery and neoliths were found behind the medieval fortress opposite the town of Kurnool. In the fresh collection of neoliths, from the top of the Sannarasamma hill, Sanganakallu (Bellary District), new types along with axe like cores resembling Acheulian hand-axes were found. Such cores are also found at the flint factory sites at Sukkur and Rohri in Sind.

103. KHATTRI, Dr. A. P.

'A century of Prehistoric Research in India', *AP*, 1-2, 1962, pp. 169-85.

A summary of work in the field of neolithic culture of India done so far by scholars (Wheeler, Subbarao, Worman, Dani, Allchin, etc.) is given under the sub heading 'The Neolithic Culture Complex'.

104. KHAZANCHI, T. N., *et al.*

'Excavation at Burzahom, District Srinagar', *IA* 1960-61, p. 11.

The earliest inhabitants were pit-dwellers. The pits were roughly circular or oval, with a narrow mouth and a flat bottom. Deep pits were also provided with a sort of landing steps. Some pits were also interconnected with arched corridors and plastered over with mud. In all probability these residential pits had a thatched roofing.

A few polished stone axes, bone tools, generally handmade mat, impressed steel grey pottery formed the cultural milieu of the period. Common types were the deep bowl with pedestal base and jars with flaring rim. A few wheel-made burnished red ware were also noticed.

The next phase of occupation here was distinguished by structures of mud and mud bricks, black burnished ware, polished stone axe and large number of polished bone tools, viz. awls, arrow-heads, harpoons, etc. The polished stone axes made out of the Himalayan trap was different from the southern and eastern counterparts. Funnel shaped vessel, basin with obliquely cut rims, jar with splayed out rim with incised decorations were the types found in the black burnished ware. Evidence of a communal hearth was also available. In the closing stage of this phase two burials, a primary and secondary were also noticed.

105 KHAZANCHI, T.N. *Et al.*

'Excavation at Burzahom, District Srinagar', *IA* 196162, pp. 17-21.

This season's work was the continuation of previous year's work. Period I and II represented the neolithic culture. In Period I sixteen pits cut into the natural soil were brought to light. The largest measured 2.74 m. at the top 4.57 m. at the base and 3.96 m. in depth. The pit had its sides plastered with *karewa* mud. Three steps led into it up to certain depth. To reach the bottom, some sort of ladder might have been used. From the post-holes on the surface of the pit it could be surmised that there might have been some sort of superstructure of perishable material viz., birch-wood. The filling inside consisting of ash, charcoal, clearly indicated occupation.

From the evidence of stone hearths near the mouth of the pits and the storage pits occurring close by we may infer that the people who lived here led an open air life during the summer. Some animal bones and bone-tools were obtained from these pits. No grains, however, were available. In three of the pits leaning stones were seen; their purpose is unknown. Two such stones were found associated with burial of the megalithic phase.

In Period II, some of the pits had gone out of use, having got filled up. The mouths of these pits were plastered with mud and covered with a thick coat of red ochre (seen all over the site) and used as floor. Successive floor levels have been unearthed. The presence of about 45 posts holes would suggest a big superstructure.

The ceramics of Periods I and II were crude handmade ware; the colour of which was grey, shades of dull red, drab, brown, buff and burnished black. Coarse in fabric and finish. Shapes included bowl, vase and

stem. In period II a burnished black ware with medium fabric is seen. The shapes in this ware were dish sometimes with a provision for stand, bowl, globular pot, jar, stems with triangular perforations and funnel shaped vases. A distinctive shape in this ware was a high necked jar with a flaring rim globular body and flat base; lower part of the neck being decorated with incised oblique notches. The exclusive design on this ware was the mat impression.

The bone tools from the excavations were unique with fine polish and sharp working edge; the types consisted of short daggers, small/large points, awls, antimony rods, polishers or scrapers chisels, needles with eyes, harpoons (including unfinished ones). Frequency stone tools was high in this Period. Tools of Periods III and IV were of lower order in polish.

Polished axes, harvesters, pounders, chisels and mace-heads, typologically different from southern counterparts were the stone objects obtained in the excavation.

106. KHAZANCHI, T. N.

'Excavation at Burzahom, District Srinagar', *IA* 1962-63, pp. 9-10.

Structures of Phase II viz., mud platforms with partitions and storage pits, floors with post holes were exposed. Fire was evidenced by the successive layers of burnt material. In the upper levels a rectangular structure of upright stone slabs was noticed.

Eight human and five animal burials were encountered in the habitation area. Of the human burials five pertained to Phase II and three to Phase III. Three animal burials belonged to Phase II and two to Phase III. Burials of Phase I were not met with. In Phase II red ochre was used on the bones of human beings. Burial pits were circular, oval and narrow at the top Inner face was plastered with lime Four of the skeletons were in a couching position. Both primary and secondary internments were practiced Except in a few cases no attendant furnishings were found. Trepaning was noticed in a burial of Phase III Animal burials were both articulated and fragmentary, animals represented were dog, wolf and ibex.

Interesting is the burial of five dogs along with an antler.

107. KHAZANCHI, T N.

'Excavation at Burzahom, District Srinagar', *IA* 1964-65, p. 13.

Excavation here was conducted for the fifth season. In the earlier season, besides structures, six burials one human and five animal similar to those exposed earlier were tackled. These pertain to Phase II of the neolithic occupation. Animals represented were dog, ibex and wolf.

This year's dig revealed several rectangular and square pits, drains, post-holes, hearths of Phase I. Rectangular pits were also used for living. Red ochre was used on floors, particularly in Phase II. Other finds included new types of bone and stone tools. Bone tools were harvesters, graves with curved and oblique working edge and an awl. Stone implements were celts with flat rectangular cross section, longitudinally bent body and straight cutting edge, bead-shaped mace-head with hour glass section from Phase I. Lhoelast type double edged points were from Phase II.

Copper objects viz., arrow-heads, coil from Phase II, a knife from Phase III and a double-edge point from Phase IV. From Phase III was recovered two wheel-turned black painted red ware pots, one of which contained 950 carnelian and agate beads.

Intresting is the find of a stone slab found fixed in rectangular structure with the engraved side downwards; the engraving depicting a hunting scene in three registers, the lower showing an antler being pierced from behind with a long spear by a hunter and an arrow being discharged by another from the front. The middle and top show a hunting dog and two suns respectively.

108. KHAZANCHI, T. N.

'Excavation at Burzahom, District Srinagar', *IA* 1965-66 (cyclostyled)

An engraved slab with incomplete pattern and similar to the one found earlier was discovered. Both the slabs formed part of a structure, rectangular in shape and belong to phase II.

109. KHAZANCHI, T. N. *et al.*

'Excavation at Burzahom, District Srinagar', 1968-69 p. 10

A few pit-dwellings with post-holes, side drains, storage pits, hearths and mud-platforms were unearthed. The deepest and broadest corner post-holes were perhaps intended to carry strong posts which in turn supported the roof. In addition there was a central post also. Hearths were oval in shape and mudlined. Hearths in the centre were rare exceptions. Occasionally some of them were stone lined. Pit-chambers were also partitioned. Other finds included saw-edged bone objects, scrapers of horn with broad butt, polished sharpened working edges, stone pounders with grind marks and smoothed surface and stone querns

110. KRISHNAMURTI, C.

'Exploration in District Mysore', *IA* 1958-59, p. 32.

Two neoliths were picked up at the junction of the Kaveri and Kapila near Kandanakoppal.

111. KRISHNAMURTI, C.

'Exploration in District Mysore', *IA* 1960-61, p. 28.

Neolithic remains were discovered in the following places :

Boodhi-Tittu, Sivakalli, Komaranapura, Talnur, Palya, Kuttalavadi, Hemmige, Hosahalli. At Talnur and Palya neoliths were associated with a burnished brown red and Black-and-red Wares.

112 KRISHNAMURTI, C.

'Exploration in District Mysore', *IA* 1961-62 p. 34.

From the surface stone axes were collected from Bandahalli, Honnur Miniya and Rampura.

113. KRISHNAMURTHI, C.

'Exploration in District Mysore', *IA* 1963-64, p. 26

At Yechangali in Taluk Nanjangud were found ground stone axes and brown burnished hand-made pottery.

114. KRISHANAMURTY, C.

'The Neolithic Cultural Remains in the Kaveri Valley, Mysore District' *Studies in Indian History and Culture*, Prof: P. B. Desai felicitation Volume, Dharwar, 1971, pp 4-12.

The paper forms the preliminary study of the remains of the neolithic phase in the Upper Kaveri valley. The author had discovered three microlithic, nine neolithic and fifty megalithic sites in T. Narsipur, Chamarajanagar, Kollegal, Gundlepet, Yelandur and Nanjangud taluks of the district.

Neolithic sites are T. Narsipur, Mettalavadi and Hemmige in Taluk T. Narsipur, Booditittu and Hosahalli in Taluk Chamarajnar, Booditittu and Srivakalli in Taluk Yelandur, Telnur in Taluk Kollegal, and Yachangalli in Taluk Nanjangud. Most of the sites are located on the alluvial plains on the banks of the river and have a later megalithic phase. A brief account of the location of the sites is given.

Antiquities from these sites consists of pottery, microliths and pecked stone tools.

Pottery from these sites are similar to those found at Piklihal, Utnur, Brahmagiri, etc. These fall into two major groups, burnished and unburnished, which again are divisible into two varieties grey and red; the difference being only in the method of firing. These are usually hand-made and are fine to medium in fabric. Organic tempering materials are absent. However, particles of sand and mica have been mixed in the clay. Common shapes are bowls, large pots, large shallow bowls with pinched rim, etc. Neck-rests are also available. Normally the pots are not slipped. Occasionally simple incised designs are found. In a few cases red ochre painting on the rims were observed. Pre-firing black on red pottery is absent.

Microliths consisted of fluted cores, parallel sided blades, points, crescents on chert and chalcedony are in negligible frequency.

Pecked and ground stone tools on trap comprised various types of but ended axes adzes, chisels, rubbers and balls. It is to be noted that the trap is not found in this region. Absence of waste flakes, etc., indicate that these tools were imported. Crude imitations of trap tools were also found.

Plates together with descriptions of antiquities illustrate the article.

115 KRISHNASWAMI, V. D.

'Stone Age in India' viii, *The Neolithic Age*, *AI*, 3, 1947, pp. 38-40.

Neoliths are typologically different from palaeoliths and are of varied forms involving new technique in manufacture. The collections of Le Mesurier, Foote, Fraser and others are surface collections without reliable field data. The transition from proto-neolithic to neolithic and ultimately merging into copper and iron ages in the north and south respectively is yet to be studied. Paterson, on the basis of patination has classified the tools into several stages and corroborating by typology assigns high antiquity to Foote's Bellary collection. Earliest tools show similarities with the proto-neolithic of Sukkur-Rohri. This is substantiated by the Museum collection at Hyderabad. Dr. Krishna's finds at Brahmagiri also confirms Patterson's findings. The author also recounts the sequence of Burzahom by the Yale Cambridge Expedition excavations by de Terra and assigns a date far beyond Mesopotamian date-6000-4000 B. C. All this would indicate the Neolithic here would be contemporary with the post glacial formations.

116. KRISHNASWAMI, V. D.

'Progress in Prehistory', *The Neolithic Complex*, *AI*, 9, 1953, pp 24 29.

The presence of domesticated animals and plants, pottery and smooth tones and the absence of metal are the main factors going to make a true neolithic culture.

Most of the stone tools are axes, adzes but other types, viz., hammer-stones, grinding stones, mortars are also present. Through association, pottery and beads are also classified as neolithic.

The author recounts Worman's classification. Dealing with the data from Middle East the author says that stone celts are associated with copper and other metal objects in levels definitely of metal age. On the basis of Worman's study the author also agrees to an eastern origin for the neolithic techniques of stone working in India.

Assam and Burma formed the corridor through which celt making

technique entered into India. The author also gives a tentative correlation of the neolithic industries of India and Indo-China.

The author recalls the field data and study of the neoliths from Bellary, Hyderabad, Raichur, Sanganakallu, Brahmagiri, Chakradarpur, etc., by Worman.

Dealing with the shouldered adze, the author says that it has been associated with the Mon Khmer speaking Khasias in Assam and with Indo-China, the Irrawaddy valley in Burma and Malaya peninsula. The old Polynesian form occurs in obsidian in Easter Island. It is found in Assam Sawara country of the Madras Agency and sporadically in the Santal Parganas. Copper replica found is in the Chota Nagpur. Association of this type of tool with the Austroasiatic language is significant. This group also erects megalithic menhirs.

Concluding the author says 'that there has been an amalgamation of these two industries on the Asiatic mainland which ultimately resulted in the polished shouldered adze with quadrangular section in the late neolithic times. Bastar is the key place in India to test the neolithic problems since the Hill Marias of Abujhumar are influenced by the cultural contacts later than the neolithic'.

117. KRISHNASWAMI, V. D.

'The Neolithic Pattern of India', Presidential Address, Anthropology Section, *Indian Science Congress Association*, 46th Session, Delhi, 1959, pp. 1-26 (issued separately).

118. KRISHNASWAMI, V. D.

'The neolithic pattern of India', *AI*, 16, 1962, pp. 25-64.

Neolithic Age is distinguished by deliberate food production i.e., agriculture and domestication of animals. In addition, pot-making and the use of ground stone tools form subsidiary traits. Absence of metal is another factor.

Four neolithic provinces viz., A, Central and Western India; B, South India; C, Eastern India; and D, Kashmir region have been recognized.

Proto-neolithic phase characterized by certain lithic industries has been

identified in the Warbada, Sabarmati, Krishna, and Kon valleys, Sukkur and Rohri, Karachi, Kashmir and the Zhob valley. Summing up the phase the author asserts, 'components of proto-neolithic phase in India and Pakistan would show that if there was to be a real neolithic phase in the same region, it should exhibit a microlithic industry as holdover into the neolithic, with ribbon blade industry of Sukkur and Rohri'. This trait is to be seen in the chalcolithic cultures of Central and Western India.

Neolithic Province A: Most of the chalcolithic-neolithic sites are located in the river valleys. Cultural sequence of Nagda, Ahar, Maheswar-Navdatoli, Mehgam, Telod, Tripuri, Bahal, Tekwada, Prakash, Nasik, Jorwe, Nevasa, Maski, Brahmagiri, etc., are recounted.

Despite local variations there is a broad homogeneity in these sites. In northern Deccan it is characterised by painted pottery, parallel-sided blades and polished stone axes. Urn-burials (Bahal and Jorwe) link both the Deccans. Painted pottery, copper/bronze celts, ribbon flakes, pottery types in post-Harappan culture of Gujarat link the chalcolithic of this region with Harappan. More so the crested guided ridge method of blade making which is present in Karnatak. This predominant parallel-sided blade industry is co-existent with backed blades, crescents and trapezes-tools indicating hunting economy. This is survival of the microliths into the immigrating urban parallel-sided blade industry of the chalcolithic phase. Backed blades with steep retouch forms the link. Blunted backed blades are absent in Harappan sites as also in the proto-neolithic. This would show that the proto-historic culture of this region is an immigrating one of western origin and is deep rooted.

Province B — South India: Pointed butt axes are found in two clusters—south and eastern India. In the former the concentration is in the Karnatak. For this tool-type north-east-south west diffusion is suggested, which is supported by Haimendorf's theory that a late neolithic civilization with eastern affinity associated with some form of Austro-Asiatic language permeated the older population of the Deccan.

The older stratum of neolithic is the pointed butt type which is not uniformly distributed. There is a spatial gap. Hence there are two neolithic regions: (i) Karnataka and south and (ii) eastern, Orissa, Bihar Bengal and Assam. In climate also these two vary; the former is arid while the latter is that of heavy monsoon. But sites in both regions are confined to the plateau. Distribution in the eastern region is ecological.

In Karnataka, largest collection is from Bellary District. Brahmagiri and Sanganakallu show the neolithic axe culture evolving from a proto-neolithic to highly evolved neolithic phase. The author asserts that the Karnataka industry is local, developed on the soil and emanating from a post-palaeolithic-microlithic flake industry of the hunting stage. The neolithic axe industry of this region also absorbed the parallel-sided blade industry of the proto-historic culture of central and western India. The picture is different in eastern India where microliths are absent. Refuting the postulate of Allchin that this Karnataka neolithic culture had been influenced by West Asia and Iran and also that of Worman's all eastern origin the author states that the Karnataka neolithic is autochthonous and dates it to 2000 B.C.

The next largest collection is from the Shevaroy Hills. Neoliths are absent in the Cauvery basin due to lack of raw materials.

Province C — Eastern India : This province is divided into two regions: (i) Assam and (ii) Bihar, Bengal and Orissa.

In Assam the neolithic follows a pattern dictated by geography and the study has been zonal. However, the technique is similar in all zones. In the zones of Bihar, Bengal and Orissa there seems to a chalcolithic phase. Two separate tool-traditions unaffected by microlithic industry have been observed. The first mostly chipped and flake tools recalling the Palaeolithic tradition is uniformly distributed in the monsoon region. This is earlier. Edge grinding is a consistent feature of chipped tools in South East Asia where they intermingle in Haobinhian and Basconian in Indo-China and Kelantan of Malaya. This is the main cultural tradition of early neolithic prior to the late neolithic distinguished by ground, sawn and full-smoothed tools. The bar celts is common in northern China and Yunan; faceted shouldered celt in South East Asia. The sporadic find of these special tools in India indicate that they are imports or at best localized imitations of foreign types. These do not form a separate or distinct cultural group.

The second type of tools in Malaya and Indo-China are associated with pottery suggesting intrusion from outside. Later Somrangson of Indo-China has links with Hongkong Culture of south-east China and exhibits similarities with Malayan. The shouldered celts have links with Laos, Burma with Malaya and Siam. Further in South East Asia distinct grouping of tools are seen. Hence a single tool-type cannot be linked with the Austro-Asiatic language.

Province D - Kashmir: Neolithic Age here is characterized by pointed butt axes and hand-made pottery of buff and grey wares.

Summing the author observes:

(i) There are four provinces, A, B, C and D. Province A is chalcolithic in character and is restricted to Western Madhya Pradesh and Western India co-existing with the Deccan trap area. Ribbon flakes, painted pottery and tools of Harappan facies of western origin are associated. As it gets closer to Province B this absorbs the polished stone Axe.

(ii) Province B is mainly distinguished by the pointed butt axes originating in the region itself. In its earlier phase it is related to the post-palaeolithic flaking technique. This, coming out of the microlithic milieu later absorbed post-Harappan ribbon flake and copper celts of Province A.

(iii) In Province C there are two phases, over-lapping each other; earlier round butted axe showing chipping, grinding and polishing. This does not show relationship with any pre-existing microlithic culture. The second phase is the faceted square cut tools involving metallic technique in manufacture. Its origin is in South East Asia. The third phase is the metal copper hoards in imitation of stone tools coming as a second wave around 4th century B.C.

(iv) Kashmir region-Province D, had a distinct culture. Concluding the author says, 'without being unduly influenced by a *mirage orientale* for the neolithic origin of India, we have evolved our own neolithic pattern of India, influenced partly by West Asian neolithic culture, by the Harappan culture and by the South East Asian neolithic culture, the rest autochthonous in origin'.

119. KRISHNASWAMI, V.D. *et al.*

'Exploration in Districts Bankura and Purulia', *IA* 1959-60, pp. 48-50.

Kurkuha (District Bankura) is a site yielding neoliths and microliths. Here three neolithic tools, two tiny celts characteristic of East India were found. Both were smoothed and polished at the working edge, triangular with rough oblong transverse section. The third showed reworking after use. These were fashioned out of phyllitic schist.

120. LAL, B. B.

'The Prehistoric and Protohistoric Period': The Neolithic Age in *Archaeology in India*, Bureau of Education, India, Publication no. 66, Delhi, 1950, pp. 28-31.

The transition from Mesolithic to proto-neolithic to Neolithic is not clear. Neolithic implements, unlike others were polished and comprised celts, adzes, slick stones, fabricators, polishers, hammerstones; the material mainly being trap rock. Earliest neolithic site is Burzahom, the sequence of which site is given. Neolithic axes are also found at Hamirpur, Allahabad and Banda districts, Chhatarpur and Panna States, Garhi Morila, Buhuterai, Hazaribagh, Patna, Santal Parganas, Singhbhum Darjeeling, Nadia, Gara Hills, Naga Hills, Cachar, Raichur, Warangal, Bangalore, Chitaldrug, Anantapur, Bellary, Chingleput, Guntur, North Arcot, Salem and Thanjavur districts. In most of the sites the stratigraphic position is unknown or vaguely known.

In south India, Bellary and the adjacent area and Hyderabad are the focal points. At Brahmagiri neolithic age is dated to the beginning of the first millennium B. C. Cultural milieu of neolithic folk at Brahmagiri is recounted. At Sanganakallu this culture is earlier still. In its earlier phase pottery is absent.

Shouldered celts from Assam, Chotanagpur etc, indicate another wave which travelled from South East Asia traces of which are found up to Godavari in the south.

The neolithic people practiced a comparatively settled life and produced food. The culture in some areas survived uptill the early historic cultures.

121. LAL, Sardar and PANT, R. K.

'Exploration in District Anantnag', *IA* 1962-63, p. 9.

In the course of a survey of the valley of the Jhelum between Anantnag and Pampur as many as nine neolithic sites of the Burzahom complex were discovered; the sites being Begagund, Gofkral, Hariparigom, Jayadevi-Udar, Olchibag, Rampur, Panzagom, Sombur and Thanjiwor. Dwelling-pits were noticed at Gofkral, Olchibag and Sempur. Collection included mace-heads, a gritty red ware with/without mat impression and burnished and unburnished grey wares.

122. LE MUSURIER, H. P.

'Hatchets or celts', *PASB*, 1861, 81-85.

Discovered many neolithic celts. Find spots are Neehee, Manickpore, Surreon, Khon (Tirhowan). It is also mentioned that Capt. Hodgson found celts at Nagode and Kotee. Some of these celts were being worshipped as Mahadeo under pipal trees. These were found while exploring the ghats westwards of Chachye Falls on the river Tonse. A dozen implements were presented to the Asiatic society.

123. LOCKWOOD, E.

'Perforated Stone implements found in the bed of river Mun a Kharakpur', *PASB*, 1875, pp. 102-03.

Two implements were found in the river bed while constructing a coffer dam. They were found embedded among large and small stones. The surrounding rock is of metamorphic origin. Commenting Mr. Theobald was not sure of the use but agreeing with Mr. Oldham said they were portions of upper stones of querns or handmills. Br. Ball remarked that the material is so soft that they could hardly have been hammerstones.

124. LUBBOCK, Sir John

'The Stone tools of Assam', *Athenæum*, Jan. 22, 1867.

125. MAJUMDAR, G. G. RAJGURU, S. N.

'Excavation at Kupgal, District Bellary', *IA* 1964-65, pp. 28-29.

Purpose was to find out the nature and origin of the ash-mounds.

Excavation revealed eight layers; their description from top downwards being: (1) light brown ashy soil; (2) whitish grey ash; (3) scorioaceous ash with a few vitrified potsherds and fragmentary animal bones; (4) pinkish-grey banded ash, perhaps a floor; (5) similar to layer 3; (6) similar to layer 4; (7) dark-brown humus rich soil at top, dark-brownish soil in the middle and reddish brown gravelly detritus with patinated basaltic and quartz flakes; and (8) disintegrated Bellary gneiss.

Soil analysis showed that in pre-neolithic times climate was semi-arid with occasional torrential rains. The pre-neolithic basaltic and quartz flakes were manufactured from local raw materials. After this climate changed to become more humid. Neolithic culture came into being after the formation of layer 7 when climate had changed to semi-arid conditions.

Ashy and slaggy layers are result of burning of accumulated cow dung. The large scale burning could not be associated with any industrial or other similar activities.

The evidence supports the theory of Zeuner and Allchin regarding the formation of these ash-mounds.

There seems to be considerable time gap between the pre-neolithic and the neolithic here.

126. MALIK, S. C.

'Concepts and Terminology in Indian Prehistory', *ICAA*, 1961 pp. 7-8.

Stressing the need for a strong conceptual framework for terms in Indian prehistory the author advocates a definition based on techno-economic basis. Thus, food producing age ' would include the polished stone axe 'cultures' with evidence for domestication of animals, farming, etc., as also those 'chalcolithic' cultures, which may have used some copper but whose economy was not yet metal-oriented. The level remains essentially 'neolithic'.

127. MANGLES, H. A.

'Stone celts found near Mercara', *PASB*, 1868, pp. 59-60.

Six miles north of Mercara, Coorg, on the crest of a hill a fragment of a stone hatchet was found. Commenting Mr. Blandford observed that this was the first time that a neolithic tool was found in southern India. Further he remarked that similar types of tools have been found in Bundelkund.

128. MEDLICOTT

'Stone hatchet from Upper Assam', *PASB*, 1875, p. 159.

Commenting on the celt exhibited by Major Goodwin-Austen he observed that the stone hatchet found two feet below surface in a plantation at Dibrugarh was similar to the one displayed but it was smaller and of softer and more earthy stone.

129. MISRA, V. N. and KUMAR Vijaya

'Excavation at Bagor, District Bhilwara, IA 1968-69, pp. 26-28.

Period II was distinguished by appearance of metal. Microliths were decreasing. Potting indicated use of wheel. Main ceramic was dull brown gritty fabric with smoky core and slipped ware. Shapes were open bowls, large shallow dishes, small broad mouthed *handis*. Incised decorations were linear and geometric patterns on the outer face. A red ware less frequent showed uniform oxidization of core; shapes being bowls and dishes. Stone hammers, rubbers, saddle querns, sling balls, mace-head of hour-glass section, beads of carnelian, banded agate and rarely of bone were other antiquities.

Floors were paved with stones. Huts were circular and of stones.

Two human burials belonged to this period, one east-west oriented and the other south-east north-west oriented. Body lay in supine posture with limbs in flexed position. Attendant furnishing, pots, etc., were also found. In the first two arrow-heads and in other one copper arrow-head and a copper spear-head were found near the head. One copper awl on the abdomen was also noticed. Besides, a necklace of semi-precious stones and a terracotta spindle whorl (plano-convex) decorated with punctured triangles are found.

Animal bones were also found, in the graves. The copper arrow-heads are of the hollow barbed variety with two holes near the base. One showed a prominent barb, similar to Harappan specimens.

Date is 2000 B. C. for this phase.

130. MITRA, D.

'Microlithic and neolithic sites, District Bankura', IA 1957-58, p. 69.

At Chiadah, three neoliths along with large number of microliths and five Puri Kushan coins were discovered.

131. MITRA, D.

'Exploration in District Dhenkanal', *IA* 1958-59, p. 36.

At Harichandanpur, already known to be a palaeolithic site fragment of a polished celt of phyllite, a chisel with oblong section with its working edge ground, a rough chisel with working edge broken, a fragment of a quartzite ringstone were found. The chisels were of epidiorite.

At Sardapur four chisels, two of epidiorite, one of dolerite and the fourth of sandstone were found.

Shri Ghosh picked up two basaltic neoliths, a fragmentary ringstone of quartzite and some microliths-parallel-sided blades and fluted cores from Kaniha.

132. MITRA, D.

Excavation at Udayagiri, District Puri', *IA* 1958-59, pp. 38-40..

In the filling of the space between the square structure and outer wall was found a dolerite neolithic celt.

The structure is assigned to the last structural phase.

133. MITRA, D. and CHAKRAVARTI, D. K.

'Exploration in District Mayurbhanj', *IA* 1958-59, p. 38.

The following sites yielded neolithic implements: Baidyapur, Kuchai, Amsikra, Silipunji and Muruda also in Sadar Sub Division; Jaipur, Patwa in Kaptipada sub-Division; Bara Manda Radia, Bindha Pratapur, Haripur, Madhupur in Sadar sub-Division; Bonaikala in Bamangatti sub-Division; The last site yielded microliths-parallel-sided blades, lunates in chert and flint, cores, waste flakes, ovate of quartzite. Baramanda Radia and Bindha also yielded microliths.

The neoliths were made of quartzose phyllite, quartzchlorite and epidiorite.

134. MITRA, D. and GHOSH, S. K.

'Neolith and microliths in District Keonjhar', *IA* 1958-59, p. 73.

At Danguapasi a celt of greenish buff sand-stone was found. Two celts had been picked up from this place earlier.

