Chapter IV

NEOLITHIC CULTURES OF ASSAM

In this chapter a thorough study of the stone tools, so far collected in Assam, is made. No account is given here of the many megalithic remains, cists, dolmens, menhirs and carved stones, which are commonly referred to as "prehistoric" in published literature. These monuments form a distinct class by themselves and much field-work is needed before any connected account and a chronological sequence can be given of them. One thing appears probable that the stone tools, of which the study is made here, can hardly be connected with them, since so far they have not been found in association with any megalithic remains.\(^1\) Hence our object is purely the classification and typological comparison of the stone tools.

Sir John Lubbock (1867) was the first person to refer to the find of jade neolithic implements in Upper Assam. In 1870 E. H. Steel (1870, Pp. 267-68) reported the find of several more jade tools from the villages of Namasang Nagas. In 1872 Lt. Barron (1872, Pp. 62-63) figured and described two types of implements (belonging to "Facetted tool" according to the classification adopted in this chapter). Both of them came from the Naga Hills, and were reported to have been found "on ploughing a field". Several stray finds were reported thereafter. Of these only two collections are important for a general survey of the neolithic cultures in Assam. The first large find was made by Mr. W. Penny, a tea-planter of Bishnath, Tezpur district, while digging a ditch on his estate. They reached the Indian Museum, Calcutta, in 1908, through the Viceroy, Lord Curzon, to whom they had been presented. These have been listed by Coggin Brown in his Catalogue (1917, Pp. 131-33); and on them two separate articles, one by Coggin Brown himself (1914a, Pp. 107-9), and the other by H. C. Dasgupta (1913, Pp. 291-93) have been published. The other large

\(^1\) J. P. Mills & J. H. Hutton (1929, p. 295) point out that throughout the area of megaliths in North Cachar stone adze heads are found, but it remains to be proved whether they are associated in any way. (See Hutton, 1931.) My recent exploration of the Jaintiapur menhirs produced not a single neolith.
collection is in the Pitt Rivers Museum, Oxford. This collection includes the materials presented to the museum by several persons, notable among whom are J. H. Hutton, J. P. Mills, G. D. Walker, J. H. Crace and C. R. Pawsey. Except for brief notes by J. H. Hutton and J. P. Mills no complete study of these tools has so far been made. Hutton in his article, "Prehistory of Assam" (Hutton, 1928, Pp. 228-232), has described only three types of tools besides dealing with megalithic remains. K. L. Barua (1939) in his paper, "Prehistoric Culture in Assam" has summarised the published material upto his time; while Pratap Chaudhuri (1944, Pp. 41-47) in his article, "Neolithic Culture in Kamarupa", has given a more general survey of the anthropological and archaeological data. In the Pitt Rivers Museum there are 385 specimens in all, and they come from almost all the regions of Assam. A study of this collection fairly well indicates the regional basis of the cultures of Assam.

The neolithic cultures in Assam follow a pattern dictated by geographical factors, and they can be best studied on a regional basis as each group of tools of a particular region show a distinct kinship in material and form. Such a study brings to full view a picture of secluded cultures with mutual inter-relations, clearly analogous to "the primitive cultures" kept up even now by the aboriginal tribes. Each region has a preference for its own material, probably dictated by availability, though there are intrusive elements which are easily detected. The technique of manufacture is common to all these regions though the forms of tools show some distinctive features from region to region. The nature of the material, which is generally obtained in the form of flat slabs probably from the bed of the streams, is such that there is actually very little need of prior chipping or flaking, a process which can be detected only in a few finished tools. Generally one notices only two methods,\(^{1}\) battering or hammering, and grinding or smoothing, which were sufficient to produce the kind of tools found here out of the available materials. It therefore seems that a particular type of material has been sought for, out of which tools could be manufactured with as little effort as possible. Save for a few exceptions in which flaking appears, all the

\(^{1}\) It may be pointed out here that E. C. Worman (1949) speaks of three processes, chipping pecking and grinding, in connection with the neolithic tools of India. But, as far as Assam is concerned, the technique of pecking was not in use,
tools have been only hammered and ground. A similar technique of making adze-blades is described by Beatrice Blackwood in her "The Technology of a Modern Stone Age People in New Guinea" (1950, p. 15): "A stone of suitable shape and size is sought for in the bed of a stream, or a small boulder is cracked with a heavy stone and such of its fragments as are suitable are picked up, one of which is chosen for immediate