135. MITRA, P.

'Prehistoric antiquities from Ghatsila', *J and PASB (NS)*, XVII, 1921, p. ccxlvii.

Records the discovery of a neolithic axe and rock carving nearby a river terrace. The rock carving has marked Australian affinities.

136. MOHAPATRA, G. C.

'Preliminary Report of the Exploration and Excavation of Stone Age Sites in Eastern Punjab, *BDCRI*, Silver Jubilee Volume, 1966, pp. 221-237.

In Terrace III of the Beas near Dehragopipur Sohanian pebble tools and flake tools and a polished celt made out of soft greyish shale were picked up.

Terrace IV of the Bangana (near Haripur Bazaar) yielded Sohan pebble tools and flake tools of chert.

Pebble tools, flake tools and neoliths were also found between Ror and Dibber. Among the chert flake tools from Ror scraper and borer are the major artifacts.

The polished celts and ringstone of shale are in a highly weathered condition. Yet they have been well-made with sharp edges. All the celts are of the pointed butt end type without faceted sides.

Discussing the evidence the author points out that the chert was not found anywhere near Ror or Haripur Guler. This point is worth consideration. The celts and the half ring-stone are of shale.

The exploration brought to light the existencce of small flake and polished stone industries which are later than the Sohanian. The only

neolithic pointed butt axe in the area between Baluchistan and Kashmir is from Shadipur opposite to Attock. Other sites yielded neoliths in metallic context.

Further excavation will help to prove whether this Kangra valley neolithic from Ror and Dehragopipur marks the route of dispersal of the peninsular neolithic into Kashmir or the southward extension of the Burzahom neolithic culture.

At Baroli on the right bank of Beas opposite to Nadaun Bazaar a polished celt and small flakes of sileceous stone were found.

137. MOHAPATRA, G. C.

'Exploration in District Dhenkanal, Mayurbhanj', *IA* 1957-58, p. 41

Polished stone celts were picked at Jangra on the banks of Brahmani.

138. MOHAPATRA, S. C.

'Exploration in Districts Keonjhar and Mayurbhan', *IA* 1958-59, pp. 36-38.

Polished stone celts fashioned out of dolerite or shale were picked up at Udaipur and Ramla on the Baitarani in Keonjhar District. All the implements are surface collections.

139. MUKHERJI, S. K.

'Neolith from West Bengal', *IA* 1955-56, p. 69.

A shouldered celt was found at Deulbarh, District Midnapur.

140. MUNN, Leonard

Letters from Mr. L. Munn regarding antiquities in the Raichur District, *ARADN*, Fazli 1337 (1927-28), Appendix C, pp. 25-32.

1. At Rawalconda, a hill, eight miles (12.8 km.) south of Sindhnur and Goberkal, 2 miles (3.2 km.) further south forty neoliths were collected.

Bellamur-rai-guda, 3 miles (4.8 km.) west of Lingsugur more than one

hundred and forty neolithic artifacts were collected.

II. From the huge ash mound between Gandur and Machur bones of cattle and many large broken rubbing stones of gneiss were collected.

The main neolithic site at Bellamur-ayan-Guda hill is to the south-east of the hill. But celts, pottery, etc., were picked up from all directions.

141. MUNN, Leonard

'Prehistoric and Protohistoric finds of the Raichur and Shorapur Districts of H. E. H. the Nizam's State', *MI*, 15, 4, 1935, pp. 225-50.

The author classifies the finds as follows : Rock-shelters and neolithic artefacts, rock-bruised graffiti and neolithic to early Iron Age and Neolithic and Iron Age finds. The sites are Billamrayangudda, Watgal, Anandgal, Maski, Redalkundi, Goarkal, Kotekal and Nawalkal. Rock-bruised graffiti are found at Billamrayangudda, Kotekal, Maski and Chik-Hesrur. Burials single and double or treble stone circles with or without underground cists with inhumation and with cremation belong to Late Neolithic and Early Iron Age. Sites are Lingsugur, Mudgal areas and Matbal. Ash mounds belong to Iron Age; sites being Wandalli, Gaudur, Benkal, Putkandodi, Yergunti, Manvi, Talamari, Manchanpalli and Idgaunpalli.

All the neoliths are surface finds. The author opines that the stone discs were hop scotches.

Ashmounds are not cremation mounds. From the heaps rubbing stones and mullackers were found. For this reason he discards the postulation of Bruce Foote that these were accidentally burnt cow dung heaps.

142. MURRY, E. F. O.

'The Ancient Workers of Western Dhalbum', *JASB* (letters) VI, 1940, pp. 79-104.

In this area several ancient workings of copper, gold and iron are found. In this paper the author deals with the tradition and history of the area. At Ramgarh, remains of shrines were found. Coins assignable to 3rd

to 5th century A. D., burial urns and pottery, beads, palaeolithic and neolithic tools were the other finds in the area under consideration. To the south of the village Goradi, away from the cemetery and above it crushing tools of stones were found in profusion. Among these three neolithic celts were also found. Besides, broken pieces of pottery and slags were also observed

143. NAGAR, M.M.

'Polished stone axes from Uttar Pradesh', *IA* 1955-56, p. 69.

A polished celt was found at Musanagar in Kanpur District. The site yielded Black Polished Ware herds as well.

144. NARAIN, A. K.

'Exploration in Districts Ballia, Ghazipur, Hamirpur, Jaunpur and Varanasi, *IA* 1963-64, p. 43.

A neolithic celt was found at Nakara in District Hamirpur.

145. NARAIN, Lala Aditya

'The Neolithic Settlement at Chirand', *JBRS*, LVI, 1-4. 1970, pp. 16-35.

The settlement at Chirand is different from other sites, viz, Bellary, Piklihal, Tekkalakotta, Burzahom, etc., for Chirand is located in the alluvial plains. Geographical features around the site are recounted. Economic basis is also dealt with. Discussing the economic area the author says that antler picks were used as agricultural implements. Blades found in profusion were not used for harvesting. The point going against this postulation is the width of blades. Saddle querns were employed in separating grains and chaff and the blades were employed as knives for skinning vegetable food.

Horns and bones of cows and goats indicate domestication of these animals. Animal food was predominant. Goat, boar, bison, rhino, deer, sambhar antelope and cow were some of the animals known. Fish, snail, molluscs and birds also formed part of food.

In the technical sphere varieties of tools and weapons of stone, bone, antler and clay are available. Ecological factors are responsible in the selection of tools according to environment.

Microliths of the previous period continued. Materials were chalcedony, banded agate, chert, carnelian, etc. Tool-types were blades, points and arrow-heads; the first tool being an essential part of the culture. Only two stone axes were found in regular excavations. Bone tools included picks, burnisher, chisels with broad and narrow end, hammer, dagger and bracelet of antler, shaft straightener, side-scraper, end scraper, needles with eye, tooth pick, drill, awl, arrow-head and whetter. Functional aspect of these tools are discussed. The convex-sided bar celt was utilized as javelin or for digging soil or cutting fire wood. Bone artefacts dominated the neolithic culture.

Technique of manufacture of antler tool is described. For preparing cutting edge these were rubbed against bone anvil or stone pestle. Tools were hardened by firing. For hunting pits were utilized. The animals which fell into them were killed by javelin, etc. The neolithic people enjoyed the warmth of ovens.

Pottery was manufactured by turn table or pad and dabber method. Clay was sandy, micaceous and the pots were burnished perhaps by antler burnishers. Post-firing painting in ochre was found; designs being linear, criss-cross, concentric semi-circle, horizontal rim bands, etc. Red ware was found predominantly. Pale and deep grey, black and black-and-red comprised other wares. Cooking vessels had rusticated underside. The exact purpose of the perforated vessel is not known.

Bone needle, bodkin etc. and spinning discs of kaolin indicate spinning and weaving. The aesthetic sense is reflected in clay figurines.

Settlement pattern of Chirond is open air settlements. Circular huts with conical roofs of reed and plastered with mud were the structures evidenced by paved floors and burnt chunks of mud plaster with reed impression.

Summing up:

(i) Known neolithic habitations in India are on hilly regions; Chirand being on alluvial plain is an exception and in India is the first of its kind.

(ii) These people are the off shoot of the main neolithic people in hilly regions of South Bihar. They possessed knowledge of pottery and grinding tools; etc.

(iii) The technique of grinding learnt from stone tools was successfully applied to bone tools.

(iv) Saddle querns, mullers, stone axes etc. were imports.

(v) The critical assessment of Chirand neolithic milieu shows that there is specific characteristics which have no parallels elsewhere in the known neolithic complex. Hence Chirand stands isolated and unique.

146. NARASIMAI AH, B.

'Exploration in Districts North Arcot and Salem', *IA* 1964-65, p. 22.

Boganapalli and Golapalli in Salem District are sites yielding neolithic implements, burnished grey and megalithic Black-and-red ware sherds.

147. NARASIMHAYYA, B.

'Exploration in District North Arcot', *IA* 1965-66 (Cyclostyled)

At Tirumalai a neolithic site yielding celts and core on Deccan trap was discovered.

148. NEWBOLD

'Note on the occurrence of Volcanic Scoria in the Southern Peninsula', *JASB*, V (1836), pp. 670-71.

Discovery of a cinder mound or ashmound at Budigunta together with a description is reported. Similar vestiges were also noticed at Budibeta near Chitaldrug, Budihal and Budhitippa.

149. PADDAYYA, K.

'Exploration in Districts Belgaum, Bellary, Bijapur, Chitradurga, Dharwar, Gulbarga and Raichur', *IA* 1965-66 (cyclostyled)

Vestiges of neolithic-chalcolithic culture were located at the following places; the district and finds are noted against each site.

<i>Site</i>	<i>District</i>	<i>Nature of site and finds</i>
Budihal	Bijapur	Ashmound with pinkish red ware, grey ware of Brahmagiri fabric black painted red ware similar to Piklihal A3, one cream slipped sherd, ground stone celts, hammer-stones, rubbers, querns, chert blades, fluted cores, parallel sided blades and crested guiding ridged flakes.
Kakkers	Gulbarga	Ashmounds with grey ware and blade tools.
Bandoli	—do—	Blade tools; a factory site
Kodekal	} —do—	Ash mounds, grey wares, pinkish red wares. Similar to A 3 of Piklihal, ground stone celts, hammerstones, rubbers, blade tools of chert viz., fluted cores, crested guided ridged flakes, parallel sided blades, scrappers, etc.
Mallur		
Thamandi Thanda		
Benkanahalli	Gulbarga	Three different localities. Grey and pinkish red wares, ground stone celts and blade tools on chalcedony.

150. PADDAYYA, K

'Radiocarbon dates and South Indian Neolithic Culture, *Antiquity*, XLV, 1971, pp. 134-38.

Till Wheeler's excavation at Brahmagiri the status of South Indian Neolithic Culture was not clear. Thereafter several sites have been excavated giving clear idea of the way of life of these people. Now this culture is well-documented. Recent radiocarbon dates warrant a revision of chronology suggested by Wheeler. The culture spreads from 2200 B.C. to 1000 B.C. The date (2335 B.C. based on 5570 half life) of the ashmound at Kodekal is the earliest. Stratigraphy of this site is recounted. Excavation here gives a glimpse of the diffusion of the culture within the zone. The author believes that the culture has north to south dispersal and this is supported by the radiocarbon dates of the sites. Further excavation would not only give a clearer picture but also would lead to recognizing several regional influences in the culture itself. As for the origin the author postulates an extra-territorial origin

possibly from further north with ultimate derivation from outside the country. This aspect needs further research.

151. PAKRASI, Kanti

'A study of some neolithic artefacts from Assam', *JUG*, VII,

152. PANDE, B. M.

'Pit-dwellers' of Prehistoric Kashmir', (in Hindi), *Samskriti*, Dr. Adityanath Jha *Abhinandan Grantha*, Delhi, 1969, pp. 451-463.

The discovery of neolithic and other remains from the excavations at Burzahom and from other sites in the Kashmir valley, have added a new culture-zone in the Indian neolithic context. On the basis of the singular nature of the stone and bone tools, pottery, etc., this has been designated as the North-Western Neolithic Culture.

In the present paper, the author has, while describing the results from the Burzahom excavations also discussed the salient features of remains discovered in the exploration of various sites in the Kashmir valley which were taken up as a sequel to the excavations at the type site. The author has also marshalled together the data pertaining to the remains of the earlier periods and has shown the sequential development of cultures in the valley. While analysing the results from the latest explorations and excavation the findings of the earlier workers have also been discussed.

At Burzahom, the remains have been divided into four phases; the earlier two are neolithic followed by the megalithic and the early historical phases. While there is evidence for continuous occupation during the neolithic and the megalithic phases, the last phase, early historical, followed after some gap. This continuity is discernible not only stratigraphically but also in the tool repertoire, pottery, burial practices, etc. The author has also envisaged on the basis of the continuation of certain elements from the neolithic to the megalithic, that in the Kashmir valley megalithism had its rudimentary beginnings during the neolithic times itself. In view of the singular nature of the neolithic remains in the Kashmir valley, the author has also tried to suggest extra Indian parallels of the North Western Neolithic Culture of India.

153. PANDE, B.M.

'The Neolithic in Kashmir: New Discoveries', *The Anthropologist*, XVII, 1970, pp. 25-41.

This article is the English version of no. 252. However, certain additional information has been added particularly regarding the animal burials and similar remains from adjoining regions and the radiocarbon dates.

154. PANDE, B.M.

'Neolithic hunting-scene on a stone slab from Burzahom, Kashmir', *AP*, XIV (1971) in press.

From the excavation at Burzahom, District Srinagar, Kashmir a stone slab was found on which was engraved a hunting scene. This is considered by the author as the first indubitable example of neolithic art in India.

The flat stone-slab, originally formed part of a structure built of stone-slabs cum rubble of neolithic phase II at Burzahom. The engraved scene, on one face of the slab, shows a stag being attacked by a male with a bow and an arrow from the front and by a female with a spear from behind. On the upper register are shown two identical suns and a dog.

According to the author, the scene on the stone slab is not merely a pictorial representation of a hunt, but is magical in character perhaps connected with homoeopathic magic. On the analogy of certain primitive modes of hunt the author has suggested that the scene depicts the beginning and culmination of the hunt which involved two days, as symbolized by the representation of two identical suns.

155. PANDE, B. M. and SAAR, S. S.

'Neolithic tools, Gurahomo-Sangri, District Srinagar', *IA* 1961-62, p 98.

A polished stone axe and a harvester similar to those from Burzahom were found at Gurahoma Sangri about 48 km. north-west of Srinagar.

156. PANT, P. C.

'Some Lithic-Tool Industries of Banda', *Bharati* Supplements, no. 2, pp. 1-29.

The author has given the physical features and the geology of Banda District. In this book the terminology used is based on that of Dr. Subbarao's. The sites are divided into: (a) sites on the river banks (b) sites on the flat hill tops and (c) sites in the vicinity of hills. These broadly fall into microlithic and neolithic sites.

Rihutia, Khoh, Badusa, Chakond, Chak, Bhunasi and Itaura, all in the vicinity of Karwi town yielded neolithic celts and a couple of hammerstones.

A polished stone axe with pointed butt along with microliths was picked up in the vicinity of the southern most hill of the group known as panch pahari.

An interesting neolithic implement from Lodhwara - a polished stone axe, pointed butt, sides straight and with slight convex working edge is reported. Polish is not of very high order. Flake scars are seen at some places. The peculiarity consists in that the tool has two pits one above the other in the centre on either side. Bruce Foote who had collected a similar specimen with a single pit considered it to be an unfinished perforation. The author is of the opinion that the pits are finger holds for convenient holding of the axe in the hand and also that these pits came into existence because of constant holding of the axe and the depth depended upon the pressure exerted by the fingers. The axe held in such a fashion was perhaps utilized for lighter work viz., scraping the wood, etc. In support of his postulation the author says that the two hammerstones of which one has two grooves and two pits on either side and the other with a single groove and a single pit could have been used in the hand without being hafted.

Since the neoliths were stray finds the author wonders whether the people using them were wanderers. He also pleads for a functional study of the implements and their probable use.

157. PANT, P. C. *et al.*

'Exploration in District Banda', *IA* 1961-62, pp. 54-55.

The following sites yielded many neolithic implements—axes and a few hammerstones—Badusa, Bhuvari, Itaura, Lodhwara, Rihutia, chak, Shahpatan, Chakond and Khoh, the last two having been explored previously also. The Lodhwara axes were found to be ground on their working edges only while at other sites they were ground through out. One example from Lodhwara had two small pits were also found on a hammerstones from Badusa.

158. PANT, R. K.

'The Tool-marks as Vital Technological and Functional Data', *ACSP*, 1972, pp. 148-54.

It has been possible to make out from the tool marks various techniques in the production of tools and their functions. Neolithic tools in stone and bone have been subjected to examination. Marks are dealt in two sets: (i) marks, their forms and occurrences and (ii) marks and the functions of the tools. In the first are included scars and pits while the second set comprises sheen, striations and scars.

Summarising the author observes that

- (i) most of the stone and bone points have been grooved out of raw materials;
- (ii) special method of gouging has been adopted for bone points;
- (iii) it is possible to distinguish whether the tool is in mint condition or used, reshaped/reused;
- (iv) it is also possible to determine the function of the tool. For example morphologically a tool may be an axe but on examination it may turn out to be an adze;
- (v) borers were made out of needles.
- (vi) Material of the tools can be determined.

159. PANT, R. K. and SINGH, Puran

'Exploration in District Kathua', *IA* 1968-69, p. 9.

Two sandstone mace-heads and gritty red ware were picked up from Palth. The pottery is hand-made, medium to thick in fabric and contains medium grained sand in the core.

Two mace-heads were also found at Diyala chak and Mananu.

160. RAGHAVACHARI, K.

Neolithic site Pusalpadu, District Kurnool, *IA* 1962-63, p. 67.

The extensive neolithic site at Pusalpadu was explored. Further exploration by Venkataramayya and Sarma yielded maceheads, polished stone axes, steatite disc beads, burnished grey ware and black painted red wares.

161. RAGHAVAN, M. D.

'South Indian Neolithic Culture', *SC*, I 1932-33, pp. 63-66.

The Stone Age is dividible into Eolithic or dawn of Stone Age, Palaeolithic and Neolithic. Transition from Palaeolithic to the Neolithic in India is not clear and the gap is very much apparent. The neolithic implements are mostly ground or polished. In the fashioning of neolithic tools four stages are observed :

(i) rough chipping into shape ; (ii) pecking and reducing the angles of the chipping, (iii) grinding to remove roughness and (iv) polishing. The change in tool types necessitated the change in material. Thus the light coloured quartzite of the palaeolithic people gave to the trapoid rock, basalt, diorite and other fine grained rocks in the neolithic times. The axe-adze is the main tool for wood-working. Sometimes these were utilized as hoe-blades.

The northern parts of the Deccan abounding in raw materials neolithic sites are plenty and to the south of Cauvery they are not found. The typical neolithic pottery is dull red, rough, decorations if any comprised impressed or incised designs. Animals were also domesticated. In India there is no intervening Bronze Age between the Neolithic and the Iron Ages. In some places vestiges of both neolithic and Iron Ages are to be seen. Again the neolithic and Iron Age people were the authors of the megalithic monuments.

162. RAGHUNATH, S. N.

'Neolithic sites, District Nalgonda', *IA* 1961-62, p. 96.

Unpolished celts were picked up from Babusahibgudem and Narmula. No pottery, however, was associated with the implements.

163. RAMAN, K. V.

'Exploration in District Madurai', *IA* 1960-61, p. 18.

At Karuvelampatti and Kodangipatti neolithic implements were found. In the former site pottery of a later date was also picked up. The implements from the latter site was of the pointed but type with oval cross section.

164. RAMAN, K. V.

'Distribution Pattern of culture-traits in the pre and proto-historic times in Madurai Region, *Araichi*, 1970, pp. 499-509.

In South Deccan, Karnataka and western districts of Tamilnadu viz-, North Arcot, Dharmapuri and Salem, neolithic culture is discernible in numerous sites. Recent explorations have helped location of several sites with stone axes and burnished grey ware. Cultural traits of west Tamilnadu are part or rather than an extension of cultural traits of Mysore. The North Arcot-Salem belt is the peripheral area with its focus in south Deccan. No traces of neolithic culture are found in south Deccan. No traces of neolithic culture are found in the south-eastern Tamilnadu. The diffusion is confined to the trap belt. Isolated finds of neoliths at Karuvelampatti and Kollanpattarai are noticed.

165. RAMAYYA, J.

'A note on the Antiquities of Peddamudiyam', *ARASMC*, 1904-05, part II General Remarks, pp. 38-42.

Excavation of an ancient mound here brought to light, among other things pottery, stone utensils and two neolithic implements.

166. RAO, B. RAJA

'Exploration in District Kurnool', *IA 1958-59*, p. 11.

Hattibellagallu and Kuppugallu yielded neolithic implements and a few pieces of megalithic Black-and-red ware. The latter site also yielded black polished ware.

167. RAO, B. K. GURURAJA

'Neolithic site in District Bellary', *IA 1959-60*, p. 72.

At Hulakundi, where Bruce Foote found neolithic grinding grooves, a worked scraper partially worked axe and a few finished implements were picked up.

168. RAO, B. K. GURURAJA and RAMAN, K. V.

'Exploration in District Madurai', *IA 1957-58*, p. 38.

Two finely polished stone celts-trapesoidal with oblong transverse section and a hammer stone were picked up at Kollanpattarai (near Kodangipatti). Similar implement was also found at Karuppannaswami koilmedu in Karuvelampatti. Kollanpattarai also yielded microlithic blades, flakes and cores.

169. RAO, M. HANUMANTHA

'Excavation at Hemnige, District Mysore', *IA 1963-64*, pp. 26-27

Five cuttings, two by the side of the village and third in an island upstream behind an old dam were made.

Site near the village: Two periods were recognized. Period I, was characterized by seven pottery groups just above the natural. Post-holes and flooring were indicative of mud houses. The groups of pottery consisted of two or three pots covered with lipped bowls. One group contained a neck-rest, another a carinated bowl in addition. All were handmade, either rough or slightly burnished.

After a long desertion Period II, assignable to early historical times begins.

The area dug in the island revealed a single cultural sequence. Pottery was mainly handmade. But in one trench in the upper levels a few wheel-made sherds were noticed. Ceramics were mostly burnished, black, red or

brown was normal colours. Pale grey ware was limited. Shapes were globular pots and neck-rests were found throughout. Other assemblage consisted of ground stone axes, pounders, corn threshers, fluted cores, blades of black chert and crystal. Spheroidal terracotta beads and copper pieces were also found.

From the river banks Middle Stone Age tools were collected.

170. RAO, M. S. NAGARAJA

'Exploration in District Dharwar', *IA* 1958-59, pp. 32.

The following places yielded neolithic tools, probably of the chalcolithic context. Jallapur, Channur, Mannur, Talihalli, Kadarmandalgi, and Tadao.

171. RAO, M. S. NAGARAJA

'Exploration in District, Bellary, Bijapur, Dharwar and Raichur', *IA* 1962-63, p. 16.

Sites ascribable to the southern neolithic complex with microliths and black painted red ware were noticed. Neolithic chalcolithic sites are: Belagodanahalu, Lakshmipur, and Tekkalakotta in Bellary District; Hadarageri, and Kunbev in District Dharwar; and Anegondi (Chikrampur) Nandihalli and Yabballu in District Raichur.

172. RAO, M. S. NAGARAJA

'Archaeological remains of the Dharwar District-A Review', *JAS* (Bom) (NS), 38, 1863, pp. 154-64.

Explorations brought to light chalcolithic remains at Hallur, Mudenur, Nadiharalhali, Belur, Hadarageri, Madapur, Kunbev, Niralgi and Battur. The chalcolithic phase is distinguished by the presence of grey ware and polished stone axes. At Hadarageri painted pottery of the cream slipped ware and the Jorwe ware were the additional features besides the grey ware and the polished stone axes. Jorwe ware was also found at T' Narasipur. This indicates contact of the chalcolithic cultures of Central India and Northern Deccan with those of Northern Karnataka.

At Hallur and Kunbev painted black-and-red ware is present. This would indicate another link between the chalcolithic culture of southern Deccan and central India. Their absence in between is enigmatic.

173. RAO, M. S. NAGARAJA

'Recent Exploration in the Tungabhadra basin - The chalcolithic phase', *BDCRI*, 23, 1962-63, pp. 55-77.

The two main problems in Mysore are: (i) the contacts and correlation between chalcolithic or the stone axe culture of the south and the chalcolithic culture of the northern Deccan and Central India and (ii) relationship between the chalcolithic cultures and the megalithic cultures of the south itself. The situation of Mysore is such that it is expected to provide clues for the problems. Dharwar, because of its geographic situation is important.

Exploration in Haveri, Byadgi, Banibennur, Shirahatti, eastern parts of Hirekerur Taluks drained by Tungabhadra and its tributaries Varada and Kumudvati in the District of Dharwar revealed interesting sites. The following sites yielded stone axes: Hallur, Mudenur, Nadiharalahalli, Hadarageri, Madapur, Niralgi and Fatehpur. A description of the ceramic wares and their analogues are given. Hadarageri, Hallur and Kunbev are important sites for solving the problem on hand.

Considering the evidence of pottery shapes, the author feels that the megalithic culture need not be taken to have been far removed from the earlier chalcolithic cultures.

174. RAO, M.S. NAGARAJA

'Excavation at Tekkalakotta, District Bellary', *IA* 1963-64, pp. 25-26.

Among the nineteen sites to the south of the village two-TKT-1 and TKT-2 were selected for excavation.

In TKT-2, were seen seven plastered floors.

In TKT-1, habitational deposit was 1 m. thick.

The excavation revealed two periods.

Period I was denoted by the occurrence of ground stone axes and blades of chalcedony and chert. Pottery consisted of hand-made ashy grey, burnished grey-both plain and ochre painted and buff wares. Representative shapes were spouted and globular vessels with funnel shaped rims, bowls with plain and pinched lips and goblet. Other finds were ear-ornaments or pendants of gold, bone tools, beads of steatite and semi-precious stones.

Post holes in a circular disposition indicated house plan.

Two burials belong to this period. The skull and long bones only were interred in the red morum. In one, bones of three persons were recognized, perhaps a collective burial. The other of a single individual contained a goblet, ashy grey in colour, with edges painted with ochre. Bones were in the north-south direction.

Period II indicated the paucity of ashy-grey and ochre painted wares while the burnished grey ware continued. Orange or dull red ware was a new industry in this level. Black-and-red ware was found used sparsely in burials. Wheel-made black-on-red ware also appeared. Shapes were spouted vessels, urn, varieties of bowls and with multiple pinched lips and perforated vessels. Ground stone axes and blades continued.

Copper was represented by a few rings and wire.

Circular houses enclosed rectangular rooms. Floors were plastered with lime.

Burials were in extended fashion. Children were interred in urns or under the floors.

Adults were buried in north-south direction. Pottery formed the associated furnishings. In one burial, of the seven pots, three were black-and-red bowls. One of these three bowls was painted on the interior in white; design being lines recalling Bahal and Tekwada specimens. This shows contact with chalcolithic cultures of northern Deccan.

As a sequel to the above excavation a wider area was tackled by Sankalia and others.

In TKT-1 where the top layers were disturbed by water-logging and later cultures, pottery viz., dull red, burnished grey, black-and-red and some black painted red ware was obtained. Ground stone axes, blades of chalcedony, copper objects, viz., bangles, fish hooks, poker and wire and gold ornament, terracotta objects, beads of steatite and semi-precious stones and terracotta were obtained. A cylindrical steatite bead with copper wire inside is interesting. Bone tools mainly with chisel end and pines were also recovered.

Eleven burials oriented north-south in a row were found besides, four pot burials.

In TKT-2 charred grains identified as horse gram was found.

In Period II a grey ware lid with punctured decoration depicting a peacock, serpent, ibex and bull is quite interesting.

TKT-3 at the foot hill known as Gaudramuli occupation ranged from the neolithic times to early historical levels.

175. RAO, M.S. NAGARAJA

'Excavation at Hallur, District Dharwar', *IA 1964-65*, pp. 31-32.

Excavations revealed three cultural periods representing, (i) the lower neolithic devoid of metal and microliths, (ii) upper neolithic with chalcolithic elements ; and (iii) neolithic-megalithic overlap.

The lower neolithic consisted of a coarse brown and-black, pale grey and burnished grey wares occasionally painted with red ochre. Stone tools were ground and pecked implements.

Period II the Upper neolithic is characterized by the sudden appearance of a large quantity of blades of chert and copper tools viz., miniature double-edged axes, fish hooks and ground stone tools. Ceramics were the coarse brown and black, burnished grey and pale grey ware in reduced frequency. Distinctive is the occurrence of black painted red ware. Besides steatite and shell beads were also found.

Houses and hearths were circular ; floors were of rammed bedding of schist chips. Charred grain and a fragment of a head-rest were also found.

A double pot burial of a child was found underneath a floor.

176. RAO, M.S. NAGARAJA and MALHOTRA, K.C.

The Stone Age Hill Dwellers of Tekkalakotta, Poona, 1965.

The subject is dealt with under the following chapters : (i) Introduction, (ii) The excavations, (iii) Burials, (iv) Study of antiquities, (v) Observations on the life of neolithic people and (vi) cultural contacts and correlations. Besides a study of the human skeletal remains from here and the analytical examination of a metal axe is also incorporated.

Two localities TKT-I and TKT-II were excavated.

Two phases were distinguished.

Phase I (layers 3 and 4) is distinguished by the occurrence of polished stone axes, blades of chert, chalcedony, rarely opal, gold objects, beads of steatite and semi-precious stones, bone-tools and a single copper axe. Pottery comprised mainly of grey ware including the pale grey variety, burnished grey, both plain and painted in ochre colour, brown and buff wares. Fractional burials with/without attendant furnishing were noticed.

Phase II (chalcolithic layers 1, 1A and 2) saw more copper objects, microliths, ground stone axes and beads. The ochre painted pottery had disappeared and the pale grey ware had diminished in frequency. A dull red ware makes its appearance besides a few black on red, and black-and-red wares. One specimen of the latter bore paintings in white pigment. Change in burial customs was also observed. Extended burials with elaborate appendage and fractional interment in multiple urns were the order.

Three C-14 dates for this site are available. They are 3395 ± 105 (3490 \pm 105) B. P., 3465 ± 105 (3565 \pm 105) B. P. and 3625 ± 105 (3730 \pm 105) B. P.

In the chapter 'excavation' stratigraphy and structural phases are dealt with. Of these, six burials (3 adults and 3 of children) pertain to Phase I while one to phase II.

The entire ceramics excepting the black-and-red of phase II were hand made. The black-and-red seems to have been turned on a turn-table. Pots were regular in shape. Stone and terracotta dabbers were also used in potting. Shapes are few. Common ones are globular vessels, bowls with/without spouts, spouted pots and jars.

Tools in ground and pecked stone industry comprised edge tools, points, rubbers and grinders, hammers, pounders, etc. Material was igneous/metamorphic rocks.

Blade industry is profuse; material being siliceous rocks. Use marks, retouch are also seen on the tools. Tool-types are fluted cores, parallel-sided flakes, plunging flakes, straight blunted backed blades, penknife blades, lunates, triangles, trapezes, saw-flakes. scrapers crested guide ridge flakes and points.

The first settlers of the region preferred castellated hills. They lived in circular structures; walls were plastered bamboo-screens. Floors were lime

plastered. Houses had storage bins. They were essentially non-vegeterians. Cattle, sheep, deer, squirrel and rat formed part of their food.

The evidence shows that the people led a settled life practicing agriculture, domestication of cattle and also hunting. Charred grains *Dolichos, lab, lab*, were also found.

Summarising the results of the study of skeletal and cranial remains at Tekkalakotta the following may be observed :

(i) Of the five skulls examined, two belonged to male and two female and one remained unidentified ;

(ii) People were medium to tall, sturdy with large cranial capacity and were long headed ;

(iii) Mediterranean and autochthonous proto-australoid in a mixed form were recognized ;

(iv) These show morphometric similarities with Brahmagiri (Stone Age Culture), Piklihal, Nevasa and Chandoli. Outside Deccan similarities are noticed at Mohenjo-daro, Harappa (R 37 and Cemetery H) Nal, Lothal, etc.

(v) A 'Mediterranean proto-austroloid' complex in Deccan and elsewhere in the sub-continent existed more than 5,000 years ago ;

(vi) These could be the ancestors of at least past/present day south Indians.

177. RAO, M. S. NAGARAJA

Significance of Pottery Head-rests from Neolithic Sites of Karnatak', Studies in Indian Archaeology, Professor H. D. Sankalia, Felicitation Volume, *Indian Antiquary*, (3rd Series) IV, 1-4, 1970 pp. 141-148-

Pottery head-rests were collected from T. Narsipur. Similar ones are found engraved on rocks at Piklihal. Most of these are of burnished grey ware characteristic of the neolithic of the Karnatak. One complete specimen was also found in a neolithic burial at T. Narsipur. Another was found on a floor at Hallur. These can be dated to c. 1800 B.C. These head-rests are confined to the Karnataka region. The Chanhu-Daro specimen comes from Jhukar levels and is different from Karnataka specimen.

The author wonders whether these could be of foreign origin and, therefore, indicate outside contacts. These are not found in Mesopotamia.

Head-rests of various types and material are to be found in Pre-Dynastic Egypt. One of the types is similar to Karnataka example. Judging from the fact that these are still in use in Egypt this could have dispersed from Egypt. Only dispersal over the sea is plausible. Egyptians had connexions with Punt which has been identified variously among which Somalia is also one. The list of objects mentioned as available in Punt is similar to those found in Karnataka. Again *Ragi (Eleusine Ceracane)* has been found in neolithic sites of Karnataka and at Paiyampalli. This grain is of African origin. This is found only in the South.

Further the Nubian excavation by Lal has revealed similarities with the neolithic-chalcolithic of Deccan. The Black-and-red ware of 'C-Group' people can be compared with Maski finds in Iron Age graves.

These evidences are a pointer to the existence of contact between Egypt and Karnataka. Further exploration in the west coast of Indian will be helpful.

178. RAO, M.S. NAGARAJA

Protohistoric Cultures of the Tungabhadra Valley, Dharwar, 1971.

This forms the report on the excavations conducted by the author at Hallur, District Dharwar.

The report contains a short historical background and geological features of Hallur.

The occupational accumulation falls into two main periods with sub-phases in Period I where phase 1 is early neolithic and phase 2 is neolithic-chalcolithic. Period I, phase 1 (layers 12-14 of Trench 1 and 10 and 11 of Trench 2) is distinguished by pale grey and burnished wares, sometimes painted with red ochre, a coarse blackish and grey and some reddish brown showing purple painted designs (cf. A3 wares of Piklihal). Blade industry as also metal were unknown. Polished stone tools were of the edge ground variety made of local schist. Floors were not encountered.

Period I phase 2 (layers 8-11 of Trench 1 and 6-9 of Trench 2) revealed a change in pottery traditions viz., presence of specialized shapes. The wares are black burnished, brown-and-black (major ware), coarse dull red and the less frequent painted black on red (similar to Jorwe ware). The pale grey of the previous phase is absent.

Copper is present. A profusion in blade industry is observed. Polished stone tools, are in plenty; materials of the tools being dolerite and trap. For blades black quartzite has been used. Types comprised parallel-sided blades, lunates, etc. Besides, bone-tools, shell and steatite beads etc., were also available.

Floors of stone chips, urn-burials similar to those found at Nevasa, Daimabad, Chandoli, etc., were the other features.

Pottery of Phase is handmade while in phase 2 some wheel thrown ones are also present. The burnished grey has post-firing ochre painting which continues in phase 2 as well.

The report embodies a study of pottery, ground and pecked stone tools, neolithic stone blade industry, metal objects, beads, terracotta and bone and shell objects. Besides the burials are also described and illustrated.

The author dated Period I phase 1 to 1800-1500 B.C. and phase 2 to 1500-1100 B.C. C-14 dates for this culture are

- (i) 3560 ± 105 (3660 ± 105) B. P.
- (ii) 2895 ± 100 (2980 ± 105) B. P.
- (iii) 3280 ± 105 (3375 ± 110) B. P.
- (iv) $3340 \pm$ (3375 ± 110) B. P.

Two appendices, (i) Animal remains by K. R. Alur and (ii) Plant remains by Vishnu-Mittre add to the importance of the report.

Alur, examining the animal remains concludes that

(i) bones of cattle are greater in number. These were used for cultivation and draft.

(ii) The bones show evidence of chopping and roasting indicating the food habits.

(iii) Horse was known in Period I phase 2.

(iv) Pigs were also present.

(v) Bones of fowl were picked up here for the first time.

At Hallur millet (*ragi*) has been found in neolithic levels. Both cultivated and wild varieties were present indicative of domestication of wild species. Besides fruits of teak were also found.

The report contains the observation of Joseph H. Hutchinson on *ragi*.

179. RAO, S.R.

'Exploration in District North Arcot', *IA 1963-64*, pp. 19-20.

A neolithic site at Thalatapamalai near Paiyampalli was discovered. Six rock-shelters and three terraces yielding grey ware, ground stone axes, pounders, querns, mullers, mace-heads etc., were found.

180. RAO, S.R.

'Excavation at Paiyampalli, District North Arcot', *IA 1964-65*, pp. 22-23.

Purpose was to determine the time lag between the end of neolithic and the beginning of the megalithic cultures.

Four trenches were laid.

Period I represented the neolithic culture with a habitational dedosit of about 1m. thick. Ground stone implements viz., axes with pointed or truncated butt, stone pounders and polishers, stone chisels and hoe; terracotta beads, terracotta figurines of long horned variety of cattle were the finds.

Pottery consisted of a handmade grey ware, some times burnished and painted on the rim; pigment being red ochre. Some sherds were also of orange to pink in colour. Shapes were lipped bowl, flaring mouthed vessel, storage jar, dough plate of thick gritty red ware. The blade industry was represented by a fluted core and an asymmetrical flake of jasper.

Post-holes, rammed gravel floor were the structural remains. Huts were circular. Neolithic - Megalithic phase overlap was observed.

181. RAO, S. R.

'Excavation at Paiyampalli, District North Arcot', *IA 1967-68*, pp. 26-30.

Purpose of this season's work was: (i) to know more about the dwellings; (ii) to obtain data regarding the disposal of the dead; (iii) to confirm the absence of metal in Period I (iv) to ascertain the part played by the blade industry in the same period; and (v) to ascertain time lag, if any, between the two periods.

Excavations was conducted in three terraces named Site I, II and III.

Period I was divisible into two phases A and B. Phase A (layers 8 and 9) was represented by the occurrence of bone-tools, short blades of jasper agate and chert and ground stones. Pottery of phase A comprised pale grey burnished grey and red wares; the last in small quantities. Stone objects were querns mortars, pestles, pounders and pebble polishers.

Phase B (layers 7 and 7a) Here bone-tools were absent and the stone blades were in increase. Built-up huts with superstructure on the dwelling-pits were an advancement. Floors were of stone chips levelled up plastered with ash and earth.

Main ceramic was the red ware although grey ware also continued.

Ceramics of the pure neolithic were either handmade or turned on a slow-wheel. A grey ware lipped bowl with a round base and painted in red ochre on the rim was an important shape. Bowl with short channel spout was rare.

In Site dwelling pits roughly oval/circular and oblong cut into the natural soil were encountered. One pit was divided into two by a row of stones. Large site had a landing ramp. One pit lined with stones showed two phases of occupation. Post-holes along the fringes of the pits indicated superstructure of perishable materials. Inside the pits were found bone-tools such as awls, points and scrapers, fragmentary ground axes and short blades of chert and quartz. Pointed butt end variety was the major type of stone axes but blunted or truncated butts were also available. Axe-hammer was an interesting type found here.

In this period cultivation was practiced. Charred grains horsegram (*Khulti*) and green gram were found in the lower levels of the transitional phase. Animals known from the skeletal remains are: the bovid group, sheep, spotted deer, fowl, pig, jungle cat, and rhinoceros.

No metal was found. Perhaps the site is of the southernmost non-metal using neolithic phase.

C14 date for Period I is 1390±200 B.C.

Layers 5, 6 and 6A are transitional overlap phase.

182. RAO, S. R.

'Exploration in District Kurnool and Excavation at Singanapalli',
IA 1967-68, pp. 3-5.

The purpose of the exploration was to know (i) the origin and distribution of painted pottery culture noticed at Pusalpadu and other sites and (ii) their generic relation with the neolithic-chalcolithic cultures of the Godavari-Narmada valleys vis-a vis the pure non-metal using neolithic cultures of the Palar Basin. The sites explored were Patpadu, Singanapalli, Sivavaram, and Ramapuram. The painted pottery culture sites in Kurnool District were open air settlements away from the hill; the mounds rising to 1-2 m. in height.

In order to ascertain the stratigraphic position of the painted pottery trial excavations were conducted at Singanapalli. The mound covers an area of 400 × 350 m. and rises to a height of 2.5 m.

Surface finds were, besides painted pottery, backed blades, lunates and fluted cores of chert, chalcedony and agate; Harappan-type steatite disc beads, ground stone axes including one in jasper with sawn margins; biconical faceted bead of crystal and a steatite bangle with triangular section.

Three trenches SGP-1 to 3 were laid.

Five layers were encountered over the natural bed-rock. Layers 1 to 3 yielded majority of painted pottery, stone beads, fluted cores and micro-beads of steatite and shell. On a lime plastered floor an intact red ware bowl with pinched lip and flat base was found. In layers 4 and 5 channelled bowls, black on red painted pottery, stone blades and steatite beads continued to occur. The red ware was handmade and bore paintings in black. Main shape was a deep bowl with pinched lip. Other shapes were convex-sided bowls, stemmed bowl high necked jar of lustrous red surface, thick jar or basin, perforated vessels with tubular spouts. Designs were wavy or oblique lines in groups on the inner side of bowls and dishes; oblique strokes, cross-hatched panels and loops, fronds, blocks, intersecting lines etc. The grey ware of Singanapalli was limited in quantity.

The people of Singanapalli were prosperous agricultural community living in large villages, adopting the painted pottery tradition of post-Harappan chalcolithic pottery but averse to potter's wheel. A part from neolithic pottery, new types convex sided bowls have parallels in Lothal. Late Harappan types are the high necked jars and flat dish. Perforated jars are reminiscent of Harappan types. Disc and micro-beads of steatite and shell have Harappan affinities.

Date ranges between 1600-1400 B.C.

183. RAO, S. R., *et al*

'Exploration in District Kolar, *IA 1967-68*, pp. 37-39

The purpose was to link the main cultures of Pennar-Palar basins and (ii) to see whether the painted pottery tradition of the Kurnool extended in the Kolar region also.

Three important neolithic-megalithic sites were located.

Banahalli is perhaps the largest settlement in south India. The terrace at the castellated granitic hill (300 × 100 m.) was an open air station. An exposed section on the periphery of the mound showed a 2 m. thick deposit above natural containing ground, chipped and polished stone axes, pale and burnished grey ware plus a coarse red ware. Upper part contained vestiges of megalithic culture.

Several rock-shelters with undisturbed strata yielded large quantities of neolithic handmade pottery and stone implements. Shapes in pottery were bowls of pale grey ware with or without pinched lip; the latter being painted; bowls or pans of grey ware.

Dodda Kalattur is an open air site with rock-shelters. Dwelling-pits were also observed. Contents were stone axes, burnt rice-husk and ash. The walls were mud plastered. Pointed butt ground stone axes, triangular edge ground axes, axe-hammer with plano-convex section and blunted end were the types. Also available were patinated flakes. Pottery consisted of pale gray ware and ill-fired coarse and gritty red ware. Important shape was the bowl with rim painted with ochre.

Kadattur was another neolithic site.

Another neolithic megalithic site is Kendatti Rock shelters and open air settlement seems to have formed the habitation. Surface finds were burnished grey ware, coarse red ware, ground stone axes with pointed and blunted butts, axe-hammers, mullers and pounders. Important shape in pottery was the lipped bowl in red ware.

Tekal was yet another neolithic - megalithic site yielding polished stone axe, pale grey ware. Neolithic habitation was perhaps in the rock-shelters.

184. RATHA, S. N.

'Exploration in district Kamrup', *IA* 1965-66, (Cyclostyled).

Exploring the District Kamakhya hills a neolithic site near Gauhati was noticed. Pottery collected from here showed cord and basket impressed decorative designs. Similar finds were noticed at Navagraha and Sarania hills nearby.

185. RAY, G. S. (1956)

'Implements of Neolithic type from Bongara-Bhangat in Manbhum', *MI* Vol. 36 No. 1 pp. 49-55, 1956.

The artefacts were picked up from a wide area in the Bongara valley as also from a nearby Bhumij settlement. Some coarse pottery was also collected. The types of implements collected included celts including a shouldered variety, ringstones (broken) dabbers, and a shallow stone trough. The sherds of pottery were coarse and of indeterminate shapes. Majority of them were handmade and the clay used seems to have been mixed with chopped straw. These celts have their prototypes in the Singhbhum area. On the basis of typology it may be said that neolithic industries of Singhbhum, Manbhum and Dalbhum were similar. The author has given a description of the tools and he feels the site to be a neolithic settlement.

186. RAY, Gautamsankar

'Prehistory of Orissa', *MI* 40, 3, 1960, pp. 169-77.

The subject is dealt with under the Palaeolithic Neolithic and metal Ages.

Dealing with the neolithic the author recounts the work done by various explorers in the Orissa region from 1923 to 1956. He feels that since the collection is only from surface, it would be difficult to assess whether Orissa passed through a neolithic stage of cultural milieu, viz., agriculture, domestication of animals, use of polished stone tools and pottery. Worman's observations are recounted, and calls for a re-examination of his conclusion in the light of Krishnaswami's 'Neolithic patterns of India'.

187. RAY, Alaknanda and RAY, Gautamsankar.

'A Technical Study of Some Prehistoric Potsherds', *MI*, 43, 2, 1963, pp. 147-54.

In Bihar in the village of Borda and Bongara potshers associated with neoliths were collected from surface without any stratigraphical correlation.

The authors have also obtained sherds of modern pottery from Dum dumi a village close to Bongara. In this paper they have analysed the technical features, physical features—thickness, colour hardness, texture, lustre, porosity, composition of clay, technique of manufacture whether handmade or wheel turned, surface treatment, etc., of the two groups of pottery. They have arrived at the conclusion that the prehistoric groups have used residual soil for making their pots just as the modern potters of one of these areas. The prehistoric pottery is handmade and crude. Since the technical data of pottery of Borda and Bongara are very similar to one another and since they were found associated with neoliths it may be assumed the potsherds belonged to the neolithic culture.

188. REA, A.

‘Excavation at Amaravati’, *ARASI* 1908-09, pp. 88-91.

The author found a celt from the *stupa* mound at a short distance from the *stupa* itself. This discovery and similar find in the vicinity would bear evidence to the existence of a large population very much prior to the coming of the earliest Buddhist monastic buildings.

189. REDDY, V. R.

‘Exploration in District Kurnool’, *IA* 1964-65, p.3.

Neolithic sites were located at Adoni, Chetnapalli and Hattibelagallu. Adoni and Hattibelagallu had been explored by Foote earlier where he could not find neoliths. The present exploration, however, yielded numerous implements in various stages of manufacture. Besides a number of blades and microlith were also picked up.

190. RIVETT-CARNAC, H.

‘Stone implements’, *PASB*, 1882, pp. 6-8.

The implements were found both by Rivett-Carnac and J. Cockburn. Many were found *in situ*. The types were celts or hatchets, hammerstones or ring-stones, flakes, etc. The celts were large in number - 366 including fragments. They fall into two classes, chipped or rough hewn and polished celts. The polished implements outnumbered the chipped ones. Chipped ones are implements unfinished and waiting to be ground and polished. Some of them had their edges ground. In shape they resemble the iron hatchet with iron straps found in a tumuli in Central India by Rivett-carnac. The celts were fixed to a handle with string or some such thing in the

manner of iron axe. A sculpture similar to this implement is to be found in Sanchi (of Fergusson, *Tree and Serpent worship*).

The raw material of these celts is generally green stone with varying degree of fineness and in some cases nearly approaching porphyry. Black basalt is also used. The collection included two hammers of a remarkable type, stone pestle and a stone ploughshare. Some of the stone objects of peculiar shape would suggest their usage as pivot for doors. Most of the implements recalled their counterparts in European types.

191. RIVETT - CARNAC, H.

'On Stone Implements from the North Western Provinces of India', *JASB* LII, Pt. 1, nos. I-IV, 1883, pp. 221-30.

The tools described and illustrated are mainly from Banda district, collected by the author and Mr. Cockburn. The district is hilly, densely forested and abounds in valleys. Kaimur sandstones, granatoid gneiss, hornblende, basaltic trap and Tirhowan limestones are the rock formations. The celts thrown up during ploughing operations are regarded as thunderbolts and are worshipped under pipal trees as Mahadeo or phallus. Best specimens from the collection have been presented to the British Museum. The types are described and illustrated. Representative tool types are hammerstones, mace-heads, celts, picks, pestles, etc.

Several types of hammerstones viz., hammerstones with central grooves, hexagonal with hole or depression on each side, these with cup marks were found. Four sided ones with painted tip, were perhaps used as a pick long pestle is noteworthy.

The polished celts are mostly on diorite but also rarely in sandstone. Chipped ones are on black basalt. The celts fall into two classes viz., roughly chipped and polished ones. The first class is further divisible into cor date where the only edge is polished; lanceolate which is long with comparatively narrow pointed end and flat and almost triangular in shape.

The tools have parallels in Europe,

192. RIVETT-CARNAC, H.

'Stone implements from India', *JAI*, XIII, 1884, pp. 119-20.

Implements numbering upwards of 400 were collected from the Banda district and sent to the Anthropological Institute, London. They consisted

mainly of polished celts, stone hammers, ringstones and 'chipped artifacts' which were made of basaltic rock. The polished celts were of diorite. Largest and most remarkable of the celts have been presented to the British Museum.

193. Roy, S. C.

'Note on some Prehistoric Implements found in the Ranchi District', *JBORS*, II, 1916, pt. 1, pp. 61-67.

The author made a collection of nearly one hundred neolithic implements-all from various places in the District. Two quartzite polished celts were also picked up in the Hazaribagh District. The Mundas, the tribal inhabitants call them '*ther pathaal*' or '*ther dir*' meaning thunderstone. They also believe that these have magical and curative properties. Quartzite various kinds of schistose and gneissic rocks are used in the manufacture of these implements. Types include chisels, adzes, pounders, hammers and axes with flat and convex faces and broad or pointed butt ends. Implements with perforation are rare. One hammer-head with a hole was also picked up. A description of the tools with the find spot is also given. The south-eastern parts of Ranchi District yields these implements in abundance. The following are the places from where neolithics were collected: Omta, Chacho Nawatoli, Sodag, Arra, Kakra, Chenegutu, Salgi, Burju, Janumpiri, Binda, Soparaom, Chendagujiti, Pangura, Semboa, Torangel, Gora, Jurdag, Pandu, Senegutu, Murud Bichna and Buruhatu.

194. S. C. C.

'Discovery of some prehistoric stone tools in South Manbhum', *SC*, 17, 4, 1951, pp. 164.

During the course of anthropological field work the author found neoliths and palaeoliths.

The neolithic finds included two ring-stones a polished celt and a few coarse grained handmade potsherds; find spot being the base of Jambira hills near Nimdih station. The use of ringstone is uncertain. A branch of the Mundas-the Bhumij who claim to be the autochthones of the place-have a living megalithic culture. Is there any connection between the local aborigines and the neolithic culture here? Very near to the neolithic sites are also to be found ancient iron smelting sites. Thus within an area of six square miles (15.55 sq. km.) there exists a wide range of cultural phases palaeolithic, neolithic, early iron age and a living megalithic culture. The

author advocates for an intensive research in coordination with prehistorians and cultural anthropologists.

195. SAHNI, M. R. and MOHAPATRA, G. C.

'The first record of small flake tools and polished stone celts in Kangra district, East Punjab', *CS*, 33, 6, 1964, pp. 178-80.

Discovery of a number of flake implements and stone celts, ring-stones in Dehragopipur Tehsil of Kangra district would partly solve the gap in time between palaeolithic and protohistoric Harappan cultures. Typotechnologically these fall between Palaeolithic and Harappan cultures.

In Terrace 3 at Dehra a celt was found. In Terrace 4 near Ror (on the left bank of Banganga) 31 polished celts of softish shale, half a ring-stone and chert flake implements were picked up. These occur all over the terrace upto Dibber and Bhatoli villages.

196. SANKALIA, H. D.

'From food collection to urbanization in India', *Indian Anthropology*, Essays in memory of D. N. Majumdar, Bombay, 1962 pp. 66-104.

The subject is dealt with under the following headings :

1. Physio-cultural regions of India ;
2. Review of archaeological evidence-primitive to advanced food collecting stages ;
3. Transition from food collection to (incipient) food production ; microlithic industry ; and
4. From the semi-nomadic and pastrol stages to urbanization through a peasant village stage, under which the early food-producing cultures of Baluchistan or Indo-Pakistan border ; Indus Civilization-first urbanisation ; peasant cultures towards second urbanisation.

Most of the Central Indian, Saurashtra and Upper Deccan painted pottery cultures are later than the original mature Harappan and probably this was the cause of its destruction. But in south India the Stone Axe culture is neolithic and contemporary with the Harappan.

Four different cultures intervene between the mesolithic cultures of the Late Pleistocene or Early Holocene and the advent of iron and the second urbanization in about 500 B.C.

Broad relationship between the riverine cultures of Central India and south eastern Rajasthan on the one side and those of Central India and Khandesh and northern Deccan on the other. Even so localized culture also existed.

Considering the origin of these riverine cultures the author points out :

1. In Andhra Karnataka a purely neolithic culture flourished around 2500 B.C. This had possibly extended up to northern Deccan. Its one feature-polished stone axe might have been derived from the East or alternatively from the west.

2. Saurashtra, Rajputana, central India came under Iranian or Central Asian influences either because of the actual migrations of peoples or because of ideas and contacts. This led to the colonization or development of village cultures.

3. That these - or some of their branches migrated further down and impinged upon the neolithic cultures of northern Deccan and Karnataka.

4. The refugees of the Indus culture after its destruction spread out and gave birth to another pottery tradition, bearing vague affinities with the Indus culture.

Concluding the author remarks that the same stages of development from food gathering stage to urbanization through intermediate stage of food producing-cum-food gathering stage and early peasant economy could be seen. At no site or in one region are all the stages of development discernible. The picture is built from a scene here and a scene there. This unequal development might be due to geographical factors. But how each particular stage of culture was reached is yet unknown.

197. SANKALIA, H. D.

'Archaeology in India during the year 1965', *Indica* 3, 2, 1966, pp. 85-94.

Neolithic stage has been dealt with in pages 88-89. Plans of houses at Sanganakallu and round houses and floors at Hallur were brought to light. At Hallur charred ragi was also found. Excavations during the year attested the spread of this culture from Upper Andhra and northern Karnataka to Madras Mysore showing similarities in ceramics, head-rests, animal figurines, identical methods of disposal of the dead, etc.

Excavation of an ashmound at Kupgal proved that it was a mound of cow dung heap burnt at high temperature'.

Sonegaon in Maharashtra yielded earliest evidence of wheat which had travelled south from West Asia through Sind, Panjab and Madhya Pradesh.

198. SANKALIA, H. D., SUBBARAO, B and DEO, S. B.
'Nevasa District Ahmednagar', *IA 1954-55*, pp. 5-9.

Earliest occupation here was evidenced by lithic tools in three layers of gravel pertaining to the Stone Ages. After a gap represented by a 20 foot (6.09 m.) thick sterile deposit regular habitational deposits of 30 feet (9.14 m.) divisible into five cultural phases were encountered.

In the first phase lithic appendageds were polished pointed butted axes on trap, with lenticular section, sling stones of quartz and hammerstones of quartz and trap; microliths of chalcedony manufactured by the crested guided ridge method, tools being cores, flakes, serrated single and double edged knives, parallel-sided blades, triangles, trapezes, crescents and scrapers. Copper/bronze bead, a hook and chisel were metal objects.

Other finds were beads of semi-precious stones, faience and steatite.

Pottery was wheel-made, thin and well-fired and red slipped on both sides. Barring storage jars, and burial urns pottery was usually painted in black over a fine red or dark chocolate base. Shapes were spouted vessels. Design, excepting for the hind portion a dog (on a sherd) was geometrical and very much limited in variety, viz., hatched square, triangle, rhomboid intersecting circle and oblique lines.

Huts were square or rectangular on plan as judged by the disposition of post-holes. Floors were of gravel mixed with lime or black cotton soil and lime.

Burials were fractional partially cremated or exposed. Collected bones were interred in handmade urns and covered by another and disposed in north-south orientation.

The culture is dated to about 1000 B.C. The succeeding culture after des-ertion is the early historical period.

199. SANKALIA, H. D., *et al*
'Excavation at Navdatoli, District Nimad', *IA 1957-58*, pp. 30-32.

Navdatoli is essentially a single culture site. On the basis of variations in ceramics the cultural deposit is divided into four periods - A to D. End of periods A and B were marked by conflagration.

Ceramic industries of the sub-periods are as follows: Sub-period A: Painted black-and-red ware and white slipped and black-on-red wares.

Sub Period B: Fine and well-baked and slipped red ware appeared for the first time. Shapes were dish-on-stand, globular vessel, carinated small bowl all decorated with wavy vertical or geometrical horizontal zig zag patterns. Black-and-red with paintings disappeared while the white slipped ware continued.

Sub Period C: Red, well-baked ware with matt-surface with shapes of red slipped ware of the previous period were present.

Sub Period D: Channel spouted cup, vessel with round bottom, vessels with high tapering side handles, large dough plates were the shapes. In painted designs new elements were noticed such as highly stylized animal forms, human figures, double spirals, etc. Graffiti was also noticed.

Other finds were microliths, beads toys and objects of metal and stone.

Microliths were end scrapers, pen knife blades, lunates, trapezes, borer, parallel-sided flakes. Beads of steatite, faience and semi precious stones, Copper wire rings, flat axes, bangles, fish hooks, nail parers, chisels and thick pins.

Stone objects were rings, mace-heads, saddle querns, hammerstones, balls and polished axes.

Charred grains viz., wheat, rice, gram, peas, *mung*, *kulya*, *til*, species of beans were obtained.

Navdatoli was a nucleated settlement. Houses were square, rectangular or round on plan. Walls were of closely laid series of wooden/bamboo posts plastered with mud and with intervening bamboo-screen in between the plastered mud. Walls were lime-washed. Floors were firm, smooth with lime spread on black cotton soil or yellow silt.

The chalcolithic debris was sealed by NBP levels.

The culture dates between 1200 B.C. and 700 B.C.

200. SANKALIA, *et al.*

From History to Prehistory at Nevasa, Poona 1960, pp. 1-549.

The report is divided into sixteen chapters viz. Introduction, Antiquity of Nevasa, Strata, structures and burials; chronology; Early Palaeolithic, Middle Palaeolithic; the Chalcolithic, Blade Industry; Polished Stone Axe industry; Coins, Bullae and Seals; Pottery; Beads, pendants and amulets; Terracotta and kaolin objects; Metal objects; objects of glass; objects of Bone; Shell and ivory; Stone objects; Contacts and correlation and eight appendices.

A remarkable feature of the Nevasa chalcolithic period is not only the existence of Polished axes but also small workshop or factories for their manufacture. These indicate that the axes and other tools found from the historic as well as the chalcolithic layers are not chance occurrence or imports from the purely neolithic cultures but played an important part in the daily life of the people. The tools were manufactured *in situ*.

A distribution of axes as well as the associated flakes implies a definite place of this industry in the chalcolithic culture with its painted pottery and blade industry came from the north and imposed itself upon the existing neolithic culture of the region or does it signify the adoption of the earlier tool tradition by the copper users because copper was scarce? No stratigraphic evidence is available for the first. The chalcolithic people seem to have derived their knowledge from the neolithians of Andhra, Karnataka region though a pre-existing knowledge of it cannot be ruled out, if these cultures are derived from Western Asia where such tools are found in association with copper/bronze cultures. At Nevasa and elsewhere the tools are of olivine dolerite which occurs as a dyke in the regular rock formation.

Anvils, hammerstones, incomplete celts or adzes, are found in chalcolithic layers and one chisel in historical layers. The tools are described.

Dealing with the burnished grey ware of the chalcolithic Period I the author is of the opinion that on the analogy of shapes found in the neolithic levels of Brahmagiri and Nagarjunakonda, the spouted vessels of Nevasa resemble those from the above sites. It is note-worthy to know that this ware is associated with polished stone axes.

It is also likely that the spouted vessels have developed from indigenous neolithic of which we have now a few examples from Nagarjunakonda.

The chapter on contact and correlation is very much informative particularly with regard to origin and dispersal.

201. SANKALIA, H. D., ANSARI, Z. D. and RAO, M. S. Nagaraja,
 'Excavation at Sanganakallu, District Bellary', *IA 1964-65*, pp. 29-30.

The problem was to determine the horizon of the patinated flakes and microliths.

Excavations were conducted at the top of the Sannarasamma hill and its foothill, about 200 m. from the Bellary-Mocha road.

At the top of the hill it was not possible to separate the patinated flakes and microliths into two distinct industries. But in the trench at the foothill microliths were found in a dark brownish soil at a depth of about 10 cm. below top soil while the patinated flakes-discoids, choppers, long blades and some highly mineralised bones occurred at the junction of dark brown sticky soil and the morum.

The neolithic occupation at the top of the hill is divisible into two phases. Phase I revealed a circular house measuring 5 m. in diameter and was on the morum. Walls were of bamboo screen plastered over with clay; the screen was held in place by wooden posts. To prevent flooding through rain the house had a raised floor of flat rubble stones and alternate layers of black soil and morum; the top being plastered with lime. A hearth, a storage jar resting on four stones, a couple of stone axes and a rubber stone were found inside the house.

A few incomplete houses of the same pattern found in other trenches.

Ceramic contents were pale grey and the burnished grey ware with occasional post-firing ochre painting.

Phase II revealed an intrusive wheel turned black painted red ware. A few bone tools also occurred. Other finds were terracotta bulls similar to those found on the rock engravings.

Correlating the results from various trenches the sequence can be summed as follows :

- Period I - Stone Age represented by chopper, chopping tools, prepared flakes etc ; all patinated;
- Period II - Microlithic cultures;
- Period III - Two phases of neolithic culture;
- Period IV - Megalithic culture

The last two were absent in the trench at the foothill.

202. SANKALIA, H. D., ANSARI, Z. D. and DHAVALIKAR, M. K.

'Excavation at Inamgaon, District Pune', *IA* 1968-69, pp. 18-20.

Two cultural periods were observed.

Period I - Central Indian chalcolithic - Malwa culture: Only one house was exposed partially. It had dwarf mud walls and screen of mud-plastered reed. The house was rectangular in shape. Two pits dug in different levels within the house of which the lower one was a storage pit, as evidenced by the lumps of disintegrated grains, jowar. This millet is the earliest find in Maharashtra. Pits were circular. The purpose of the second pit is not clear; it might be for storage as well. In the vicinity of the site people still live in pits.

Finds in Period I consisted of pottery and blades only. Shapes in pottery were similar to Malwa Ware culture. But the stumpy goblet or chalice was not found. A vessel with tubular spout was a new shape. Coarse grey and red ware and some black burnished wares were also found; a handled bowl is the distinctive shape in the last ware.

Structure of period II (Northern Deccan Chalcolithic - Jorwe culture). Plans of twenty-two houses were traced. Houses were closeby. One of these partly exposed pertained to early phase of period II. Rectangular on plan (4.25 x 4.50m.), it had wattle and daub screens and dwarf walls. Here also near the western wall was found a storage pit, 1.10m. in diameter and 70 cm. deep. Jars were supported on four stones.

Plan of one of the late phase houses was circular (3 m. in dia) and with 40 cm. thick wall. Traces of hearth evidenced by four flat stones and burnt patch was also found inside the house. Floor was black clay plastered over several times. Another had a courtyard and the floor was of rammed morum and fine yellow silt. In the courtyard a squarish hearth and two unbaked clay male figurines were found. A pit with broken pots and ash was perhaps kiln.

Pottery of early phase of this period consisted of the Jorwe Ware; shapes being carinated bowls and spouted jars. In the late phase the fabric became coarser and surface dull red. The carinated bowl was replaced by convex-sided bowl, though a few of the former continued. Other wares were red and grey. Huge handmade storage jars with incised and applique designs

were found. Besides some pieces of sandy ware also were noticed. Black-and-red was a new element. Every house possessed at least one bowl.

Other finds were terracotta human figurines (mother goddess?) having stump for arms and legs, crudely shaped hands and pendant breasts. Animal figurines were bull, bear and horse. Bull had prominent hump, short horns and block legs.

Crested guiding ridge blades were found in both periods in large numbers. Ground polished stone axes, sling balls and mace-heads were also found. Axes were perhaps locally ground on huge querns. Querns were of basalt with flat bottom and dressed sides.

A fish hook, pieces of bangles, pair of tongs were the copper objects. Points and punches of antler were the bone-tools.

Bangles of shell, ivory and copper; beads of ivory and semi-precious stones; terracotta reel-like ear studs were the other finds. A bead factory was also located.

The people practiced mixed economy of farming and hunting. Charred grains of wheat, lentil, jowar and perhaps rice were known in both the periods. Deer was the most hunted animal.

No burial of period I was found. In period II (early phase) two extended burials, one of an adult and the other of a child were found. The body was placed in a pit in north-south orientation. Child burial had no furnishings. Others had a carinated bowl, spouted vessel of the Jorwe ware.

In the late phase children were interred in urns and adults in pits. Children were buried in two urns facing mouth to mouth in pits; single urn was also used. Usually burials were fractional; one exception being articulated. Adult bodies were interred in pits with attendant furnishings, either in the courtyard or under the floors in one of the rooms.

203. SANKALIA, H. D. and DEO, S. B.

'Excavation at Nevasa, District Ahmadnagar', *IA* 1955-56, pp. 8-10.

Period II here represents the neolithic-chalcolithic culture. The cultural *milieu* consisted of microliths, stone celts, copper to restricted extent, and painted and plain pottery. Small anvils, hammerstones, polished axes and an adze represented the neolithic element. Copper objects consisted of a chisel, a needle or poker and three beads.

Square or round pillars supported the roofs of residences while the floors were set with lime or lime mortar mixed with clay.

Disposal of the dead is very interesting. Adults were interred in an extended or slightly flexed posture in shallow pits lined with lime or in jars horizontally in pits. Children were inhumated in single urns with lids; double urns placed horizontally face to face as also vertically face to face; in three urns placed horizontally, the third covering the broken bottom of the middle jar. The inhumation was fragmentary consisting of mainly skull and ribs. Preferred orientation was north-south though a slight variation to NNE - SSW was also noticed. Several pots bowls, spouted vessels with flaring rims, etc., - painted with geometric designs in black over fine red slipped surface formed the attendant burial objects. Naturalistic painted designs human animal and plant life were noteworthy. The graffiti marks on each pot was different. A pale brown and black partially handmade, fine glossy black, sturdy ware with post firing red wash or painting which easily rubbed off, came next in frequency to the chalcolithic wares. Sling stones and steatite beads were also found.

204. SARKAR, H. and VIDYADHARARAO, B.

'Excavation at Kesarapalli near Gannavaram, District Krishna' *IA* 1961-62, pp. 1-2.

An exploratory dig was made in the mound.

Period I with a 2.7 m. thick deposit yielded, in the lowest layer, only a few sherds of red, black-slipped, black-and-red and grey wares. It was not possible to determine shapes. But in the main the ceramic contents displayed affinities with chalcolithic culture of central and western India. Two polished neoliths collected from the surface may pertain to this period. Other finds were terracotta spacer bead, pottery disks and two bone pins. A huge stepped pit, 4 m. in diameter, containing ash, burnt earth, charcoal, pottery and mollusc-shells belong to this period. Natural soil was not reached.

205. SARKAR, H.

'Quartzite-Flakes in the neolithic deposits, Nagarjunakonda', *MI*, 42, 3, 1962 pp. 223-27.

Quartzite flakes, resembling blades were found in neolithic levels along with neoliths of dolerite, microliths of chert and prismatic quartz-crystal, pottery, etc. Majority of the flakes do not exhibit secondary working for

shaping into any form of standard tool. Nor they can be discarded as waste flakes since no neolith of quartzite was found while dolerite flakes could be waste flakes.

Neolithic settlement in Nagarjunakonda was practically confined to the nearabouts of a trap dyke which divides the valley into two halves. The neolithic-folk of the early phase used river worn quartzite nodules plentifully available from the surrounding hill slopes. The earliest phase was represented by pale brown handmade pottery, chert microliths and three crudely chipped microliths. Flakes of basalt or struck of quartzite pebbles are present but not in large numbers. Last two phases greyish quartzite flakes were numerous. In this phase burnished grey ware is predominant while red ware was rather insignificant. These locally manufactured flakes can be classified into cores, reject flakes, flake blades, points, scrapers, wedges, etc. Majority of flakes, either have a sharp cutting or pointed end. Flake blades without secondary working might have been used as knives. Blades exhibit a variety of shapes: parallel-sided blades with high medial ridge and thick bulbar end; tanged blades with evidence of use; backed-blades used as knife; blades with pointed end and were used as drill or awl. One pit yielded a stone tablet with holes which might be described as drill-holes.

Points with definite secondary working: worked tangs; variety of scrapers; thick squarish flakes used perhaps as wedges were also found. Quartzite flakes are not reported from any other site.

Concluding the author opines that these quartzite flakes had an utilitarian value in the daily life of the neolithic people of Nagarjunakonda and came handy in such jobs where normally the neoliths or microliths could not be used. If the flakes are discarded it would appear that the Nagarjunakonda neolithic-complex had no knife; the function of which was carried out by ribbon flakes in other sites. Microliths are too small and delicate to have been used as knives for cutting tougher materials.

206. SARKAR, H and KRISHNAMURTHY, K.

‘Exploration in District Guntur’, *IA 1961-62*, p. 1.

At Syamarajapuram on the Buggavagu a neolithic implement was picked up.

207. SARKAR, H and KRISHNAMURTHY, K.

‘Exploration in District Krishna’, *IA 1961-62*, p. 1.

Donabanda, situated at a distance of about 22 km. north-west of Vijaya-wada and Mungasala on river Munneru yielded neolithic implements. At the former place associated pottery was also found.

208. SARMA, I. K.

'Exploration in District Kurnool', *IA* 1962-63, p. 2.

Sites yielding neolithic tools viz. celts, chisels, etc., besides microliths and burnished grey and black painted red wares were located at Budidepadu and PENCHAKALAPADU.

209. SARMA, I. K.

Stone Age and neolithic site, Peddandluru, District Cuddapah', *IA* 1962-63, p. 65.

From the area known as Kanyathritam, besides tools of stone Age, polished stone axes, microliths black painted red ware and handmade coarse grey ware sherds were collected.

210. SARMA, I.K.

'Exploring District Kurnool', *IA* 1963-64, p. 4.

Exploration the district several neolithic sites were discovered; the sites and the cultural assemblages are as under:

Gaddamankampalli	Broken neolith, microlithic fluted cores, blades, waste flakes, black painted red ware and Middle Stone Age tools.
Mettupalle	Ground stone axes, fluted cores, finished ribbon flakes on chert jasper and quartz; black painted red ware and megalithic Black-and-red wares.
Sivavaram	Ground stone axes, fluted cores, blade on chalcedony, of the crested guided ridge, black painted red ware, burnished grey ware and megalithic Black-and-red ware.

211. SARMA, I. Kartikeya

'Painted Pottery from Pusalpadu Andhra Pradesh and Further Explorations in the Cuddapah and Kurnool Districts', *Indica*, 4, 2, 1967, pp. 75-94.

Neolithic sites here and in the neighbouring districts give details of the earliest food producers.

Painted pottery of Brahmagiri IA and similar ones from Maski I reveal affinities with the Indus pottery. Maski I pottery is wheel-made whereas in other neolithic sites it is entirely handmade. The pottery found in Lower Neolithic is imported. Potter's wheel came late into the neolithic culture. Later the technique was locally developed as result of contact with Harappan culture. Raw materials and minerals of the Andhra Karnataka region must have made the Harappans to come into close contact with neolithic people. In the Upper Neolithic contact was greater. Due to this contact with higher culture and specialization in industries, local trade or exchange of objects took place.

At Pusalpadu ($15^{\circ} 30' N 79^{\circ} 7' E$) three localities were observed, of which locality-1 is most promising. Pottery collected from this site falls into (a) Painted black-on-red, (b) non-megalithic black-and-red, and Black-and-grey, (c) burnished grey, (d) coarse red-and-brown and (e) megalithic wares.

The painted black-on-red ware is coarse to medium in fabric, well-fired and made on slow wheel/turn-table. It has an orange to red slip. This is different from Jorwe Ware. Design repertoire consisted of lattice, loops, horizontal bands, curvilinear, conventionalized plant-patterns, leaf, etc. Shapes were bowls, goblet-bowl, etc. This shows affinities with painted black-on-red-Malwa pottery, Maski, Sanganakallu, Brahmagiri, etc. This is due to contact with higher culture and not due to chalcolithic intrusion.

The non-megalithic black-and-red/black-and-grey ware is crude, hand-made, coarse, ill-fired and has a thin slip. Shapes are jars, shallow basin and lids.

Burnished grey ware is limited in number. Presence of numerous plain and painted red ware shows that this lower neolithic ware was giving way to the red wares; the former did not entirely go out of use. This is thick, coarse to medium and ill-fired. Shapes were lipped bowl, lid, channelled bowl, etc.

Coarse red and brown ware is slipped/unslipped. Shapes were globular jars, high necked jars. etc. This plain ware has affinities with Malwa ware.

Other antiquities collected were steatite disc beads, ground stone axe, etc., and sandstone mace-head. The beads were imports.

Exploration in adjoining regions revealed:

- (1) Profusion of red wares particularly painted black-on-red pottery;
- (2) Coarse grey and burnished ware is absent;
- (3) At Lanjapoluru and Kanyathiratham cream/white black painted ware was found; this pertains to late levels of the Lower Neolithic and derives its source from Banas/Malwa cultures.

The typical channelled bowl of the Lower Neolithic might have been originated in the Andhra-Karnataka and spread northwards or it was derived from a source other than the Central Indian Chalcolithic.

Two independent cultural waves can be noticed; the earlier within the lower Neolithic and the other from the upper neolithic and Andhra Karnataka. The first with channelled bowls and cups, and the basal neolithic wares. The lower neolithic of Cuddapah and Kurnool is chronologically coeval with early phases of central Indian chalcolithic cultures.

Concluding the author observes that channelled bowl is of local origin. Further he states that 'a metamorphosis seems to have taken place in the late levels of the Lower Neolithic of southern Andhra and Eastern Karnataka which went into the make up of so many painted pottery series.

212. SARMA, I Karthikeya

'Patapadu Revisited: A New Painted Pottery Culture of South-East India', *Puratattva*, 1, 1967-68. pp. 1-15.

Topography and details of previous exploration of the site are given. The present exploration in 1962-63 revealed two localities in the village, viz., western mound close to the village and the eastern mound yielded microliths of the Late Stone Age in Jasper, a few red slipped pot sherds, plain coarse and red ware pointing to a late historical period. The east mound enclosing the 'cache' of Foote was very much fruitful. Finds from here included pottery and stone implements.

Pottery was as follows :

- (i) *Painted black-on-red ware* : More than two hundred sherds were picked up. The fabric is from coarse to medium with predominance of the

former. With a few exceptions where slow wheel technique is noticeable, the pottery is handmade. The ware was medium fired, thicker pieces showed smoky central core. Slip on these was generally of dark red with a variation of orange-red. Some were burnished. Pigment of the painting was black. Sometimes paintings extended on the inner side particularly in cups and bowls and basins. Shapes in painted and plain vessels were similar. Paintings are common on the exterior. Designs were both geometric and naturalistic comprising horizontal bands, close and plain lattice, simple uprights or oblique lines from horizontal bands, oblique lines on the inside of bowls and dishes; short vertical strokes, circular bands, cross hatched segments, wavy bands, irregular horizontals, etc. The naturalistic designs resembling these on the central Indian chalcolithic designs comprise stylized human figures, stylized horned animals, birds, snakes, leeches, insects, *trisula*, etc. Shapes were hemispherical bowls, goblet-bowls, channel bowl, with several variants. The last form is found in several sites. The painting style has no analogues. The reason for the variants is that in the Lower Neolithic of Andhra-Karnataka this shape is available in unpainted variety. The painted tradition is not an isolated development. Globular pots, pots with narrow, straight neck and globular bulging body are also available. In smaller vessels in the broad spacious rims palm-leaf patterns are drawn.

(ii) *Plain red ware with crude red slip*: This is distinguished due to absence of painting. Further potting is poor. Surface is not regularly smoothed and rarely slipped. Shapes are bowls, vases and jars. Base exhibits soot patches.

(iii) *Coarse brown and crude Black-and-red ware*: The brown ware has a varied colour and sometimes with blotchy surface. This is hand made and ill-burnt. Crude Black-and-red is limited.

(iv) *The plain red ware*: This ware was of coarse and medium fabric. Shapes were thick walled vases in the first and bowls in the second. Bright red slip was present. This might be assigned to the chalcolithic times.

Stone implements were microliths and neoliths. The former consisted of two categories; materials being mainly jasper, chalcedony and quartz. Flake tools of purely neolithic affinity were scrapers and blades. Other was the chert blade industry with fluted cores. Serrated, bi-serrated flakes were also found. Only one neolithic celt of the triangular shape and pointed butt type was found. Dealing with a new painted pottery culture of south-east India

the author asserts that it has close affinities with the Malwa ware and not the later Deccan chalcolithic, both typologically and in surface treatment. Painted designs are also nearer to the Malwa Ware of Navdatoli, Eran and Nagda. But the spouted vessel and carinated bowls are absent. The geographical distribution of the painted ware shows a preference of sites by neolithic-chalcolithic people for habitation. These people sooner or later moved to plainer hills. Chronologically the site is equated to early phases of Navdatoli, Nagda and Eran.

Discussing the origin of the painted pottery the author says that the sites bearing this come in existence due to inter-regional development on account of some external stimuli. The author wonders whether the emergence of black painted design and the switch over to red slipped wares by a group of early neolithic people was due to Harrappan contact.

Dealing with contact and correlations he observes that there is a basic unity in the painted group of pottery with the Lower Neolithic. Specialized types comprised spouted, channel spouted vessels having parallels in Central Indian Chalcolithic levels. These are found in Harrappan sites of Lothal and Rangpur. The 'Malwa culture' grew up not only in Central India but also in Andhra Karnataka region.

Southern neolithic culture traits are found in handmade grey ware urns, ground stone axes and burial complexes. This painted pottery culture of south-east India spread towards Deccan first and central India also. The fact that the typical Malwa Ware did not contain the channeled bowl and the source for the central Indian chalcolithic wares was not in the Malwa region makes the author search for a third, chronologically earlier source for the Malwa and south-east Andhra-Karnataka region.

The painted pottery tradition with ground stone axes and short blade industry proves the extension of the chalcolithic and Iron Ages.

213. SARMA, I. Karthikeya

'South-east Asia, India and West Asia (A study on the beginnings of the 'Food-Producing Stage)', *ACSP*, Nagpur, 1972, pp. 95-112.

In the excavation of 'Spriti Cave', North-eastern Thailand, crude stone tools and seeds-peas, beans cucumbers and Chinese water chestnuts were found. These are dated to 11,000 B.P.

From Formosa and the pollen analysis of Sun-moon lake are available evidence of slash-and-burn horticulture with fruit and root crops in c. 10,000 B.C.

Edge ground tools were found in Australia in c. 20,000 B.C. level. Thus domestication and tool technology is earlier in the Far East than in the Middle East.

Examining the evidence in India particularly from Kodekal, Utnur, Terdal etc., and the absence of village settlements to the north of these sites Iranian inspiration for the Lower Neolithic of Deccan is hard to accept.

The typical pottery shapes like the channeled bowls and spouted vessels are regional developments. The handmade pottery from the earliest levels of Maski, Brahmagiri, Piklihal, etc., are anterior to the central Indian chalcolithic wares. So also the black-on-red pottery from neolithic levels which are earlier than the wheel made Malwa Wares. Further the chalcolithic of central India is autochthonous.

Indian evidence is considered in two divisions or Provinces viz., Province A comprising Central, Eastern and Peninsular India and Province B representing North-western India up to Saurashtra.

The basal neolithic of Eastern India sans metal and shouldered quadrangular axes and with ceramic traditions and tools-types is nearer to the Vindhyan and peninsular neolithic. Province A had a uniform cultural set up in the food producing stage. The neolithic province of B (Burzahom) had its roots in the Baluch-Afghan foot hills and extended into the Beas and Banganga.

Contacts between Harappan and the Lower Neolithic is also discussed.

Dealing with the domestication of animals the author asserts that a prolonged pastoralism existed in India. Contact between Late Stone Age people and pastoral communities was the cause of the coming up early agricultural communities. Likewise cultivation of cereals viz., wheat, rice etc., are dealt with.

Summing up the author observes :

(i) Province A is distinct from Province B.

(ii) The Lower Neolithic had the advantage of geographical isolation from the Harappans resulting only in trade along the sea coast and the

north-east hill terrain connecting penninsular India rather than cultural impact.

(iii) As a result of above influence of South-East Asia and China reached Province A quickly.

(iv) This influence was not one sided. India also gave something to these countries, particularly in historical times.

(v) Food producing stage is late in India.

In a post script new evidences for from Chu-Chia-Ling and Hanshui valley comprising Yangshao, Ch'u-Chia-Ling and Lungshan periods and evidence from Bagor (India), etc., are also dealt with to substantiate the author's plea for looking towards east for culture contact.

215. SASTRI, T. V. G.

'Exploration in District Mahbubnagar', *IA* 1967-68, p. 5.

In the submersible area under the Srisailam Project neolithic axes, chisels, leaf-shaped points and awls were found at Velaturu in Taluk Kolhapur.

216. SEN, D.

A preliminary note on neolithic typology of Chakradharpur, *ISCA*, Proceedings Anthropology & Archaeology Section, 28th Session, Banaras, 1941, p. 214.

217. SEN, D.

'A note on some celts and chisels from West Bengal', *SC*, XIV, 6, 1948, 252-53.

The site is a mound situated near Bamal village, by the side of River Kasai. It is about 50' (15.24 m.) high from the present day level of the river. Twelve implements-ground celts and chisels-were collected. Two-one celt and the other chisel-came from a small trial trench. The celts excepting one are all ground with slight evidence of chipping. The material of which these have been fashioned seems to be some basic igneous rocks, greyish green in colour. Tools are described and illustrated.

218. SEN, D.

'A celt-site in Singbhum', *MI*, 30, 1, 1950, pp. 1-12.

The site is located near Barda bridge on the river Sanjay by the Chakradharpur - Chaibassa road, four and half miles (7.24 km.) south-east of Chakradharpur. The geology of the site consists of dark clayey soil, with blocks of shale and phyllites, rolled quartzite and a mixture of pebbles and gravels. Outcrops of schists, quartzite and epidiorite provided the necessary raw materials for the tools. The site itself is on a high ground above the flood plain of the river. The numerous tools in all stages of manufacture found here would make it a factory site. Some tools show yellow-brown patination. Materials used in the making of the tools are quartzite, epidiorites and basalt, the preferred material being epidiorite. About 250 artifacts in all stages of manufacture comprising: (1) completely chipped, (2) partially chipped and partially ground, (3) partially chipped ground and polished, (4) wholly ground, (5) partially chipped and partially polished and (6) wholly polished celts have been found. Chipping is the primary process; pecking grinding are the stages culminating in polishing. A study of cutting edges reveal several varieties, viz., (i) normal deep and very deep convex; (ii) slightly deep, convex oblique; (iii) laterally bulging which appears to be a peculiar development of convexity. The straight form of cutting edge develops into the chisel type rather than the axe or adze. The tools here belong to the celt type. The study of the cross section at pole or butt reveals the following varieties: Rectangular, sub-rectangular, square, triangular, hexagonal circular or round, oval or elliptical, oblong and irregular. Common shapes are triangular and oval celts with more or less convex forms of cutting edge 'U' forms and rectangular shapes are also present. The former has convex oblique or more less straight cutting edge. The chisel type is on quartzite, stouter at the butt and square in cross-section. The screw driver type is a development of chisel with obliquely and sharply bevelled cutting edge with convex margins at both ends suited for insertion in a handle. This is a unique type.

(This forms the subject of a paper 'A note on the Neolithic Typology of Chakradharpore' read before the Indian Science Congress, 28th Session, Banaras, Jan. 1941).

219. SEN, D

'Prehistoric researches in India', *MI*, 33, 3, 1953, pp. 185-94.

Recounting the work done so far in the prehistory of India the author pleads for further work indicating the lines on which research is to be carried out.

As records neolithic culture he says that research in Mysore and adjacent Madras State is likely to reveal lines of contact and true succession. A systematic study of the distribution of certain types of neolithic celts with oval and rectangular cross sections may reveal the probable centre of dispersal and relative age. This would also help verify Worman's postulate.

Excavations in the more primitive tribal tracts for providing evidence for typological correlation between Late Stone Age cultures and oboriginal culture is needed. Excavations in tribal preliterate culture-areas for cultural development from Late Stone Age to present day is advocated. A study of primitive arts and crafts is also needed.

220. SEN, D. and CHATURVEDI, Uma

'Further finds of stone axes in Singhbhum', *MI*, 35, 1955 pp. 303-14.

In the Sanjai valley numerous implements including axes, chisels, cores, microliths and potsherds were discovered on the surface and also a few inches below the soil. Axe-forms is the predominant type and is found in all stages of manufacture. The paper deals with technique and typology of the finds. Typologically the tools from here bear resemblance to those found in Indo-China and Malaya in clearer datable neolithic context. The process of manufacture consisted of chipping and pecking; grinding; and polishing. In the collection the majority of tools were manufactured by chipping and polishing, polishing was generally restricted to working edge. One group reveals all the stages of manufacture; chipping, grinding and polishing at the margin, surface grinding and polishing the cutting edge. Polish is smooth and glossy.

Technologically the axes fall into completely chipped, partially chipped, and ground and polished; and completely polished tools. According to shapes they may be grouped as trapezoidal, oval or ovoid; and triangular or trapezoidal, the cutting edges being convex in various degrees: ovoid or lenticular, straight or convex and margins bluntly chipped; flat or flattened lenticular; elongated trapezoids or roughly triangular cutting edges straight to deeply convex or almost semi-circular. Polar cross section-rough rectangular or lenticular not very common. Triangular-with convex cutting edge is generally polished; Polar cross section triangular is rather rare. Plano-convex-oval or triangular and elongated trapezoidal-cutting edges range from straight to deep convex or almost semicircular. Polar cross section is plano convex or lenticular. This forms the popular axe

type in the collection. Rectangular cross section-trapezoidal are polished mainly at the poles and lateral margins and blunted by grinding cutting edge symmetrically convex. This type is rather rare.

In partially polished tools polishing is confined to working edges. Types II, III and V having rectangular shapes exhibit typological similarity with Hoabinhian Basconian and Somrangen of Indo-China. The authors have given a description of tools. Also are found hammerstones, hone or polishing stones, pounders, ringstones, etc.

221. SEN, D. and CHATURVEDI, Uma

'Further studies in Singhbhum Neolithic typology', *MI*, 38, 3, 1958, pp. 176-85.

The site is Chakradharpur. The artifacts were mainly collected from the surface or just below surface. Types found included chisels, hammerstones, pounders, ring-stones, discs, polishing stones, etc., besides pot-sherds and a few microliths. Celts are the predominant tool-type. Typologically the Singhbhum data compare well with Indo-Chinese finds. In form, technique and cross section and in many specimens even in the rock material a considerable number of the Indian and Indo-Chinese celt-types are so strikingly similar that a cultural relationship may be envisaged. On the basis of Indo-Chinese division of neolithic period the Singhbhum finds would be dated to the Middle to Late Neolithic times. The Singhbhum data would be typologically correlatable to the Late Somrangen and Late Basconian phases of the Indo-Chinese neolithic period. With emergence of the more evolved types of celts bevelling the cutting edge becomes more prominent. Correlating the Indian types with those of Indo-China the Indian types are grouped as belonging to the Early, Intermediate or Middle and Late neolithic.

222. SEN, D and GHOSH, A. K.

'Exploration in District Singhbhum', *IA* 1961-62, p. 9

A neolithic site yielding *in situ* celts, pounders, saddle querns, chisels and hammerstone was discovered near Seraikalia.

223. SEN, D and GHOSH, A. K.

'Exploration in Districts Bankura, Birbhum, Burdwan, Hoogly, Jalpaiguri and Midnapur', *IA* 1961-62, p. 59.

Many neolithic implements viz., celts, pounders and ringstones were discovered on the surface near Belpahari, District Midnapur.

224. SEN, D and GHOSH, A. K.

‘Exploration in District Singhbhum’, *IA 1962-63*, pp. 6-7.

Several neolithic sites in the Sanjay valley near Sini yielding celts, chisels, pounders, saddle-querns and ring-stones were located. Material of the tools was mainly epidiorite. Associated with these finds was pottery, hand-made as well as wheel-thrown, grey-black to reddish in colour.

225. SEN, D and GHOSH, A. K.

‘Excavation at Barudih, and District Singhbhum’ *IA 1963-64*, p.9.

A few trenches were laid at this site. Sequence of layers from bottom upwards is as follows:

- (i) thick deposit of sterile red soil;
- (ii) implementiferous compact dull-black soil; and
- (iii) a thin mantle of reddish brown, possibly windblown.

The red soil at bottom yielded microliths at some places.

At depth ranging between 40 and 90 cm. stone axes, adzes, mostly chipped and smoothed, round butted, were found. Besides, charcoal, burnt earth and fragmentary animal bones and potsherds were also observed. Charcoal and potsherds were found throughout the level. Pottery was both handmade and wheel-made. Colour was grey, orange-brown and black. No pattern of distribution according to depth was observed. Bowls and dishes were the observable shapes.

In the gullies stone implements were seen. On the top of the mound weathered and broken iron pieces and non-descript beads were found.

226. SEN, D. and GHOSH, A.K.

‘Exploration in District Midnapore’, *IA 1964-65*, p. 48.

Opposite the village Kechanda, on the bank of Tarapheni two neoliths were picked up.

227. SESHADRI, M.

The stone using cultures of Prehistoric and Protohistoric Mysore, London, 1956.

Chapter IV deals with the neolithic-complex in Mysore. The neolithic sites of India when plotted on a map group themselves into (i) eastern (ii) central and (iii) southern Indian. The shouldered celt is a late intrusion into India from the Far East and is contemporary with one of the metal ages. This culture should not be designated neolithic. The uneven distribution of the pointed butt axes is perhaps connected with the racial movements.

Recounting the sequence of Burzahom the author says that the polished stone axe culture antedates the Jhangar phase of the Indus civilization. He also recapitulates the results of Sanganakallu and Brahmagiri excavations. He concludes from the available evidence that the neolithic phase in south India was later than the north.

The neolithic phase of Mysore is contemporary with the chalcolithic phase. In Mysore the majority of tools are axes but adzes are also present. Fabricators are not found in Mysore. Technique of manufacture of tools is recounted, besides discussing the modes of hafting.

Dealing with the chronology the author opines that the stray finds of stone tools at Mohenjo-daro, Nal, and Rana Ghundai are contemporary with the Indus Civilization with a possibility in all these sites a pure neolithic preceding the Bronze Age. Allowing four five centuries for the development of neolithic the date would be c. 3000 B.C. Brahmagiri neolithic could be dated to 800 B.C. Thus it would seem that the polished Stone Axe Culture of south India was later than that of north-western India.

228. SESHADRI, Dr. M.

'Excavation at T' Narsipur, District Mysore', *IA* 1958-59, p. 33.

Excavations revealed two periods of which Period I represented the neolithic phase. Pottery consisted of a thick burnished grey ware, burnished sherds of orange-red and brown. Some of the orange red sherds had curved lines in violet while the grey ware was decorated with incised ornamentation. The early layers contained a thin burnished grey pottery with its lip painted in red ochre with analogues in the chalcolithic layers at Bahal. Channel spouted vessels in coarse grey and buff as obtained in Brahmagiri was a

common shape. A typical find was the neck-rest fashioned out of clay. Stone implements included polished axes, pounders, etc. Only one fluted core was found. Copper was absent.

Polished stone axes were found in the river-section as well.

229. SESHADRI, M.

'The Polished stone axe-adze culture of Brahmagiri Mysore State *Professor P. K. Gode Commemoration Volume*, Poona, 1960. pp. 378-86.

Besides axes, adzes also occur at Brahmagiri. An axe is hafted to a handle with its cutting edge parallel to the handle while an adze the cutting edge is at right angles to the handle. Hence adzes have symmetrical cutting edges. Other tools at Brahmagiri are chisels, hammers, fabricators, etc.

Two stratigraphical positions for the Brahmagiri axes are noticed: (i) the majority of axes are found in Period IB, and (ii) the flattened lenticular type is restricted to Period IA. One was found *in situ* at Brahmagiri. These flat types are adze blades. Functionally they are axe-adzes.

At Brahmagiri the following tool-types are available (i) pointed butt-end axes, (ii) adzes, axe-adzes, chisels, fabricators and pounders.

The axes might have used loose in hand or hafted to a handle. They might have been hafted in any of the following ways: (i) club haft, (ii) slot haft and (iii) modified slot haft. Small flake adze might have been fixed in a knee haft.

The adze-axe blade might have also been hafted in pivot sleeve which gives freedom for the implement to be used either as an axe or an adze by turning the sleeve.

230. SESHADRI, Dr M.

'Excavation at T' 'Narsipur', *IA 1961-62*, pp. 35-36

This season's work here revealed a neolithic burial. The longer axis of the skeleton was east-west. The hands were found placed on the stomach region, above the other. Two pots handmade and cream coloured, a channel spouted shallow bowl along with a terracotta stand with concave top were found beside the head. The concave stand which was on the right side had been described earlier as neck-rest. The presence of this in a grave has confirmed beyond doubt its function as neck-rest.

231. SESHADRI, M.

'Excavation at T'Narsipur, District Mysore', *IA* 1964-65, p. 32.

Period I represented the neolithic culture using the burnished and unburnished hand-made pottery and ground stone tools. A small pit contained pieces of bones, charcoal and ash. Quartz flakes indicated the use of blade-flakes by the neolithic settlers. In the upper levels wheel-turned pottery and a few sherds of black painted red ware and a copper bead were found.

232. SESHADRI, M.

'A Neolithic Burial from T.Narasipur', *Puratattva*, 2 1968-69, pp. 55-56.

A neolithic burial in an oblong pit oriented east-west was encountered in TN 16. Two post-holes one each on either side of the pit were also seen. The body lay supine with its head on the east and hands crossed on the abdomen. Two large handmade burnished grey ware pots, a neck-rest and lipped bowl was found near the head. No surface indications for the burial pit was observed. Post holes are enigmatic.

Study of the skeletal remains revealed: (i) that it belonged to a female, about 21-25 years of age at death; (ii) belonged to the Mediterranean stock with medium sized, high vaulted head long face, with cranial capacity above 1300 cc.; (iii) height was nearly 5'2" (155 cm.); (iv) compares well with skeletal remains of Piklihal, Tekkalakotta, and Nagarjunakonda; (v) the neolithic folk had a uniform pheno-type, *i.e.* Mediterranean; and (vi) Adikarnataka, Agasa, Ganiga, Babbur Kamme Brahmins have similar features.

The remains can be dated to C first half of the second millennium B.C.

Neolithic and neolithic-chalcolithic burials of Deccan were oriented alone north-south direction unlike the T. Narsipur burials. The spouted vessel found elsewhere is absent here. The position of hands here is also different.

So far pottery head-rests are found in the neolithic cauvery basin only. These are also available in the Nile valley. Could this indicate a cultural diffusion from Egypt?

233. SETON-KARR, H.W.

'Note on prehistoric Implements in some Indian Museums', *Man*, XXVIII, 1928, Art. no. 85, p. 123.

The author rearranged stone implements in Madras Museum. All implements including neolithic celts and heavy type of hammers with finger holes from Kon river have been stacked away for reference by students. Most of the specimens are from south India.

234. SEWELL, R.

'The Cinder Mounds of Bellary', *JRAS*, 1899, pp. 1-16.

Cinder Mounds are to be found under the hills four miles (6.4 K.m) east of Bellary, in the plain on the eastern side of copper Mountain, and at Budigunta. The most important one is at Nimbapuram. Mr. Sewell recapitulates Newbold's observations.

Results of sample submitted by the author and examined by Mr. Watts are as follows: the specimens are neither volcanic slag nor the result of ore-smelting, lime-burning, glass, etc. The glossy slag from Nimbapuram is due to the presence of grits like felspar and quartz.

Bone fragments were also seen in the sample.

Budigunta specimen is due to burning of fuel. Peacock hill specimen is also similar.

Newtons observation of bones are as under : The bones belong one to human, 2 pieces not human and the rest are indeterminable.

Hence these are huge funeral pyres of human and animal beings.

If the mounds are only three to five hundred years old then they are: (i) funeral pyres of warriors dead in fight with muslims; and (ii) funeral pyre of queens who committed *sati*. But in Peacock Hill the story is different.

Summing up he observes that some of the cinder mounds are neolithic. Three mounds are funeral pyres rest are neolithic but some may be more modern.

235. SHARAN, B.K.

'Neolithic celts, Rajgir, District Patna', *IA* 1963-64, p. 86.

A neolithic celt was picked up here.

236. SHARMA, A. K.

'Neolithic human burials from Burzahom, Kashmir', *JOIB* XVI, 3, 1967, pp. 239-42.

Human burials found in the excavation are dealt with.

Phase I did not yield any burial.

In Phase II-six interments, both primary and secondary were encountered. Burials were found in egg-shaped oval pits, invariably dug into the floor of the house and were narrow on top. Pits were plastered with *chunam* and filled up with ash, stone pieces and potsherds. Skull was normally towards the north-east or south direction. Variation was towards west.

Of these two were secondary burials. Bones were freed of flesh before interment. Mostly skull and long bones were collected, treated with red ochre and interred. Attendant furnishings were also found.

In three of the primary burials the body was interred in an embryonic position. Another skeleton in an extended position was oriented SW-NE. Skull was mutilated; it being pierced by stone pieces. Of the skeletons of the three primary burials one was that of a child with its head towards west; second was that of a grown up adult with five carnelian beads in the neck region. The third was an interesting burials. All the bones were treated with red ochre. The pit was *chunam* plastered. The skull bore trepanning marks-seven finished and four unfinished. As none of these had healed they were perhaps for obtaining fetishes. In the same pit animal bones were also found; a soapstone flat circular disc with three linear perforation was also found.

Three burials of phase III were encountered. Oval *chunam* plastered pit and the crouching interment indicate the continuation of tradition. Ochre treatment of bones had disappeared. Orientation also changed to east-west. Filling was earth, ash, stone pieces and potsherds. In one instance with stone lining of the pit was noticed. Pots were the attendant furnishings.

In conclusion the burials of Burzahom are comparable to those of Catal Huyuk and also bear some semblance to burials at Tepe Hissar and Sialk, particularly Burzahom phase II. Red ochre is used in Russian burial as well.

Modern ethnological parallels that of the onges of Andaman island for secondary burial and sprinkling of red ochre. Trepanning is practised among the Tibu of Africa.

Burzahom exhibits cultural links with West Asia, Europe and southern Russia.

237. SHARMA, A. K.

'Animal burials from Burzahom-A neolithic settlement in Kashmir', *JOIB* XVIII, 1-2, 1968, pp. 41-44.

Majority of the burials pertain to phase III. Only one or two can be ascribed to phase II. there was none in phase I, Phase II marks the beginning of animal burials. The grave pits were oval, narrow at the top and wide at bottom and ranged from 0.90 to 1.05 m. in diameter. One pit of phase II was irregular. One pit was plastered with *chunam* on the inside. Filling was clay and stones, pieces. Three modes of burials were noticed. In all but one the orientation of the body was north-south with head towards north. Exception was east-west. Modes of burials are as under :

A: Animals buried were in all probability, those sacrificed in honour of the dead; perhaps flesh was eaten and collected bones interred along with human body in the same grave either at the same level or a little higher. Bones, mostly of goat and antler and in one case of a dog were noticed. Bones were treated with red ochre.

B: Fractional burial of the three examples, two pertained to phase III and one to phase II. Phase II burial was of wild dogs and two antlers (*cervue duvauceti*). Dog remains were five skulls, ribs, limb bones, etc. Dogs were sacrificed and excarnated before burial. The pit was cut into the floor of a house. In another was found a disarticulated skeleton one of an ibex.

C. The third method comprised interring in the same pit at different levels. Burials were mostly of dogs but two of wolves were also noticed. Body was in north-soute direction in crouching i.e. sitting at ease resting on right or left position. Only one was in supine attitude. Bones were well-preserved. In a double burial both were dogs. Only one case of wolf at a higher level was noticed. Another articulated burial of wolf showed completely charred bones and the pit was filled with ash. Inferences are as follows:

1. Like humans, animals were also buried in regular pits.
2. Orientation of the animal and human burials were similar.
3. Bones of pet animals sacrificed were interred along with human remains.
4. Double burials of animals were common. Pits were in continuous use
5. The animal burials did not yield any antiquities.

The animals perhaps had some totemistic relationship with the deed. It would be interesting to find out to which variety the dogs of Burzahom belonged. Only Burzahom yielded wild variety of dogs. Hence domestication of dogs in the Kashmir region was independent of origin in about C 2000 B.C.

238. SHARMA, G. R.

'Exploration in District Banda', *IA* 1955-56, p. 4.

Khoh, Agārhunda, Majadpura and Chakond all within a radius of 8 miles (13 km.) from Karvi, yielded large number of neolithic celts of the Brahmagiri type with pointed butt, splayed edge, convex sides and lenticular section.

239. SHARMA, T.C. and H.C.

'A Report on the Investigation into the Prehistoric Archaeology of the Garo Hills (1966)', *JUG, Science*, 1966 XVI-XVII, pp. 73-84.

Geographical location of the Garo Hills is given.

The paper deals with the antiquities - pottery and stone tools collected by H. C. Sharma in 1966. These were collected from Matchakholgiri, Ganolgiri, Rongram and Rengchengiri - all on the north-western face of the Arabella range. Majority of the tools - 55 in number - are from the last site.

Pottery from these sites were fragmentary and they form part of same industry in all the sites. Colour ranges from greyish brown to dull red; interior being darker. Clay is impure, heavily tempered with coarse sand

and quartz grit. In fabric it is coarse. They are hand-made and smoothed over by wet hand or cloth. There is no evidence of burnishing, tooling or application of slip. Core is dark and seems to have been burnt in open fire.

Stone implements are dealt with under two main headings—raw material and technique of manufacture; and typological classification.

Patination on the tools would make one believe that the raw material is sandstone but actually it is dolerite. Flaking was the first process in tool-making. Some are roughly flaked exhibiting large flake-scar, others are carefully flaked and trimmed. Chipped axes are those which are finished by flaking alone and perhaps used without grinding and these form the majority. A fair number of tools are finished by grinding. For this purpose slabs of sandstone showing grooves found in the Exploration were perhaps used. Pebbles of quartzite were hammers. Some of the ground tools retain marks of chipping.

Shouldering and edging the tools are features peculiar to Garo Hills. The stages are (i) careful chipping and removing minute flakes from the lateral sides of the butt and (ii) smoothening the shoulders by grinding. In edging the same process is followed. Edge grinding is seen mostly on the flatish underside; perhaps an ideal method of making a hoe-blade. Flat-grinding common in Late Neolithic of South East Asia is absent here.

Flake tools and cores in this collection are of dolerite. Cores are on lumps of dolerite, cylindrical in shape and have prepared striking platform. Flakes were used for making scrapers.

Tools are classified on the basis of (i) technique of manufacture, (ii) cross section and (iii) form and size. Tools are divided into two groups, A and B; the former is chipped and the latter fully ground. Under A the following types are noticed: handaxe type, Sumatralith, flakes, chipped celts, pointed tools (spear-head), broad axe. Under group B are flat celts, shouldered celts, giant axe, byproduct flakes, cores, grinding stones, hammers. A chart showing site-wise distribution of tool-types is also given.

Summarising the following are observed:

(i) Co-occurrence of stone axes and grinding stones indicate local manufacture of tools.

(ii) Most common tool is the chipped celt forming 30% of the collection; next is the fully ground tools, flat celts with lenticular section 15.3%; third is the shouldered celt with 15%. Frequency of the rest is not clear.

Association of pottery with stone axes is yet to be determined.

Sumatralith is an interesting type and may represent a pre-neolithic phase. It is possible that Hoabinhian Culture in S. E. Asia where this type is common has spread to Asia.

Shouldered celts established contact with South East Asia. The lenticular sectioned unifacial ground tool has come from Cambodia. Cultural sequence is as follows :

1. Hoabinhian-Sumatralith and hand axe types;
2. Early neolithic-Chipped stone axes.
3. Late neolithic-Fully ground axes and shouldered celts.

Hoabinhian continued till 2,000 B.C. and that is the beginning of Early neolithic. Late neolithic can be dated to the first half of the second millennium B.C.

Sumatralith is described as follows: It is a massive-heavy and crude-biface hand axe based on flaking river pebbles. Usually only one surface of the pebble is worked by primary and stepped flaking and retains the original pebble surface with small flake scars on the margin.

240. SHARMA, T.C.

'A Note on the Neolithic Pottery of Assam', *Man* (NS) 2,1. 1967, p. 126-128.

Till 1963 all tools were surface collections and hence unstratified; the character of this culture including pottery remained unknown.

With the excavation at Daojali-Hading the picture changed.

Before the site was destroyed through road-building activities salvage excavations were conducted which brought to light for the first time pottery in association with neolithic implements.

The trial trench revealed that the cultural layer superimposed by an undisturbed layer of compact brown earth which in turn was sealed by humus. The thickness of the implementiferous strata is $2\frac{1}{2}$ ' (76 cm.) thick. There is no break in stratification and hence represents a single layered

habitational deposit. Common tools were shouldered adzes, quadrangular adzes, small axes of rectangular and oval cross section. Crudely flaked axes of sandstone, flaked all over and edge ground were also available.

Pottery was fragmentary and shapes could not be reconstructed. Baked pottery is well-preserved. Others ill-baked show weathering. Technically they may be grouped into four:

- | | | |
|-----------------------|---|----------------------------|
| (i) cord marked | } | colour predominantly grey. |
| (ii) incised | | Other colours are red and |
| (iii) stamped pottery | | chocolate-brown |
| (iv) plain red | | brick red in colour |

A sherd count showed cord-marked pottery is the dominant group. All others are rare; rarest being plain red.

Only the plain red ware seems to have been made of fine clay. Others are of coarse and impure clay. The clay in some cases is heavily tempered with quartz and sandstone grit. Coarse sand and vegetable matter were also used as tempering agents.

Plain red ware seems to have been made on a pivoted turn table. Others were handmade. In some coil and ring method was adopted and finally shaped through beating by the beater and pad method. Two types of beaters of rectangular piece of wood were used. The first was where a long beater wound with string or cord and the second engraved beaters; engravings being cross-hatchings or diamond patterns.

This method is used for preventing wet clay sticking to the beater. The pattern is adopted in China as well. Outer face of the pottery shows the designs while the inner pad marks. The pad may be a pebble wrapped in cloth or leather. Sometimes back of the free hand was also used. These characteristics are found in Daojali-Hading.

Parallel grooves in rows seem to be the frequent pattern of cord marks. Another was the double threaded twisted cord. Pottery showed no burnishing. Firing is imperfect and the core is dark. Perhaps baked in open fire with dried grass or wood. Sema Nagas practice this. Incised decorations are herring bone and cross hatched diamonds.

Cord-marked pottery occurs in majority with polished stone tools including the shouldered variety in Eastern Asia, China and South East Asia. But the Assam specimens do not belong the Eastern Asiatic strain. Due to insufficient data the affinity with other regions cannot be established. But it

may be suggested that the red pottery of Huang Ho valley with its southern extension up to Szechwan have some affinities. Perhaps the pottery of Assam reached from that direction.

241. SHARMA, T.C.

'Assam in Prehistoric Times', *Kamarupa* 1967, pp. 83-90.

242. SHARMA, T. C. and SINGH, O. K.

'Studies on the Prehistoric Archaeology of Garo Hills', *JASS*, X, 1968, pp. 36-40.

243. SHARMA, T.C. and SINGH, O.K.

'On the discovery of Stone Age relics from Manipur', *JARS*, XI, 1969,

244. SHARMA, Y. D.

'A new stone implement from Orissa' *MI*, 32, 1, 1952, pp. 14ff.

Four implements found by some workers of Bird and Co., and passed on by Dr. West were examined. These were found at Thakurani in Barajamda area in the erstwhile Keonjhar State.

The celts or stone chisels are made of fine grained blakish chert. Although the material is not locally available, it is found at a distance of about 15 miles (24 km.) towards south at a place known as Chardhara in the Bonai State. All the chisels have rough chipped surface and are patinated. They measure approximately 7" × 0.8" (17.7 × 2 cm.) at butt while the cutting edge is 1.3" (3 cm.). Both ends are sharp. The wider cutting edge flattens out and resembles metal prototypes. The sides have a pointed oval or elongated leaf shaped section. Similar things are to be found in the Orissa Provincial Museum, Bhubeneshwar, Patna Museum, Patna and Indian Museum, Calcutta. Two also come from Sitabhanji.

Even though these may be described as neolith yet these would belong to metal age as evidenced by the flattened cutting edge. Distribution seems to be confined to the hilly tracts of Orissa and adjacent territories. On the assumption that some of the lithic types are connected with language complex and since the implements are found in the hill tracts inhabited by the Mundas the author doubts whether these implements were a characteristic type fashioned by the forefathers of the tribes of this region.

245. SINGH, R. C. Prasad

'Exploration in District Monghyr', *IA* 1962-63, p. 5.

At Rehana two pieces of ring or hammer stones and a small polished celt were picked up.

246. SINGH, R. C. Prasad

'Spouted vessels in India' in SINHA, B.P. (ed) *Potteries in Ancient India*, Patna, 1969, pp. 118-124.

What was the reason for introduction of spouted vessels in the Upper Neolithic?

Shortage of food supply in the Upper Neolithic led them to seek the aid of the spirits of their ancestor through the medium of fortune tellers. In order to economize in the offerings to the spirits recourse was taken to spouted vessels.

Spouts are found in the West Asian vessels also. Mesopotamian vessels are dated to 3200 B.C. while the Indian specimens do not go earlier than 2000 B.C. leaving a gap of more than 1000 years. Comparing the spouts from these two regions the following observations are made:

- (i) Those of from Sialk and other sites are beak-like.
- (ii) Mesopotamian specimens are thicker at the base with a tapering top;
- (iii) Mesopotamian specimens are luted obliquely in the space between the neck and the shoulder;
- (iv) Those from Susa, Hissar, etc., have shorter necks.

Spouts from Indian sites with a single exception from Jorwe are cylindrical and are luted on or below the shoulder. If spouts had diffused from West Asia then there has been quite a bit of adaptation in India. Long necked spouted vessels are peculiar to Nevasa. Wide mouthed vessels from Nevasa and Pimpaladar form a group: Nagarjunakonda and Brahmagiri are similar while the carinated and spouted vessels of Tekkalakota stand isolated. These represent different sets of people living in various parts of the country.

Spouts here are either cylindrical or concave while the Nal ones were funnel shaped. Spouts are handmade and attached later. In some sites spouted vessels are painted, both pre-firing and post firing paintings are seen on red surface in black; designs being faunal and geometrical in character.

Cups, bowls and basins also have spouts. Some have pinched spouts also, particularly the channel spouts. Spouts are joined obliquely on the shoulder or parallel to the body. Usually they are cylindrical but one from Oriyap

which is concave with bent top. The bowl with spout parallel to the body has a wide distribution and perhaps diffused from Middle East. Paintings are also seen on some. Paintings are over a red surface in black colour. Designs comprise geometric patterns and animal motifs.

Spouts continue in later times also in the early historical levels.

Spouts are perhaps intended to pour libations into the mouth of the dead. Allchin suggests these were cooking vessels but this is not plausible.

Spouted vessels are referred to in literature also.

Concluding the author remarks that spouted vessels came into existence in the Upper Neolithic. If they had diffused they were Indianized and put to religious use. They might have also been used in household for economizing purpose also.

247. SINGH, Rameshwar

'Exploration in District Jhansi', *IA* 1959-60, p. 48.

A neolithic celt was picked up at Rajghat and the find spot might be a factory site.

248. SINHA, B. P. and VERMA, B. S.

'Preliminary Report on Chirand Excavation for the year 1969', *Patna University Journal* 23, 3, 1968, pp. 97-104.

Chirand has been excavated since 1962-63. The present excavation revealed a sequence from Lower Neolithic to Pala-Pratihara period.

Period I with its two phases pertains to the neolithic culture. However, in Period II-A polished stone axes were also available.

Period I is bereft of metals and black-and red ware. The earliest phase of this period - Period I-A - yielded doubtful pieces of wheel-thrown pottery. Majority of the pots were hand-made with gritty core. Powdered mica quartz were mixed in the clay and mica powder was also dusted on the pots. Some pots were burnished while some others had a slip. Shapes were large jars with flaring rim, spouted vessels, spouted bowls, basins, etc. Burnt daubs bear witness to structural vestiges. Walls were perhaps of reeds plastered

over with mud. The people practiced hunting economy. Broken stone pieces might be part of some stone-cutting tools or digging tools.

The next phase - Period IB - is characterized by the appearance of plain and painted grey wares. Besides red, black ware was also noticed. Pottery is finer than the previous phase. Evidence of pottery made on turn-table is present. Pot making techniques recall those of Utnur and Piklihal. Some of the pottery was highly burnished on both sides. Some bore thin slip. Post-firing painting in red-ochre is seen on grey and black wares. Designs were bands on rims and lips, mouth, spout, etc. linear criss-cross, concentric semi-circles/circles etc. were the patterns. Shapes were bowls, basins, pedestalled bowls high and narrow necked jars, dish, vase, long spouted vessels, lipped bowls in grey ware, etc. A few coarse red ware with punctured designs were also found; decorations being triangular patterns. Several examples of rusticated vessels were also seen.

Burnt daub pieces represent remains of houses. In these paddy husks were noticed.

Metal was absent. Stone tools were pounders, grinders, rectangular celts, mostly hammer dressed with a single polished specimen. Cylindrical hammer, circular balls, were also found. Theassalian axe (illustrated by Childe) and specimens from Kuchai, Brahmagiri and Chandoli are similar to those found at Chirand. Microliths are numerous. Microlithic tools were lunates, scrapers, cores, tanged arrow-heads, parallel-sided blades, penknife blades, points, etc. Blades formed seventy-five percent of the collection and were made by the crested guided ridge method. Chert, chalcedony, jasper, agate were the materials. Bone-tools were also used. Points, mostly polished, parallel-sided bone-tool (blade), terracotta discs were other finds. Evidence for textile industry is also present.

Neolithic people practiced agriculture, besides hunting and fishing. They lived in huts of reed plastered with mud. A hearth with three cooking positions was also discovered.

The strata should be deemed neolithic with ground tools, microliths, pottery, agriculture and textile industry. There are more affinities with the peninsular neolithic complex.

Phase A of Period II with black-and-red ware also yielded neolithic celts.

249. SOUNDARA RAJAN. K. V.

'Excavation at Nagarjunakonda, District Guntur', *IA* 1956-57, pp. 35-36.

The area to the south-west of the Nallarallabodu is the neolithic zone at Nagarjunakonda. Excavation here yielded celts and axes in all stages of manufacture. Associated finds included thin burnished grey ware-typical neolithic pottery and fragments of copper. A damaged urn burial that of a child was also brought to light. Pits contained plenty of animal bones. The culture is analogous to the chalcolithic culture of Brahmagiri, Sanganakallu and Maski.

250. SOUNDARA RAJAN, K. V.

'Studies in the Stone Age of Nagarjunakonda and its neighbourhood', *AI*, 14, 1958, pp. 49-113.

Varieties of neolithic implements in finished and unfinished stages and flakes of basaltic and other soft materials were found particularly on the highground to the south-east of the Nallarallabodu hill. This neolithic industry associated with bits of copper and is therefore chalcolithic in character.

Outstanding tool-types represented in the collection are axe, 'shoelast-hoes', wedges, adzes, picks or retouchers, chisels, hammers and miscellaneous flake-tools. Raw material was invariably trappoid or basaltic rock which is available locally. Technique of manufacture of tools is recounted.

Elongated flakes, often with secondary chipped found scattered on the surface. Heavy spherical basaltic cores with deep multiple scars are found. Description of tools from the surface collection is given.

A flourishing neolithic community with some primitive mode of agriculture here is indicated. On account of the typography, these people must have practised subsistence agriculture.

The excavation yielded as many as 27 neolithic tools of which three-fourths were recovered from the lowest horizon enriched by pottery, bones besides ashy deposits.

A part of the pit in layer 3 was lined with stones within which were seen circular pebbles ashy and charred earth in bands, many bones (largely animal) quite a few interesting pottery types, etc. Along the fringe of the pit two small fragments of copper were also found.

Of the neoliths from the excavations quite a few are patinated, creamy to frosted greenish in colour. Tools in many stages of fabrication were found. Axes, picks and chisels predominate. Noteworthy is a splayed axe, with trapezoidal section, splayed ends made on sandstone; fine long cold chisel with a neatly polished body and working edge, and blunted butt; a pointed-ended pick-drill with a semi-elliptical section and a pointed butted oval sectioned axe with polished convex cutting edge were found in layer 3.

The ceramics follow the general traits of neolithic pottery familiar to us from other neolithic sites viz., Brahmagiri and Sanganakallu. The pottery was thick, greyish or alternatively brownish in colour; occasionally with a burnished exterior. It is often coarse and handmade. Greyish and brownish wares were found in equal proportions; latter has variety of forms. Grooves on ledges, and incised herring bone patterns are the decorations.

Shapes consist of lipped pot, spouted vessels, pot with a widely flaring featureless rim and thickening downwards the neck and shoulder which is often externally ledged or ribbed and a globular body and bowl with straight sides.

Animals known and domesticated were buffalo and spotted deer.

Concluding the neolithic of Nagarjunakonda is coeval with the upper levels of Sanganakallu (II, I) and upper levels of Brahmagiri (IA-IB)

Apart from the pointed butted oval sectioned axe the typical-tool is the pick-hoe or pick chisel with twin working edge, high polish, flat, occasionally curved underside generally arched longitudinal profile. The admittedly scrappy occurrence of some copper fragments may at least tend to give the industry a chalcolithic colouring. On the evidence of occurrence of neolithic tools in negligible number in upper two layers with many pieces of iron slag, the residual neolithic culture at its last stages overlapped with a new (intrusive) culture which on the analogues of other sites is likely to be none else but the megalithic culture. Excavations should prove this.

251. SOUNDARA RAJAN, K. V.

'Community-movements in protohistoric India - An Archaeological Perspective', *JOIB*, XII, 1, 1962, pp. 69-82.

Unlike modern states the boundaries of cultural provinces are not well-defined. But in distribution of cultural equipment and sites there is a basic pattern. In this respect geography and climate played an important role. Five major cultural divisions viz., Harappan, the Painted Grey ware industry

the chalcolithic black-on-red sites of Malwa, central and western India and in the Lower Deccan the southern neolithic culture are discovered. Apart from these the black-and-red seems to be an intermediary current among these.

At some places overlap between black-on-red and the neolithic burnished grey wares are to be seen. But no such overlap exists between Harappan and the (Painted Grey Ware). The PGW and the southern neolithic did not come into direct contact with each other; thus indicating a cultural aloofness.

It is also interesting to note the movement of black-on-red traditions towards the Lower Deccan from Central India. Similarly the black-and-red from a chalcolithic stage into iron using pre-NBP (Northern Block Polished) ware stage and subsequent historical times

Again the indigenous neolithic cultures of the Lower Deccan moved towards south and north coeval with the dispersal of chalcolithic black-on-red. But in protohistoric times in the whole of the Deccan black-and-red did not coexist with the burnished grey ware.

The original inhabitants of the Lower Deccan were australoids. It is possible that the central Indian brachycephals supplanted the race of the Lower Deccan Neolithic folk with australoid ethnic affinity.

252. SOUNDARA RAJAN, K.V.

'Chronological and Cultural Aspects of the Indian Neolithic, based on Recent Data', *JIH*, XLII, 1, 1964, pp. 107-17.

The excavations at Brahmagiri, Sanganakallu, Maski, Piklihal and Nagarjunakonda revealed: (i) the intrusion of non-indigenous, though apparently friendly culture-elements of ceramics and other material equipment into what is already a reasonably well-established basal neolithic horizon and (ii) at a higher stage by an entirely new vigorous and revolutionary Iron Age milieu. Basal neolithic polished and finished stone celts, burnished grey ware (handmade and less wheel-turned) and microliths. Succeeding level saw the introduction copper or bronze-heralding chalcolithic culture-ground and polished outfit, neolithic celts alone are common feature for these two earliest stages. A clear evolution towards semi-urbanization, or at any rate, a functional economy out of what was a lithic and pastoral barbarian mode, had taken place.

The author also gives a rough correlation among Brahmagiri, Maski and Utnur as follows:

Iron Age intrusion

Br. IA	Piklihal Upper Neolithic, Maski I	Utnur IV
Br. IB	Piklihal Lower Neolithic	Utnur III
		Utnur II
		Utnur I

Recounting the problem of ashmounds the author says that since there is a basic chronological gap between the latter neolithic habitations and these earlier ashmounds the mutual occurrence of these two closeby might have been purely accidental.

The culture or industry presented by the ashmound pottery and implements would be truly the basic neolithic of the Deccan although it would be difficult to visualize the neolithic culture as substantially lacking in the typical polished celts.

Thus while on the one hand there is a relatively greater claim staked by Utnur ashmound lower levels (I-III) to being called the 'neolithic' as against those of Brahmagiri, Maski Piklihal, etc., where burnished grey ware, black-on-red ware and copper metal apart from the microliths combine to make the picture a bit more composite and developed, still the lack of occurrence of the polished tools in larger numbers in the Utnur ashmound (Lower levels) besides the very limited nature of the pottery and other necessary outfit would seem to show that the cinder mounds may after all be really speaking cinder camps, as Foote surmised, by which was implied that they would have constituted seasonal accumulations of cattle dung and droppings (disposed of by burning?) with the minimum amount of occupational vestiges as would have warranted by some pastoral people residing at or adjoining the actual stockades or deliberately accumulated dung heaps.

The absence of crested guiding ridge flake at Utnur, Sanganakallu and its presence in Brahmagiri, Maski would reinforce the antiquity of Utnur in relation to other.

If we concede that the ashmounds were habitations of an earlier basal neolithic people then the neolithic barbarian culture of south India would be as early as the mature stages of the Indus Valley civilization and would present thereby a most lucid contrast in cultural motivation. Simultaneously it would not leave much scope for justifying this neolithic culture as other than strongly autochthonous and entrenched in the lower Deccan.

As a sequel the date of the intruding Iron Age would be affected, the anterior date would be C 500 if not earlier.

A time chart detailing the progressive transmutation of the main protohistoric neolithic culture in the Lower Deccan is also given.

253. SOUNDARA RAJAN, K.V.

'The devolution of the Penninsular 'Neolithic' culture-An analysis of ceramic influence' in SINHA, B. P. (Ed.) *Potteries in Ancient India*, Patna. 1969, pp. 30-35.

Before the 3rd millennium B.C. there is no true semi-urban culture. This stage happens to be towards the close of Late Stone Age. In India there was no true metal Age-copper or its alloy. Except those of Indus copper tools others including those in chalcolithic context are imports. Only after the Indus culture some chalcolithic communities began a real hunt for metal. It is for the archaeologist to decide whether a particular assemblage is chalcolithic or neolithic. Occurrence of numerous microliths along with copper gives rise to problems. So, too when these are found in neolithic context along with painted pottery. This would suggest a synthesis of culture-traits due to evolution of neolithic agro-pastoral communities as also the migration of stone tools and painted pottery. Thus there is a process of mingling primitive functional group attempting to raise its social status and the technical industries of specialized groups trying to fuse into a self-sustaining society. On account of this the peninsular neolithic with its basaltic tools, burnished grey ware and microliths transform into a chalcolithic entity in several parts of the Deccan engulfing regional traits viz., Jorwe ware, black-and-grey, red ware, Malwa ware, etc. In further north this becomes more complicated, as in the Tapti valley, where the painted black-and-grey-ware is ousted by the Malwa ware. The cultural level prior to this can be guessed i.e., the peninsular neolithic culture was here in some form or at other with coarse burnished and plain pottery. In other words the vigorous Malwa ware intruded into the earlier base at about 1700 B.C. i.e., towards the end of the Harappa culture. This is borne out by sites in the Narmada valley, Tapti, Bhima, Godavari and Krishna basins, at T' Narsipur in the Pallar basin, etc. Everywhere it is clear that the basal matrix connected with traits of peninsular neolithic is peacefully intruded into by copper and painted pottery using cultures of various categories with less metal and more stones which some times developed into highly localized culture.

This would lead to the conclusion:

- (i) At an early stage (1800-1700 B.C.) the neolithic life was fairly wide-spread from Salem to Banda, absorbing regional traits.
- (ii) Chalcolithic wares of Jorwe, Dhaimabad and Sanganakallu are its manifestations.

(iii) Neolithic in degenerate form continued till the close of the first millennium B.C.

(iv) There is no direct link with Indus culture but the carriers of its trait had links with post-Indus group in Sind-Rajasthan and Saurashtra.

(v) Arterial waterways helped in the zonal groupings.

The two major zones of culture-spread - Indus and the neolithic agro-pastoral way of life in the whole of peninsula is discerned. The skilled workers of the former merging with the latter produced a better application of tool-technology than what happened in the PG Ware of the Ganga-Yamuna doab.

254. SOUNDARA RAJAN, K. V. et al

'Excavation at Budhitittu, District Mysore', *IA* 1968-69, p. 24.

Trial digging was carried out in the open field which revealed a degenerate neolithic culture. Thick burnished grey and brown wares were found with a few megalithic Black-and-red ware indicating the overlap phase. Head-rests were also found. Celts, however, were not found in the actual dig but were collected from surface.

255. SREENIVASACHAR, Dr P.

'Excavation at Utnoor, District Mahbubnagar', *IA* 1958-59, p. 11.

Rows of post-holes indicated the alignment of the stockade around the settlement. Original floor and subsequent rebuilding can be inferred from the remains of a flat platform. Habitational deposits inside the stockade yielded a few pot-sherds, animal bones, mostly charred, blades of chert and chalcedony. A thick irregular ash deposit below the second floor indicated a huge deposit of cow dung. Several layers of burnt material would warrant an inference of several conflagrations at the site. This is mainly a neolithic site and was abandoned during that period itself.

256. STEEL, Lieut. E. H.

'Stone celts found in the hill ranges to the S. E. of Dibrugarh', *PASB*, 1870, pp. 267-68.

The celts were all collected from the Namsang Nagas in the hill ranges to the south-east of Dibrugarh. These are described and illustrated.

257. SUBBARAO, B.

'*Stone Age Cultures of Bellary*' Being a report on the excavation at Sanganakallu, Deccan Collage Dissertation series no. 7, 1948, pp. 1-62.

The work involved the assessment of available evidence viz., typology, technique physical condition of the tools and stratigraphy. The evidence obtained has been correlated with that of Brahmagiri. The examination of evidence revealed that Sanganakallu had passed through all the phases of Brahmagiri. In addition it also revealed that Sanganakallu was a factory site. In summary the results are: (i) Top beginning of megalithic culture interlocked with a late phase of Stone Axe culture; (ii) below was found the Neolithic Axe culture with brown-and-black and pale grey pottery, polished axes and a microlithic industry of chert, jasper and quartz; and (iii) underlying after a gap, were found heavily painted flakes of trap and sandstone associated with a crude microlithic industry.

Excavation on the top of Sannarasamma hill did not yield the Andhra criss-cross painted pottery. Otherwise finds resembled those from Brahmagiri. No structures were found excepting for a loose line of stone which was perhaps a sort of retaining wall. Perhaps people lived in shelters or huts of perishable material. A few deep narrow pits (post-holes) gave no sensible plan.

In trench II three phases were observed.

Phase III was represented by highly polished red and black pure black pottery, coarse brown-and-black and burnished handmade pottery and polished stone axes and flakes.

Phase II is the highly developed pre-megalithic Stone Axe Culture. On the basis of the relative quantitative distribution of the tools, coarse pottery pale grey and brown-and-black ware dominating the Lower and upper levels respectively the microlithic facies the phase is divided into two sub-periods. Essentials of sub Period I are coarse brown and black handmade pottery, pale grey ware in diminishing proportions, rich stone axe assemblage and a weakening microlithic facies. A few sherds with violet and purple paintings on a dull background and sometimes on a dull red slip are also found.

Sub Period II characterised by fresh stone axes and flakes associated with fine microliths of chert and jasper. Pale grey ware is the main pottery though a few sherds of brown-and-black are found. Phase I is the earliest occupational period. This is separated by a barren layer. Large number

of patinated flakes of quartz and chert are found. Pottery found are very few pieces of pale grey ware which must have been subsequent intrusion. However, there is definite evidence of the association of pottery in this period.

Pre-megalithic Stone Age pottery was a crude coarse and handmade ware along with a few handmade burnished types. The clay is fine, quartz or sand served the purpose of degreasing. The pottery was a dull brown or black in colour. With this, a pale grey ware made of fine clay with lime and mica was also found. Pale grey ware was predominant in Sub Period I of Phase I. Ornamentation consisted of incised finger groove, applied bands of clay around the shoulder. Pigments used in painted ware were violet, purple and red ochre. Painted designs consisted of single, complicated lines and circles, bands with cross hatchings, criss-cross and comb designs. Burnished hand made pottery belonged to Sub Period II of phase II. In the same fabric some spouts were found. Large number of perforated sherds were found but shapes were not determinable. Perhaps this is the precursor of the polished megalithic ware. A series of rimless bowls with round (?) bottoms were found in pale grey ware and coarse brown ware.

Patinated flakes showed brown patination; tools were long, short, thick, discoid flakes. Definite types of microliths could not be determined.

Unpatinated flakes profic in Phase II, represented the waste flakes manufactured tools. The Stone Age tool types of phase II were axes, chisels, slick stones, sling stones, etc. Predominant types in microliths were parallel-sided blades blunted on one side by steep retouch, some with broken serrated edges and lunates, blunted along the arc.

Other finds were beads of steatite.

Worked bones were a cylindrical point or awl, with notch at the butt end perhaps for hafting and a bone piece ground by rubbing. Utility of these are unknown.

Discussing the correlation with surface evidence from Bellary the author fixes the lower limit of the Neolithic Culture of Bellary and its relation to the proto and early historical cultures of India.

Corelation between the two excavation on the basis of typology and physical condition of the tools is attempted. The tools are divided into Series I and II. Series I are flakes of trap and sandstone with crude microliths of Phase I. This industry lead typologically to the regular neolithic industry

viz., ground and polished tools made on fine grained materials like trap. It may also be possible that the flakes of Phase I might be a byproduct of an early neolithic industry.

The thin butted axe with a more or less pointed butt, convex cutting edge, rounded sides abruptly meeting the flat face of the axe and a flat pointed oval section might be one of the earliest forms of Bellary neolithic axes. Tools classified as Series II are the developed phase of neolithic. Types included axes, chisels, picks, fabricators, pounders, grooved hammerstones, sling stones, slick stones or polishing stones and discs. The author describes the technique of manufacture as well. The axes have been classified on the basis of their external forms and median cross section across the butt.

The text is well illustrated.

258. SUBBARAO, Bendapudi

'*The Personality of India*', M. S. University Archaeology series no. 3, 2nd edition, 1958, pp. 40, 77-84 and 150.

Last phase of Stone Age is distinguished by the occurrence of polished stone axes. That it succeeded the Late Stone Age is proved by stratigraphic evidence in the Central Deccan. Further these people using polished stone axes were widespread agricultural and pastoral communities preferring upland or hilly type of terrain.

In Central Deccan this culture has been studied well. The presence of copper and bronze in small quantities does not change the economic nature of this purely neolithic culture. This can be explained, if we understand the 'fusion with the dominant resident traits'. Scarcity of copper would have warranted the retention of heavy stone tools. The neolithic folk always lived on or near the granitoid hills with convenient rock-shelters overlooking their fields. That they avoided the schistose hills of the Dharwar system is an excellent negative evidence. Association of neolithic sites with granite and gneissic hills, dykes, is very interesting. From the occurrence of fresh and patinated tools one may conclude that this culture lasted for a long time preceding the introduction of metals in central Deccan at the beginning of the first millennium B.C.

The author has dealt with the Neolithic aspects of Killee Ghul, Mohammad, Burzahom and other tool collections from other Indian sites. He is of the opinion that at present there is lack of evidence to postulate a definite origin for the culture. Findings of worman and Dani are recounted.

Concluding the author remarks that these people domesticated cattle and cultivated fields around their hills in tropical and semi-tropical scrub jungles. Neolithic culture survived in Central Deccan till about 1000 B.C. The presence of shouldered celts, and adzes in certain parts of India is due to the penetration of Austro-Asian and proto-Australoid elements from the east. There is an opinion that these celts are adoption in stone of metal tools. Similarly some are of the same opinion regarding the Copper hoards of Gangeti Plain. It would, therefore, mean an coexistence of both cultures-Copper Age in Plains and Stone Age in uplands.

Knowledge of copper technology helped to clear the semi-tropical river valley and to drain the swamps and marshes. This led to the displacement of the earlier neolithic people. Hence we see in the forested hills of Vindhya and Chotanagpur plateau the congenes of so-called neolithic tools (Peninsular elliptical section types and the square axe type). Some of the later neolithic people like the earlier batch of hunting communities were confined to the hills with the advent of large agricultural communities in river basins. These confined unfortunates were the precursors of most of our modern tribals.

259. SUBBARAO, B

'Archaeology and Anthropology in India', *Indian Anthropology*, Essays in memory of D. N. Majumdar, Bombay 1962, pp. 105-131.

Tracing the important discoveries and researches in archaeology in the past decade in all its cultural stages - the Stone Ages, Early, Middle and Late, the Neolithic age, Copper Age etc., the author pleads for a close co-operation of anthropologists in solving archaeological problems. The anthropologist could very well help the archaeologist in the study of fossil skeletal materials in a wider sense including the recent historic communities. Study of conventional ethnology - study of the material culture of the various communities in an attempt to understand and correlate living and fossil communities is needed. Since the anthropologist uses the knowledge of ethnology of the living communities particularly of people who are historically backward and in earlier stage of civilization he is best suited. The basic concept is one of evolutionary pattern of cultural stages.

260. SUBRAHMANYAM, Dr. R.

'Excavation at Nagarjunakonda, District, Guntur,' *IA* 1957-58, pp. 5-7.

Six neolithic graves were excavated. Though the skeletons were in an extended position there was no proper articulation of bones. Towards the

feet were found pots - spouted vessels, straight sided bowls with featureless rims, both wheel turned and handmade of burnished grey ware. Comparable specimens were found in the habitation deposits also.

261. SUBRAHMANYAM, Dr. R.

'Excavation at Nagarjunakonda, District Guntur', *IA 1958-59*, pp 5-6

Excavation of another area revealed neolithic pits, roughly circular; their diameter varying from 3' 6" to 6' (1.06—1.82 m). Contents of these pits were pottery, animal bones, microliths and flake tools, stone objects and beads of paste. Post-holes near the edges of some pits would suggest the utility of these pits as a sort of shelter. In one of the pits an articulated skeleton was noticed. The area yielded a large number of neolithic stone axes, blades and flakes of crystal and bone-tools. Types of ceramic wares were the burnished grey, reddish brown and black and cream slipped wares. Shapes included the typical neolithic urn with a flaring and out-turned rim, deep bowl, shallow dish-cum-lid, sherds of spouted vessels, etc. Pottery was mostly handmade and the decorations were incised oblique lines and leaf designs and bands or ribs around the body.

262. SUBRAHMANYAM, Dr. R

'Excavation at Nagarjunakonda, District Guntur', *IA 1959-60*, p. 6.

In the neolithic sites remains of an oblong house 18x14 feet (5.48 x 4.26m.) was brought to light with two large pits (hearths?) the centre of which were found a blunt butted axe, a fabricator, fragments of animal bones, potsherds and microliths of crystal. In another pit in the vicinity two intact pots and remains of a deer were discovered.

263. SUNDRA, A.

'Exploration in District Bijipur', *IA 1957-58*, p. 39.

Neolithic tools, mostly axes made of fine grained trap were discovered at the following places: Dulakheda, Ingalgi, Jirankalgi, Indi Gugihal, Kenginal and Masali Khurd. The sites are located on the banks of Bhima or its tributaries.

264. SUNDRA, A.

'Exploration in Districts Belgaum, Bijapur and Gulbarga', *IA 1963-64* p. 23.

At Dyaganhatti and Konnur in District Belgaum neolithic-chalcolithic sites were located. At Konnur an ash-mound was also located. Grey,

blackish-grey, pinkish buff-a few micaceous and a few with incised decorations, flakes trap, parallel-sided blades of chalcedony and chert, fragments of slick stones, saddle querns of granite, etc., were collected. Finely retouched lunates, a trapeze and a small piece of black-on-red ware of the Jorwe fabric were interesting among the finds.

Harnur, Ijheri, Mandewal, Sangwar and Tadbidi are the neolithic-chalcolithic sites in District Gulbarga.

265. SUNDARA, A.

'Exploration in District Dharwar', *IA 1964-65*, p. 31.

At Hirehal grey ware, including the painted variety of the Brahmagiri fabric besides parallelsided blades, polished flakes of trap were picked up.

266. SUNDARA, A.

'Exploration in Districts Belgaum, Bellary, Bijapur, Chitradurga, Dharwar, Gulbarga and Raichur', *IA 1965-66* (Cyclostyled)

Neolithic-Chalcolithic sites yielding parallel sided blades, flakes of black trap with occasionally ground surface, black painted red ware, grey ware, etc., were found at Nesur, Saptasagara, Satti, Shegunashi in Taluk Athani; Examba, Kallolli, and Sadalaga in Taluk Chikkodi, and Haravgeri, Kudeni, Mugalkhod, Sasalhatti and Yerbrati in Taluk Raibag in District Belgaum, Bilgi, Asangi, Chimmad, Hanagandi, Hippargi, Jagdal Kalhalli, Konnur, Shirguppi, Terdal, Gugalamari, Terdal. Here Bevanur in District Bijapur, Pradkeri, in District Dharwar; Budihal, Hunsgi, in District Gulbarga, Gorkul, Karadigudda, Tavaragera in District Raichur.

A finely ground, sharp working-edged stone axe of black trap at Sttimani, potsherds of grey ware of Brahmagiri fabric together with parallel-sided blades, lunates, etc., from Shidlphadi in District Bijapur and a large fluted core of chert from Kodekal in District Gulbarga are worth noting. At Watgal district Raichur three adjacent localities yielding neolithic grey ware of Brahmagiri fabric, black painted red and plain red wares of Jorwe fabric and megalithic Black-and-red ware were noticed. These would suggest successive arrival of peoples with their wares.

267. SUNDARA, A.

'Exploration in District Dharwar', *IA 1967-68*, p. 36.

Neolithic sites yielding stone axes microliths on chert and grey ware of

the Brahmagiri fabric were found at Mannur, Menasgi, Nidagundi, Nidagundikop and Savadi.

268. SUNDARA, A

'Protohistoric sites in Bijapur District', *JKU*, Social Sciences, IV, 1968, pp. 3-23.

A few potsherds of Jorwe fabric were found in neolithic levels in sites in Karnataka. Do these represent trade contact or part of cultural movement? Besides, at Tekkalakotta, apart from Jorwe sherds black-and-red ware was found confined to burials. What is the important of this? These two problems are sought to be solved in the paper.

As many as eighty-six neolithic chalcolithic sites were discovered in the District. These sites fall into three groups, viz., (1) sites of the Lower Don valley, (2) sites of the tributaries of the Lower Bhima and (3) sites of the Bhima.

The first group has microliths of chert and grey ware pottery (Brahmagiri fabric). The second group of twenty-four sites yielded microliths on chalcedony and chert and grey ware (Brahmagiri fabric). Twenty-five sites of the third group yielded microliths of chalcedony, plain and painted Jorwe ware. Grey ware of Brahmagiri fabric is also found; its frequency diminishes along the Bhima upstream. Microliths consisted of parallel sided blades, fluted cores, retouched blades, obliquely or crescentically backed blades, serrated blades, symmetrical and asymmetrical retouched points, lunates, triangles and trapezes. Crested guiding ridge technique was unknown.

Majority of sites yielded at least one fragment of neolithic tool. However, in a few, complete ones were also found. Types were pointed butt axe, adze chisel, wedge and discoid tools. The axes were polished at working edge. Completely polished ones were rare.

Pottery from these sites consisted of grey, red and black-and-red wares. The grey wares is of the Brahmagiri fabric. Shapes were urns, vases, pots, bowls, cups, dish-on-stand, platters etc. Pre-firing paintings in purple or violet pigment and post-firing ochre paintings are also observed.

Plain and painted red ware is of chalcolithic Jorwe Ware. Carinated bowls, spouted pot, eigh necked jars, etc., were the shapes.

Painted designs were geometric. Other antiquities were sparse.

Jorwe ware is found more in Bhima valley. Krishna valley (from Kodekal) Ghataprabha and Malaprabha basins are devoid of Jorwe pottery. In the Krishna-Tungabhadra *doab* a degenerated form of Jorwe fabric is available.

Jorwe ware seems to be imported. Evidence shows migration of Jorwe people and they were not traders. Movement in Lower Bhima and Krishna-Tungabhadra appears to be along the Bhima downwards from Bijapur and shows a decline in Krishna-Tungabhadra *doab* and Tungabhadra valley.

The chalcolithic of group (i) comprised black-and-red ware also. Black-and-red of group (iii) falls into two viz., megalithic and that of fine fabric. This is black-and-grey and is not highly polished. Shapes are bowls and vases. This is akin to chalcolithic wares of Tekwada, Chandoli, etc., the chalcolithic traits along with the black-and-red is an intrusion.

269. SUNDARA, A.

'Neolithic and Megalithic sites, District Belgaum', *IA 1968-69*, p. 67

Kallur, Kithur and Maradigi yielded grey ware of Maski fabric, parallel sided blades of chert and Black-and-red- ware pottery.

270. SUNDARA, A.

'Exploration in District Dharwar', *IA 1968-69*, p. 23.

Several neolithic-megalithic sites on the Malaprabha and its tributary Bannihalla and Javlahalla were discovered. Sites yielding grey ware of Maski fabric, pieces of stone axes, parallel-sided blades and fluted cores are: Arashangodi, Bhairanahatti, Halgop, Kurgovin Kop, Lingadhhal and Shirol. Lime encrusted animal bones were also occasionally found.

271. SUNDARA, A.

'Neolithic and Megalithic sites, District Raichur', *IA 1968-69*, p. 68.

At Kopbal grey ware of Maski fabric and Black-and-red ware besides parallel-sided blades of chert were found while Malkhed yielded a few pieces of polished stone axes and grey ware.

272. SUNDARA, A.

'Rock-shelters Hire-Benkhal, District Raichur', *IA 1968-69* p. 68.

- In rock-shelter no. 2, a fluted core of chert and a grey ware sherd of a platter bearing painting in red ochre on the rim were found. Sherds of grey ware and Black-and-red ware were also found in rock-shelter no. 6.

273. SUNDARA, A.

'Neolithic Cultural Patterns and Movements in North Mysore State', *JKU Social Sciences*, VI, 1970, pp. 1-13 and *Ibid.* VII, 1971, pp. 1-8 (Both issued separately).

Explorations and excavations in the region have made it possible to assess the neolithic cultural patterns and movements based on painted pottery and lithic equipment. Accumulated evidence shows that a painted pottery tradition affiliated with local culture was present from the beginning of the neolithic culture. The author had discovered 33 sites in the upper Krishna, 94 in lower Krishna-Bhima-Don and 15 in Ghataprabha-Malaprabha valleys. These fall into three groups viz., (i) sites in upper Krishna, (ii) sites in Tungabhadra and (iii) Sites on Bhima and Don.

Summarising the results of the data the author observes:

- (1) Three cultural movements with distinct features from three separate sources could be discerned in the region.
- (2) The first strain is characterised by exuberant painted pottery and copper. From Upper Krishna it moved along the river to Ghataprabha and Malaprabha valley, then to Bhima-Krishna-Tungabhadra *doab*; the last being the peripheral region. Upper Tungabhadra was the least affected area. These people introduced copper and the movement took place between c. 2300-2000 B.C.
- (3) Another strain is represented by the 'Savalda' ware; it is found limited to the Upper Krishna basin only.
- (4) The third movement is evidenced in the Tungabhadra valley. This is distinguished by a grey ware pottery, parallel sided blades and copper similar to the lower-Krishna-Pennar-Palar valley. This is datable to 1900-1700 B.C. and seems to have developed among the Late Stone Age local populace coming into contact with chalcolithic of Upper Krishna. This strain superimposed itself on the existing culture in the Upper Krishna Tungabhadra-Krishna *doab* resulting in a mixed strain as seen at, Brahmagiri Tekkalakota, Piklihal, etc.

A later intrusion into the hybrid neolithic culture is represented by the Jorwe ware from Godavari valley. This travelled along the Bhima between 1300-1000 B. C. and survived in a degenerate form in the Krishna-Tungabhadra *doab*. At this time Iron Age emerged and wiped out the neolithic culture.

274. SUNDARA, A.

'New Discoveries of Ash-Mounds in North Karnataka: Their Implications', *Professor K. A. Nilakanta Sastri Felicitation Volume*, 1971, Madras, 308-14.

Several aspects of the ash-mounds are reviewed. More than a dozen new sites were discovered in the region. Of these fourteen sites, eleven are in the Upper and Lower Krishna valleys, two in the Lower Tungabhadra and one near the left bank of the Ghataprabha. In all these sites vestiges of chalcolithic culture viz., grey ware plain and painted variety, microliths, neoliths - polished pointed butt ended stone axes, etc., were noticed.

In the Upper Krishna valley plain and painted red, a grey ware different from the Maski fabric but comparable with those found at Savalda and occasional Black-and-red of the Iron Age were found. It is noteworthy that the ash-mounds were found to overlie immediately the neolithic-chalcolithic deposits.

No ash-mounds was, however, found in the Upper Tungabhadra from Kundadri up to Hospet, in the Malaprabha, Upper Ghataprabha upto Konnur, and the Bhima up to Shahpur. Thus in space the ash-mounds are distributed mainly along the Krishna valley and the spread is along the valley of the same river towards the *doab*.

Four neolithic cultural strains moved towards the Krishna-Tungabhadra *doab*. They are:

(i) Earliest and most extensive (2200 B.C.) with grey ware of Mask fabric;

(ii) the first stimulating the Late Stone Age people of Palar-Pennar and Kaveri (T'Narasipur) to neolithic economy as seen at Paiyampalli, Nagarjunakonda, Singana-palli, Hallur and Brahmagiri (1900 B.C.);

(iii) represented by the Savalda pottery in the Upper Krishna later to (i) in time; and

(iv) represented by the painted and plain pottery of Jorwe fabric spreading from the Godavari region towards the Krishna Tungabhadra *doab* (1100-800 B.C.)

Of the 250 sites only 35 yielded ash-mounds. In the chalcolithic sites with Jorwe ware ash-mounds are not known.

At Kudichi, the ash-mound overlies the chalcolithic in which the chalcolithic pottery is sparse.

At Terdal no trace of slaggy ash was noticed in the lowest three layers.

At Wandalli and Kudatini neolithic grey ware was found in a restricted area and in limited quantity indicating the later formation of ash-mound over the pre-existing habitational debris.

At Kodikal lowest part yielded neolithic vestiges. Very few antiquities were found in the ash-mound proper Site III. But elsewhere in Site I, some were found in the lowest layers. The C-14 date of this level (layer II) can not be assigned to the ashmound as well for the occurrence of grey ware in the ashmound is purely accidental.

Several hypotheses of various writers regarding the origin of the ash-mounds are restarted.

The Savalda ware and pottery from the passage tombs have common factors and the occurrence of neolithic pottery might be of the overlap phase. The authors of the ash-mounds were either the people using the painted pottery very much similar to Savalda ware or the passage-tomb people.

275. SUNDRA, A.

'Chalcolithic Phase of the Upper Krishna Valley', *Studies in Indian History and Culture*, Professor P. B. Desai Felicitation Volume, Dharwar, pp. 13-30.

Through extensive exploration of the valley the neolithic cultural phase in North Karnataka its characteristics, chronology, contacts and correlations with other cultures have been brought to light. The paper deals with the importance of the chalcolithic sites discovered by the author between 1964-67. Thirty-eight new sites were discovered. General features of the sites are as follows:

- (i) Sites are in plain ground near/on the banks to the Krishna or its tributaries, and are distinguished by the ashy surface colouring;
- (ii) These are concentrated and are usually extensive;
- (iii) Almost all of them are single-culture sites.

Besides in many shells of gastropods and pelecypods are found. Ash mounds were seen in thirteen sites.

Finds from the explorations are:

(1) Microliths, comprising fragments and flakes of chert and chalcedony, fluted cores including crested guiding ridged ones, parallel-sided blades, blades with single and double retouch, backed blades, crescentically or obliquely retouched blades, serrated edged blades, points, triangles, lunates, etc. These were locally manufactured.

(2) Neoliths were rare finds. Fragments of a pointed butted axe from Satti and one small axe from Terdal were the finds. A neolith from Saptasagara has been reported earlier. Besides two polished stone axes were also found at Lohakur near Shedbal.

(3) Plain and painted pottery were found. These can be classed into (i) Maski fabric, (ii) greyish buff pottery, (iii) Savlada fabric and (iv) black slipped wares.

A brief description of the wares and shapes in them are given. The rare fish motif design in Maski fabric is due to Savalda influence. Pre-firing white painting in this fabric has not been reported from any other sites, excepting at Prakash and a few in Tapti valley in other fabrics. The same is the case with pinkish ochre pigment. One vessel bore a graffiti similar to one of the Indus scripts.

In greyish buff fabric the shapes are similar to those in Maski fabric. Painted and incised designs are absent in this.

Paintings in the Savalda ware in violet are both geometric and naturalistic. Bichrome paintings are also noticed; the pigments being black and red. In the grey ware the pigments used are jet black, white or brown; the designs are essentially geometric. White painted red ware - the bichrome grey wares have no parallels in the Tapti valley.

Black slipped ware is found in limited quantities. Painted designs in red pigment are star, horizontal and vertical lines. This ware is found at the earliest levels of Kayatha.

An account of the excavations at Terdal is incorporated. Habitational debris is 65 cm. divisible into three strata. Layer I yielded flakes and fragments of chalcedony fluted cores, parallel sided blades, two flakes of polished neoliths, grey ware of the Maski fabric red and grey wares of the Savalda fabric.

Layer 2 contained flakes of chalcedony, broken parallel-sided blades and red ware of the Savalda fabric.

Layer 3 yielded two pieces of chalcedony, grey ware sherds of Maski fabric, black-on-red painted sherds, one red ochre painted red sherd, white-on-grey and red ware of Savalda including red-on-black ware.

Layer 4 is natural, the upper portion of which contained flakes of chalcedony, parallel-sided blades, diminutive sherds of Maski grey ware.

Besides, animal bones charcoal from layers 2 and 3 were collected.

Antiquities were as follows: stumps of burnt wooden posts indicative of structural activities; microliths comprising fluted core of chalcedony with crested guiding ridge and prepared platform, parallel-sided retouched blades and neoliths.

No burials were found. But 2 km. east-north-east of the site in the midst of megalithic burials a neolithic interment was found.

Here the pottery of the Maski fabric can be dated to c. 2200 - 2000 B.C. which is corroborated by Kayatha dating as also of Kodekal. C 14 datings for Terdal are 3615 ± 120 (3720 ± 120) B.P. and 3885 ± 100 B.P. for layers 3 and 2 respectively. Megalithic culture is dated to 800-700 B.C. Upper limit for chalcolithic cultures is between 1200-1000 B.C.

Observations of the author may be summed up as follows :

- (i) The valley is rich in chalcolithic remains.
- (ii) But for the buff ware and Savalda ware the ceramics are similar to Maski, Brahmagiri IA, and Piklihal, Lower Neolithic.
- (iii) From here the chalcolithic culture dispersed along the Krishna into Raichur *Doab* and further east.
- (iv) One or more intrusions are noticed.
- (v) Savalda ware culture is better represented in this valley.
- (vi) Impact from regions of Baluchistan and the Indus Valley in successive waves can be discerned in the materials of valley.
- (vii) The chalcolithic people had contact with the people of the coastal region.

A note on the animal remains from Terdal excavation by K. R. Alur is an useful appendix.

The animals belong to the pastoral culture. Chopping marks on the animal bones are indicative of food habits.

276. THAPAR, B. K.

'Maski 1954: A Chalcolithic site of the southern Deccan', *AI*, 13, 1957, pp. 4-142.

Location and geology of the site are given. Only one cutting MSK-10 revealed complete evidence of successive occupation. The sequence is divided into four periods numbering I to IV from bottom upwards. They are I, Chalcolithic culture to a height of 3' (91 cm.) above natural soil; II, Megalithic culture to a maximum height of 5' 6" (1.67m.) with an overlap into the following; III, Early historical 4' to 4½' (122 cm to 137 cm). high overlapping into the next; and IV, Medieval period

IV. Medieval period

The main characteristics of the cultures are given. Dealing with the chalcolithic culture the author remarks that microliths along with a sporadic spread of copper was available throughout the period. No neoliths were obtained from the stratified digs and the four illustrated though assignable to this period was from surface. The presence of copper in a limited quantity (only one rod of doubtful use) in the middle levels is an essentially stone using culture would mean a slow infiltration of metal in an essentially neolithic culture. No iron was found. The cultural assemblage consisting of microliths, beads, pottery, terracotta objects, etc., and animal remains are also dealt with.

There is no data available to warrant a chronological change in three cultures from that already established at Brahmagiri. On corroborative evidence, based on contacts between western and peninsular India the chalcolithic period may be assigned to early first millennium B.C. to 400 B.C. The author also enumerates the affinities of Maski chalcolithic culture with other chalcolithic cultures. On mere speculative grounds the painted pottery of Brahmagiri IA may be equated to Maski I, though not remarkably similar to some Indus Pottery may, nevertheless, show some affinities with Harappa culture through some unidentified stages. To prove this more data is needed.

Dealing with the polished stone axes the author says that they are extremely sparse and are confined to rock-shelters. Although reported in earlier digs the author did not find any in the present digs. All the axes are of the pointed butt end variety with lenticular or ovoid section. Material is dolerite.

Plates and text figures illustrate the report.

277. THAPAR, B. K.

'Excavation at Kuchai, District Mayurbhanj', *IA* 1961-62, p. 36.

The excavation was undertaken with a view to investigate the eastern neolithic culture. The site is located at about 8 km. to the north of Baripada along the National Highway to Keonjhar. The digging was encountered. The stratigraphic sequence revealed an upper clayey deposit about 40-45 cm. thick yielding neolithic tools, associated with a coarse grit tempered red ware pottery, sometimes slipped. Decorations were found were either incised or finger tip designs. The implements were all of the butt ended variety. Though shouldered adze was reported from surface earlier the digs never yielded any; from the succeeding layer of gravel mixed with greyish and loose laterite were recovered microliths - blades, points, lunates scrapers essentially of the non-geometric types. No pottery was found in this layer.

The exact age, environmental conditions of the microlithic industry the time-gap between the microlithic and neolithic industries are problems yet to be solved. The importance of the excavations lies in the finding in stratified sequence of neoliths in association with pottery and a preceding microlithic culture hitherto unrecorded in this region.

278. THAPAR, B. K.

'Neolithic Problem in India' in Misra, V. N. and MATE, M. S. (ed.) *Indian Prehistory: 1964*, Poona, 1965, pp. 87-112.

The food-gathering and hunting economy was succeeded by intentional food producing economy i.e. neolithic. This represents a stage of economic and technological development. Ground tools, pottery making are other traits. Pottery is not an essential pre-requisite.

As a back drop, emergence of neolithic culture in the ancient Orient is given.

In India three neolithic zones viz., northern, southern and eastern, have recognized. A fourth one for the Deccan trap area is also suggested but as there is no sharp different between the chalcolithic and the neolithic here it is left out of consideration.

The cultural milieu of Burzahom (northern neolithic) is recounted. Its southward extension towards the Beas valley is yet to be determined. Radiocarbon date for this culture is first quarter of the second millennium B.C.

The traits of the southern neolithic culture as gleaned from the excavations of several sites are recapitulated. The economy was pastoral, i.e., domestication of cattle as suggested by the evidence of the cattle pens. Carbon-14 dates range between 2000 B.C. and 650 B.C.

Results of excavations at Daojali Hading and Kuchai give an idea of the Eastern neolithic culture. But from the available evidence it is difficult to determine the economy of this culture in Orissa. Stone axes would indicate clearance of forest for cultivation, while pounders, etc., are indicative of husbandary.

The pottery of this culture at Daojali Hading showed basket and cord impressions. There was evidence of metal. The neolithic assemblage is similar to that of Kuchai. The ceramic contents were different in each region. Does it indicate independent diffusionary impulses in each region? As a corollary should the neolithic here be grouped into two regions-Assam and Bengal, Bihar and Orissa?

Circa 1000 B.C. is the tentative date for this culture.

Several scholars commented on this paper and they are as follows :

V. N. Misra

The northern neolithic culture has unique assemblage and is different from other regions. The presence of harvester shows diffusion from East. Since there is no evidence for an antecedent stage in this region, and, therefore, only diffusion is possible. The date of Burzahom neolithic is consistent with that of China and Japan and the harvester must have reached Burzahom before the Shang Period.

The southern neolithic is autochthonous. Evidence for husbandary and stock raising is lacking in the Eastern neolithic culture. Due to lack of proper field work beginning of the neolithic farming economy is ill-defined.

The evidence at Langnaj with grinding stones, mace-heads and pottery would indicate a possible change from 'terminal era of food collection to the incipient era of cultivation'. The role of ecological factors in this remains to be seen. Further 'natural habitat zone of potentially domesticable plants and animals' within our borders will have to be found out.

D. P. Agrawal

It is not clear whether the term neolithic is used in the economic sense or

technological. In western Asia it is an economic phase. In India Thapar considers the ground tool as the main trait, and hence technology becomes the deciding factor. But certain sites excluded on this basis cannot be overlooked. Only actual archaeological evidence will provide clues to the change from food gathering to food producing stage and not the study of environment. The quest for 'natural habitat zones of potentially domesticable plants and animals' within our borders will be chasing the mirage.

A. Ghosh

Omission of the chalcolithic culture of Central India and Deccan from the purview of this paper is justified. The chalcolithic culture is prosperous than the neolithic. The growing specialization, highly sophisticated pottery, spun silk and cotton presuppose specialized craftsmen dependent for subsistence on the surplus food production by the society. In Indian context the pure neolithic, the chalcolithic and the Iron Ages are the various stages of food production. Hence advent of metal played a role of definite advancement of economy and the essential presence of craftsman. Further on chronological, technological and economic considerations the chalcolithic does not belong to the pure neolithic and hence has to be treated separately.

Banerjee

The term chalcolithic is illogical. Even a single copper tool is sufficient to designate the culture as Copper Age.

Lal

Till profuse use of copper together with the knowledge of metallurgy is attested a culture should not be labelled 'chalcolithic'.

A culture which is not linked to a nearby known neolithic culture in time and space must have developed in the region itself although the basic traits might/should have been borrowed from a nuclear area. In this sense the southern neolithic is indigenous.

M.S. Nagaraja Rao

He does not agree with Misra in that economy and not technology is the diagnostic trait. Sparse use of metal with microliths and polished stone axes combined with semi-urban life together with agriculture, etc., form the transitional phase from neolithic barbarism to urbanization. The question of including shouldered celt in the neolithic-complex should be reconsidered.

H.D. Sankalia

Exploration should be conducted in potential neolithic area of southern Deccan to find out whether domesticable plants and animals existed there or not.

Soundara Rajan

If a metal-free neolithic culture existed, a site should be found out showing the evolution of the level of economy and technology.

S.P. Gupta, Mohapatra and others also commented.

Replying to the comments Thapar observed that 'It was the cumulative effect of more settled life or the need for a permanent settlement that systematic grinding for the wood dressing tools like axes, adzes, chisels or for ploughing hoes began in the early neolithic'.

Which came first-agriculture or domestication of animals is yet to be decided. Like animals, domestication of plants also passed through several stages before domestication.

Both economy and technology are considered in defining the neolithic culture.

Presence of metal tools in an essentially neolithic assemblage would suggest diffusion through trade if not by propagation by metallurgical technology. Neolithic traits are directly related to the geography of the area. Under given circumstances there can be many nuclear zones for the domestication of animals. Though pottery is not an essential trait yet its use implies from the economic sense a stage approaching primary settlement.

279. THEOBALD, W.

'Celts from Bundelkund' *JASB* Proceedings, XXXII, 1862, pp. 323-327,

The author explored the region previously traversed by Le Mesurier and found celts, hammers, etc. The find spots are Powari, Kari, Debrughat and Sibdilla in Bihar. He feels that there is little evidence for saying that these implements were used with handles. Most of the celts were being worshipped as 'Mahadeo'. Material seems to be a sort of green stone, schistose rock and limestone.

280. VENKATARAMAYYA, M.

'Neolithic and early historical site, Kambaduru, District Anantapur', *IA* 1962-63, p. 65.

Around the fringes of the Durgamkonda hill, polished stone axes and ceramics of the early historical period were found.

281. VENKATARAMAYYA, M.

‘Neolithic and early historical site, Chilamakuru, District Cuddapah’, *IA 1962-63*, p. 65.

Besides other things, a stone mace-head was picked up from this site,

282. VERMA, B. S.

‘Excavation at Chirand, District Saran’, *IA 1962-63*, p. 6.

Among other antiquities recovered from Period III (c. 100 B.C. - 250 A.D.) in this site was a neolithic celt.

283. VERMA, B. S.

‘Exploration at Chirand, District Saran’, *IA 1964-65*, pp. 6-7.

This, third season’s work confirmed the findings of the earlier season’s findings adding new dimensions.

In order to find out the nature and extent of the chalcolithic culture trenches numbering nine were laid in different parts of the mound. In the earliest sub-Period IA houses were of perishable materials with plastered walls of reddish rammed earth and reeds and bamboos. Floors were of burnt earth. Two circular ash pits near a floor yielded sherds of black-and-red and associated red and black wares, bones of birds and fish, charcoal microliths including cores and flakes. Painted pottery was absent. Other finds were copper objects, microliths, beads of terracotta and stones, ivory, bone arrow heads and styluses.

284. VERMA, B. S.

‘Excavation at Chirand, District Saran’, *IA, 1968-69*, pp. 5-6.

In sub Period IA, the levels earliest revealed a circular hearth and post holes. New shapes in pottery viz., bowls with elongated lip in black-and-red and plain red wares, *lotas* in black-and-red and black slipped wares are noteworthy. Microliths, cores and flakes, bone arrow-heads and pins, terracotta incised beads, stone balls, etc., were the other antiquities. At the top level, a doubtful post-cermentation burial was found. While scraping

the top surface of this burial a neolithic axe, two tiny steatite discs beads one copper bead, microliths, bone arrow-heads and pins were found.

285. VERMA, B. S.

'Excavations at Chirand: New Light on the Indian Neolithic Culture-Complex', *Puratattva*, 4, V. D. Krishnaswami Commemoration Volume, 1970-71, pp. 19-23.

Full fledged neolithic culture was noticed in the Gangetic valley at Chirand for the first time with a deposit of 3.5 m. in thickness.

Bone tools and decorated pots from this level form quite an impressive repertoire.

Bone implements consisted of various types of celts scrapers, chisels, hammers, needles, points, borers, awls, digging implements, shaft straightener, pins, styli and arrow-heads, both tanged and socketed varieties. These are different from the Burzahom assemblage.

Bone ornaments comprised pendants, ear-rings, bangles discs and combs. Interesting is a pendant in the form of an axe. Tortoise shell and ivory were used in the manufacture of bangles. A reel-shaped object with perforated decoration is an interesting specimen. Among stone tools may be mentioned celts, hammers, pestles, balls, etc. Materials were quartzite basalt and granite.

Microliths were an integral part of the assemblage. Types were parallel sided blades, scrapers, arrow-heads, serrated points, notched blades, points, lunates, borers, etc. A few geometric forms were also noticed. Materials were chert, chalcedony agate, jasper, etc. Microliths were locally made. Crested guided ridge technique was not known.

Long tubular, long-barrel, short-barrel, cylindrical, triangular, disc-shaped beads of semi-precious stones, marble steatite and faience were also available.

Terracotta objects included humped bull, birds, *naga* (one of the coiled variety), bangles, beads, puncture-decorated objects, a pipe-sort of object, wheeled objects, discs with central hole, balls, etc. Two incised and puncture-decorated tablets one of which had an applied boss for pinning were interesting.

Many burnt clay pieces seemingly similar to terracotta cakes at Kalibangan were also found.

Pottery was mainly handmade though a few turned on slow wheel were also available. Most of the pottery is red ware, grey black, and black, black-and-red Wares were also found. The black-and-red ware shapes are different from the chalcolithic black-and-red ware forms. Fine lustrous burnishing was noticed on many pots. Shapes were spouted vase, bowl, lipped bowl, perforated bowl, footed bowl, oval bowl with broad lip, bowl with stand, footed cup, channel spouted vessel, miniature pot, spoon or ladle, etc. Applied decoration on the neck portion was a common feature. Graffiti marks were also found. On one mat impression was noticed.

Interesting is the post firing painting in red ochre on grey ware and rarely on red and black-and-red wares. Designs were criss-cross, concentric semi-circles, way lines, dots, etc.

Structural vestiges were floors below the ground level in earlier levels and above ground in latter levels. Walls of later levels were of reed plastered over with mud. Circular floors belong to late levels. A semi-circular hut had several oblong ovens.

From the presence of husk it may be concluded that rice was known. Charred rice, *masoor*, barley were also noticed. Bones of animals testified to the food habits. Main occupation seems to be fishing and hunting. Animals known were elephant, rhino, buffalo, ox, stag and deer.

The neolithic chirand was an advanced culture without the knowledge of metal.

C-14 dated range from 1900 to 1300 B.C.

286. WALSH, E.H.C.

'A Note on Stone Implements in the Darjeeling District', *JASB*, LXXIII, pt. III, 1904, pp. 20-24.

Stone implements are mostly found in the Kalimpong sub-division (District Darjeeling) east of the Teesta River and on the slopes of the hills on the western bank of the same river. In other areas they are rare. The popular types are axes, and chisels. A hammer-head of light greenish granite resembling a dumb bell (ground hammer) was also picked up.

287. WHEELAR, R. E. M.

'Brahmagiri and Chandravalli 1947: Megalithic and other Cultures in the Chitaldrug District, Mysore State', *AI*, 4, 1948, pp. 181-310.

The earliest culture at Brahmagiri is known as Stone Axe Culture (Chalcolithic in character) with a maximum deposit of 9' (2.74m.) over the natural soil. It is subdivided into IA and IB, earlier and later phases respectively.

The three cultures here numbered I to III overlap into each other, representing a continuous occupation at the site and, therefore, a chronological interrelation could be established here. The Stone Axe Culture has been dated from the early first millennium B.C. to the beginning of 2nd century B.C. with a tendency to gradual disappearance after an overlap in the succeeding Megalithic Culture.

The Stone Axe Culture is distinguished by the presence of polished pointed butt axes in trap associated with crude microliths of jasper, flint, agate, common opal, and rock crystal. Specialized types are trapeze, triangle, crescents were absent.

A copper chisel in the middle of the accumulation and two small rods of copper and bronze from the lower strata would bear evidence for the knowledge of these metals. This metal was, however, rare. Pottery was invariably handmade, mostly of a coarse grey fabric. Common shapes prevalent throughout was a globular vessel of unvarying type. However, in sub-phase IA painted and incised sherds were available. No shapes could be made out of these. These were absent in IB. An intervening weathered layer separated IA and IB.

Burials of this culture were of two classes. Infant burials were numerous. They were interred in large roughly made uniform urns, the body being folded up into close compass and put into the urns. Two other inhumations were in extended fashion. One was fully exposed. The head was towards east with two earthen bowls near the upper skull. Such vessels are found in Luristan graves as well. No house plans were available. From the post-holes we may infer that houses were of timber, occasionally with basic lines or low walls of rubble. Some of the structures were rectangular.

Pottery is handmade, of coarse fabric, sometimes with thin slip. In higher levels some sherds are polished. Common shape is a round bottomed vessel with plain slightly everted rim. The earlier culture is somewhat elaborate than the later. The painted and incised pottery are exclusive to sub phase IA. Painted sherds have a red of buff slip. Red slipped ones are burnished and seem to have been salt glazed. Buff slipped ones are not. Paintings were executed after firing. Pigment was ochre, mostly with a brownish

purple in colour. Painted design consisted of simple curved lines and highly conventionalized plant pattern. Incised decoration were herring-bone and criss-cross patterns.

Burial urns of phase IB urns were hand-made and indifferently fired, grey in colour, coarse fabric and micaceous in texture with a globular body, wide mouth, flared rim and rounded base and sufficient in size for interment of infants in a huddled position. No evidence for a postulation of fragmentary burial was available. A small copper rod (pin) was found in an urn. Urns were covered with bowl placed upright or inverted or with broken lower half of an urn.

Forty-four polished stone axes including broken ones were recovered from the excavations; all were of the pointed butt type made out of trap rock. The presence of flakes in this material would warrant a postulation of local manufacture. The process involved are :

1. rough chipping of the stone in shape by stone hammer;
2. removing of irregularities and chipping the edges by pecking through a pointed stone; and
3. polishing particularly the cutting edge by grinding on stone, possibly by use of abrasive like sand.

Majority of implements are from lower levels of IB culture and fall into (i) flat or flattened lenticular sectioned and (ii) lenticular of ovoid sectioned. The first is available in lower levels but the second is found through out.

A solitary example of a polished stone adze was also found in Late Phase IB.

The material of microliths were jasper, agate, carnelian, flint, common opal and rock crystal. Retouching was rare. Types included double edged blades, blades with battered back, crescentic blade, narrow leaf-like blade with points at both ends and battered back points with curved back, battered back, triangular blades, serrated edge, retouched points, oblique points, graver or burin double shouldered points, beaked graver, chisel ended blade, side scrapers, etc. Use of microliths was an essential factor with Stone Axe Culture. Double edged blades with retouch was common.

Other objects included saddle querns, spheroid balls, beads of magnesite, shell, terracotta, agate carnelian, jasper and steatite; unbaked animal figurines, pottery discs, etc.

Useful appendices include distribution of pointed butt polished stone axes in India and distribution of microlithic industry in India.

Photographs, maps and drawings illustrate the text.

288. WHEELER, R. E. M.

Early India and Pakistan, Chapter IV, More Stones, London, Bombay, 1959, pp. 83-92.

The axes belong essentially to eastern and southern India, but are absent from the extreme south and Ceylon. They have been classified into four groups on the basis of shape. Technique of manufacture is also incorporated. Sequence of Brahmagiri and Sanganakallu are recounted. Other evidence supports the active survival of pointed butt or comparable axes into the later half of the first millennium B.C. Terminal date is 3rd century B.C. At the other limit of the time scale there is no proof that these axes preceded the Copper or Bronze Age. This negative evidence is difficult to establish. At best metal was scarce. Short of proof it is likely that most of the polished pointed butt and similar stone axes of India were made between 1000 B.C. and 200 B.C. with a preference for the latter half of the period.

The tanged and shouldered hoe or adze, a well known type in Eastern India is found as far as the lower Godavari. Giving a distributional detail of this he says that the eastern bias of the type is clear enough. Tracing the provenance of this type beyond India the author feels that the evidence as a whole points to a Chinese parentage for the shouldered hoe with its origin, perhaps in the earlier half of the first millennium B.C. and a southerly trend through Chinese lowlands to Laos, and Burma. When it arrived in India is unknown. Verification of Tonking evidence might perhaps prove helpful. Linguistic association of this type is a mere guess work.

The essentially east Indian types are not derived directly from Western Asia. The patchy state of present knowledge and the lack of evidence for positive dating is a hurdle towards any close correlation between the Chinese and the Indian evidence. But a route along the Yangtze river past Szechwan towards Hunnan and the Burmese passes seem possible for the axes. This cannot be stipulated for the shouldered hoes which are absent from Yunnan. Alternatively coastal routes to Indo-China would perhaps give access to Burma and Assam and Bengal. There is evidence to suggest, an eastern dispersal for the Indian series with a bias in favour of Central China.

The implication of these stone axe phase upon man or landscape is not known.

Discussing the way of life the author observes it was a food producing population practicing limited agriculture based on jungle clearance within the range of nuclear settlements. The evidence of cinder mounds would suggest that they were committed to rudimentary agriculture.

Summarising he states that in Central India stone axes superimposed upon or commingled with a microlithic flake industry people to whom the axe was an useful tool. Knowledge of bronze was the contribution of the chalcolithic people. The usherers of stone axes entered were truly in the neolithic stage.

289. WOOD-MASON, J.

'Note on some objects from a Neolithic Settlement recently discovered by Mr. W. H. P. Driver at Ranchi in the Chota Nagpur District', *JASB*, LVII, part II. 1888, pp. 387-96.

The objects were polishers, perforated stones, (ringstone) celts (polished and edge ground). The materials were olive green-grey uncutous clayed stone, actinolite schist and black trap. Besides these tools a few arrowheads and flakes of chert and chalcedony were also found. A brief description of the implements is given.

290. WOOD-MASON, J.

'Notice of a Neolithic Celt from Jashpur in Chota Nagpur District', *JASB*, LVIII Part II, 1889, p. 254.

Describing the implements the author says that 'It is a rather narrow double-edge celt with one face nearly level longitudinally and but slightly convex transversely the other face longitudinally rather more strongly arched than the broader of the cutting edges, and the two sides plane; and when viewed from either side somewhat resemble a strong bow in outline'. The material is weathered to a pale clay-brown colour and the rock appears to be trap.

291. WORMAN Jr. Eugene, C.

'The "Neolithic" problem in the prehistory of India', *Journal of the Washington Academy of Sciences*, 39, 6, 1949, pp. 181-201.

The paper is the result of the study of neolithic objects in the Indian Museums and other literature. Traits of neolithic culture are: (i) intentional

food producing as against food gathering as a means of subsistence i.e., agriculture/domestication of animals or both; (ii) pottery (iii) and smoothed tools. These by themselves do not form the criteria. Absence of metal is another trait. Since majority of the evidence is in the form of tools the author has confined himself to its study.

The neolithic tools are found in Assam, Bengal in eastern, central and southern India; i.e. south of the Ganges plain and north of Pudukkottai and east of line drawn from Lucknow or Kanpur to Goa.

As to the origin and technique of these celts they appear to have been derived from the Far East rather than from Middle East. In their manufacture two basic techniques are observed. The first involved chipping and smoothening, sometimes with pecking in between the two. In this method the transverse section of the tool was ovoid, lens-shaped, trapezoidal or triangular. The second technique consisted only of chipping and smoothening. Transverse section of tools in this technique was roughly rectangular. Smoothening in this covered more than half of the tool surface and a highly shiny polish was seen over most of the surface while in tools of the first technique smoothening was confined mainly along the cutting edge.

There are 12 sub division of axe, adze in India based on shape, cross section and technique of manufacture.

Celt types 1 to 4 are by the first technique and form a second group by themselves. Types 5 to 8 also form a second group. Implements are either completely pecked or smoothed and the technique here is not determinable. Types 9 to 12 forming another group being manufactured by the second technique.

The types are described and illustrated. Type 1 is found sporadically in east and south India; type 2 is common throughout the north, east, central and south but never in north India; type 4 is mainly in the south and rarely in the east and central India; type 5 is from east India and occasionally found in central India also; type 6 is found in the east, central and south but mainly from the east; type 7 is usually in the east and sparsely in the central and south India; type 8 entirely confined to east India but rarely near the Godavari; type 9 occurs exclusively in east India; type 10 is also limited to east India; type 11 occurs in Orissa; and type 12 is confined to eastern India.

Of these three groups the first is oldest and form the basic types in India; second group is intermediary and the third latest. However, there is no archaeological corroboration for this conclusion.

Indian tools are compared with those in other countries.

THE MIDDLE EAST:

Evidence for comparison is fragmentary and scanty. Comparison is to be made on the basis of typology and distribution in disregard to chronology. In Palestine most of the celts of neolithic and Bronze Ages are chipped and slightly smoothed along the cutting edge. Other tools are carefully fashioned and completely smoothed and appear to have made by first technique. Twentyfive per cent are of type 9 and 10 and are made by technique 2. Types 4, 5, 8, 11 and 12 are absent.

In southern Iran where lowest levels have yielded metals stone celts are better made. Tools are smooth finished, and are angular in form. Variety of shapes are present. Between fifty to sixty-three per cent are similar to Indian types 1, 2, 3, 6 and 7. Thirty-three to fifty per cent are similar to types 9, 10 and 11. Celts from the west are similar to those of Indian technique 1 and those from east one of technique 2.

Summing up earliest neolithic sites in the Middle East are located in the north and west of the Tigris-Euphrates basin; most ancient sites closer to Indian are very late neolithic or of metal age. There is no evidence that the celts in India came from west.

Types 2, 3, 6, 7, 9 and 10 found all over the world bear close resemblance. Shouldered type 8, 4 and 12 are absent in the Middle East. Painted pottery found in association with celts in the Middle East is not available east of Indus in India.

INDIA AND FAR EAST:

Assam and Burma: Type 1-3, 5-8 and 9 are found in Assam and 1-3, 6-8 and 9 in Burma; 4, 11 and 12 are not found.

Siam: This region is *terra incongnita*. Types 8 and 9 are found. Stratigraphy and implement-types from surface and excavated sites resemble those from Indo-China and Burma.

Indo-China: Industries of Hoabinhian, Basconian and Somrongsen cultures are described and their co-relation is also given. Mid-Hoabinhian and Early Basconian culture have Indian types 1 and 2. Late Hoabinhian and Mid Basconian types 1, 2, 3, 6 and perhaps 7. Late Basconian and Somrongsen have types 2, 4, 6, 8, 9, 11 and possibly 10. Hence there is some cultural connection among these. The auother asserts that, 'Inspite of certain discrepencies and gaps in the evidence the conclusion that the

smoothed stone celts of Indo-China are related both typologically and chronologically to similar tools in India is hard to avoid'.

Malaya: Stone Age cultures are almost similar to those of Indo-China. 'Celt types and stratigraphy of Malaya are much the same as those from other parts of south-east Asia'.

China: Recounting the neolithic culture in the several regions of China the author observes that, there is some reason to believe that cultural connections involving the use of celt types 5, 7 and 10 were close between China and India rather than between India and other regions.

With the available scanty evidence it is possible to postulate general outlines in dating. 'The earliest Neolithic stone tools probably appeared in India not earlier than 3500 or 2500 B. C. They remained in general use in north-eastern India at least until the introduction of the late celt types 9 through 12 at about 1500 B. C. In peninsular India they may have been employed till the fourth century B. C. Celt types 9 to 12 were still spreading westward when they were supplanted by metal implements bought into the Ganges river basin by the Indo-Aryan immigrants from the west at approximately 1000 B. C. They never reached the southern part of the country'.

The following points are noteworthy:

- (i) In India there is no proof for neolithic peoples before or after the use of metal in the country;
- (ii) Neolithic types, regardless of their cultural affinities were derived from east and introduced at different times;
- (iii) Typological comparison supports the above; certain types are earlier;
- (iv) Majority of the Indian celts are similar to those of South East Asia.
- (v) Arising out of above a large part of eastern India belonged to South and East Asiatic area. In earlier period the area included much of India, Burma, South East Asia and southern China. In later it was restricted in the west to the eastern-most provinces of India but extended in the east to include parts of north and south China. Lastly,
- (vi) Typologically the present study based on incomplete information are of value to suggest presence of cultural movements and relationships.

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292. YAZDANI, G.

Note on the survey of the Neolithic sites of the Western Talukas of the Raichuru District, *ARADN* 1345 (1935-36), Appendix A, pp. 19-21.

The author, besides excavating at Maski explored the following sites; the finds from each site are noted against each:

<i>Site</i>	<i>Finds</i>
Rodalkonda	Abundant artifacts found in the valley between the two hills.
Gobarkallur	On the western slopes of the hills artifacts were found. Iron slags and traces of smelting were noticed.
Matbal	Artifacts were found on the hill slopes at a distance of $1\frac{1}{2}$ mile (2.4 km.) to the west of the town.
Benkal	Ashmound was found.
Bellamrayanguda	Neoliths were picked up on the slopes of the hill.
Yerguntly	Ashmounds were observed and chert and agate flakes were picked up.
Anahusur	Neoliths and chert flakes were picked up.
Kotegal	Implements were found along the slopes of the hill.
Watgal	Artifacts pottery and slag were found.
Kantal	A natural cavern was found. Artifacts, along the slopes of the hill, iron slag and ancient pottery were also found.
Nawalkal	A natural cavern was noticed. Along the slopes of the hills artifacts were picked up.
Alsindhi hill	Artifacts and iron slag were found along the slope of the hill.
Sirwar	Implements were found along the slope of the hill.
Anandagal	Along the slope of the hill artifacts and iron slag were found.
Halapur	Artifacts were found along the slope of the hill.
Karehal	Around the small hill implements were found.
Wandalli	Near an Ashmound artifacts were picked up.
Patkanduddi	Ashmound was noticed.

293. YAZDANI, G.

'Note on the Excavations at Maski,' *ARADN* 1345 (1935-36), pp. 22-24.

The site taken up for excavation was located in the fields of Sultan Muhammad along the slopes of the hills. In the eroded gullies neoliths viz., celts, chisels, crushers and hammers in considerable numbers were picked up. No house plan was available but furnances for smelting iron and gold were noticed. Small finds include beads of different shapes and colours; chank bangles and terracotta figurines. The material of the beads were crystal, amythest, carnelian, lapiz luzuli, agate, bloodstone, coral, chank and terracotta; shapes included barrel, bipyramidal, globular, discoïd and triangular. The artefacts included lancelots, scrapers and knives.

Concluding the author remarks:

- (i) Black-and-red pottery, polished stone implements and chert flakes are datable to 1000 B.C. or earlier.
- (ii) Beads, chank articles and some terracotta figures are assigned to 500-300 B.C.
- (iii) Seal, impressed and ornamented pottery and some terracotta figurines pertain to 300-100 B.C.
- (iv) Some glass bangles may belong to (iii) above but majority are of later date.

294. YAZDANI, G.M.

'Excavations: Kadkal and Maski', *ARADN* 1936-37, pp. 14-16.

In the excavation at Maski, besides other antiquities stone implements and pygmy flakes on chert were found. From the illustration (pl. X) recognizable tool-types are celts of pointed butt type, chisels, etc. Both ground and chipped varieties are noticed

295. ZEUNER, F. E.

'On the Origin of the Cinder Mounds of the Bellary District, India', *Bulletin of the Institute of London*, 2, 1959, pp. 37-44.

The scoriaceous ashmounds around Bellary are regarded as funeral pyres of giants or saints, structures of ancient people, etc. As for the date these are regarded as of Neolithic Age by some while others are in favour of a later date. But recent researches have proved their Neolithic character. Samples from Kudatini (Budikanma), Gadiganur and Kupgal were subjected

to microscopic, chemical examinations and melting point determination. The results are embodied in this paper.

Several theories viz., volcanic ash, travertine formed by calcareous springs, cremation ground, burnt cowdung, glass slag and metallurgical slag, etc., are examined.

Concluding the author remarks 'microscopic investigation, chemical analysis and melting point determination are consistent with cow-dung nature of the material of the mounds. They must have been of large size to sustain high temperatures while on fire. Burning occurred at intervals, and sedimentation was not continuous. There were times when the mounds were abandoned and exposed to wind, others when human occupation material was added, possibly implying an occupation'.

Mounds were formed due to deliberately heaped up cow-dung; reason for such a heap is unknown.

Index to Sites

The constituent states of India, in which the sites referred to in the bibliography are situated, have been abbreviated thus: A.P. - Andhra Pradesh, Bih. - Bihar, Guj. - Gujarat, H.P. - Himachal Pradesh, J & K - Jammu and Kashmir, Mah. - Maharashtra, M.P. - Madhya Pradesh, Meg. - Meghalaya, Mys. - Mysore, Ori. - Orissa, Raj. - Rajasthan, Tn. - Tamilnadu, U.P. - Uttar Pradesh and W.B. - West Bengal. The numbers refer to serial numbers of the articles.

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Renchengiri	Gargo Hills	Meg.	83, 84, 86, 239
Rihutia	Banda	U.P.	156, 157
Rodalkonda	Raichur	Mys	292.

Rombhagiri	Garo Hills	Meg.	84
Rongchugata	-do-	-do-	84
Rongram	-do-	-do-	80, 84, 90, 239
Rongram Chimbima	-do-	-do-	81, 84
Ror	Kangra	H.P.	136
Sadalaga	Belgaum	Mys.	226
Salgi	Ranchi	Bih.	193
Sanganakallu/ Sanganakal	Bellary	Mys.	3, 5, 9, 11, 13, 21, 102, 116, 118, 120, 197, 201, 211, 227, 249, 250, 252, 257, 288
Sangwar	Gulburga	-do-	264
Saptasagara	Belgaum	Mys.	266, 275
Sarania Hills	—	Assam	184
Sardapur	Dhenkanal	Ori,	131
Sasalhatti	Belgaum	Mys.	266
Satti	-do-	-do-	266, 275
Savadi	Dharwar	-do-	267
Selbalgiri	Garo Hills	Meg.	82
Selbalgiri-1	-do-	-do-	90
Selbalgiri-2	-do-	-do-	76, 90, 91
Semboa	Ranchi	Bih.	193
Sempur	Anantnag	J. & K.	121
Senegutu	Ranchi	Bih.	193
Sengamedu	S. Arcot	Tn.	56
Seraikala	Singhbhum	Bih.	222
Shadipur	—	—	136
Shahpatan	Banda	U. P.	157
Shegunashi	Belgaum	Mys.	266
Shevaroy Hills	Salem	Tn.	70, 72
Shidphadi	Bijapur	Mys.	266
Shirguppi	-do-	-do-	266
Shirol	Dharwar	-do-	270
Sibdilla	—	Bih.	279

Silipunji	Mayurbhanj	Ori	133
Simlupal	Midnapore	W. B.	75
Sindhur	Raichur	Mys.	140
Sindibong	Darjee'ing	W. B.	65
Singanapalli	Kurnool	A.P.	182, 274
Sini	Singhbhum	Bih.	76, 224
Sincarsamakkulam	Coimbatore	Tn.	68
Sirwar	Raichur	Mys.	11, 292
Sitabhanji	Keonghar	Ori	244
Sitimani	Bajapur	Mys.	266
Sivkalli	Mysore	-do-	111, 114
Sivapur	Raichur	-do-	11
Sivavaram	Kurnool	A.P.	182, 210
Sodag	Ranchi	Bih.	193
Sombur	Anantnag	J&K	121
Songaon	Pune	Mah	54, 55, 197
Soparaom	Ranchi	Bih.	193
Suguru	Bellary	Mys.	11
Surreon	—	—	122
Susunia	Bankura	W.B.	48
Syamarajapuram	Guntur	A.P.	206
Tadao	Dharwar	Mys.	170
Tadbidi	Gulburga	-do-	264
Tahanmandi Thanda	-do-	-do-	11
Talihalli	Dharwar	-do-	170
Talmari	Raichur	-do-	141
Talmari-Kutukunru	Mahbubnagar	A.P.	11
Tamluk	Midnapore	W.B.	66
Tavaragere	Raichur	Mys.	266
Tekal	Kolar	-do-	183
Tekkalakotta	Bellary	-do-	3, 145, 171, 174, 176, 232, 246, 268
Tekwada	Khandesh	Mah.	118
Telnur	Mysore	Mys.	111, 114
Telod	Broach	Guj.	118
Tembavati Nagari	Chitor	Raj.	36

Terdal	Bijapur	Mys.	214, 266, 274, 275
Tezpur	Darrang	Assam	31
Thakurani	—	Ori	244
Thajiwor	Anantnag	J. & K.	121
Thalatapamalai	N. Arcot	Tn.	139
Thamandi Thanda	Gulburga	Mys.	149
Thusekgiri	Garohills	Meg.	82
Timmapuram	Anantapur	A.P.	60
Tirumalai	N. Arcot	Tn.	147
Torangkel	Ranchi	Bih.	193
Tripuri	Sagar	M.P.	118
Tullet	N. Arcot	Tn.	41
Tura	Garohills	Meg.	84
Udaipur	Keonjhar	Ori	138
Udayagiri	Puri	Ori	132
Utnur/Utnoor	Mahbubnagar	A.P.	3, 6, 11, 114, 214, 248, 252, 255
Vaidyapur	Mayurbhanj	Ori	39
Vajewada	Ahmadnagar	Mah	29
Velaturu	Mahbubnagar	A.P.	215
Wandalli	Raichur	Mys.	11, 141, 274, 292
Wargund	Dharwar	-do-	62
Watgal	Raichur	-do-	141, 266, 292
Yabbalu	-do-	-do-	171
Yechangali	Mysore	-do-	113, 114
Yerbrati	Belgaum	-do-	266
Yergunte/Yergunti/			
Yergunty	Raichur	-do-	11, 141, 292.

B

Outside India

<i>Site</i>	<i>State</i>	<i>Country</i>	<i>Art No.</i>
Aktanga	Tadjikistan	USSR	92
Amir - Tamir	Uzbekistan		92

Gissar/Hissar	Tadjikistan	„	92
Katukisewar	—	Nepal	23
Kohjikent	Uzbekistan	USSR	92
Kui - Builion	Tadjikistan	„	92
Kukhna bai	„	„	92
Tut - Kaul	„	„	92

**Radiocarbon Dates of
Neolithic and Neolithic-Chalcolithic Sites**

Site	Lab. No.	Dates based on half value in B.P.		Dates reduced to B.C. / A.D.
		5568	5730	
Barudih	TF 1100	2920 ± 200	3005 ± 210	1055 ± 210 B.C.
	TF 1099	2625 ± 105	2700 ± 110	750 ± 110 B.C.
	TF 1102	2540 ± 90	2610 ± 90	660 ± 90 B.C.
	TF 1101	2475 ± 85	2545 ± 90	595 ± 90 B.C.
Burzahom	TF 128	4205 ± 115	4325 ± 120	2375 ± 120 B.C.
	TF 123	4055 ± 110	4175 ± 115	2225 ± 115 B.C.
	TF 127	1935 ± 110	4050 ± 115	2100 ± 115 B.C.
	TF 14	3860 ± 340	3975 ± 350	2025 ± 350 B.C.
	TF 13	3690 ± 125	3800 ± 125	1850 ± 125 B.C.
	TF 129	3670 ± 90	3775 ± 100	1825 ± 100 B.C.
	TF 10	2580 ± 100	2655 ± 105	1705 ± 105 B.C.
	TF 15	3390 ± 105	3485 ± 110	1535 ± 110 B.C.
	Chandoli	P 437	3184 ± 68	3280 ± 70
P 472		3175 ± 68	3270 ± 70	1320 ± 70 B.C.
P 474		3099 ± 85	3160 ± 88	1210 ± 88 B.C.
TF 42		3035 ± 115	3120 ± 120	1170 ± 120 B.C.
TF 43		2905 ± 100	2990 ± 105	1040 ± 105 B.C.
Chirand	TF 1032	3600 ± 150	3705 ± 155	1755 ± 155 B.C.
	TF 1031	3525 ± 135	3625 ± 140	1675 ± 140 B.C.
	TF 1030	3430 ± 100	3530 ± 100	1580 ± 100 B.C.
	TF 1034	3420 ± 110	-3520 ± 115	1570 ± 115 B.C.
	TF 1033	3390 ± 110	3490 ± 110	1540 ± 110 B.C.
	TF 1125	3365 ± 150	3465 ± 155	1515 ± 155 B.C.
	TT 1127	3230 ± 95	3325 ± 100	1375 ± 100 B.C.
	TF 1035	3125 ± 100	3220 ± 105	1270 ± 105 B.C.
	TF 334	2715 ± 120	2795 ± 125	845 ± 125 B.C.
	TF 1036	2485 ± 120	2555 ± 125	605 ± 125 B.C.
	TF 1126	2290 ± 120	2355 ± 125	405 ± 125 B.C.

Eran	TF 331	335 ± 90	3450 ± 95	1500 ± 95 B.C.
	TF 329	3300 ± 105	3395 ± 110	1445 ± 110 B.C.
	TF 327	3280 ± 100	3375 ± 110	1425 ± 110 B.C.
	TF 330	3220 ± 100	3315 ± 100	1365 ± 100 B.C.
Hallur	TF 580	3560 ± 105	3660 ± 105	1710 ± 105 B.C.
	TF 576	3277 ± 107	3375 ± 110	1425 ± 110 B.C.
	TF 586	3055 ± 95	3145 ± 100	1195 ± 100 BtC.
	TF 575	2895 ± 100	2980 ± 105	1030 ± 105 B.C.
Kodekal	TF 748	4285 ± 105	4410 ± 105	2460 ± 105 B.C.
Nagarjunakonda	TF 74	1900 ± 90	1955 ± 100	5 ± 100 B.C.
	TF 63B	1750 ± 100	1805 ± 105	45 ± 105 B.C.
	TF 30	1535 ± 95	1585 ± 100	365 ± 100 A.D.
	TF 72	1525 ± 95	1570 ± 100	380 ± 100 A.D.
	TF 73	1495 ± 100	1535 ± 100	415 ± 100 A.D.
Narsipur (T'Narsipur)	TF 412	3645 ± 105	3755 ± 110	1805 ± 110 B.C.
	TF 413	3345 ± 105	3445 ± 110	1495 ± 110 B.C.
Nevasa	TF 40	3110 ± 110	3200 ± 110	1250 ± 110 B.C.
	P 181	3106 ± 122	3199 ± 124	1249 ± 124 B.C.
	P 184	2545 ± 115	2620 ± 118	670 ± 118 B.C.
Paiyampalli	TF 827	3570 ± 105	3675 ± 110	1725 ± 110 B.C.
	TF 349	3340 ± 100	3435 ± 100	1485 ± 100 B.C.
	TF 833	3215 ± 210	3310 ± 210	1360 ± 210 B.C.
	TF 828	2100 ± 95	2160 ± 100	210 ± 100 B.C.
	TF 829	985 ± 105	1015 ± 105	935 ± 105 A.D.
	TF 832	770 ± 100	795 ± 100	1155 ± 100 A.D.
Palvoy	TF 701	3805 ± 100	3915 ± 105	1965 ± 105 B.C.
	TF 700	3388 ± 97	3490 ± 100	1540 ± 100 B.C.
Sanganakallu	TF 354	3440 ± 100	3540 ± 110	1590 ± 110 B.C.
	TF 355	3435 ± 100	3535 ± 105	1585 ± 105 B.C.
Sonegaon	TF 359	3400 ± 100	3500 ± 105	1550 ± 105 B.C.
Sonegaon	TF 384	3415 ± 105	3515 ± 110	1465 ± 110 B.C.
	TF 380	3230 ± 105	3325 ± 110	1375 ± 110 B.C.
	TF 382	3195 ± 100	3290 ± 100	1340 ± 100 B.C.
	TF 383	3185 ± 100	3280 ± 100	1330 ± 100 B.C.
	TF 379	3150 ± 90	3240 ± 95	1290 ± 95 B.C.
Tekkalakotta	TF 266	3625 ± 100	3730 ± 105	1780 ± 105 B.C.

	TF 237	3465±105	3565±105	1615±105 B.C.
	TF 262	3460±135	3560±140	1610±140 B.C.
	TF 239	3395±105	3490±105	1540±105 B.C.
	TF 227	2220±105	2285±110	335±110 B.C.
Terdal	TF 684	3775± 95	3885±100	1935±100
	TF 683	3615±120	3720±120	1770±120 B.C.
Utnur	BM 54	4120±150	4243±155	2293±155 B.C.
	TF 167	3890±110	4000±115	2050±115 B.C.
	TF 168	3875±110	3990±115	2040±115 B.C.

Note: B.M. = British Museum, Research Laboratory

P = University of Pennsylvania, Department of Physics

TF = Tata Institute of Fundamental Research, Bombay.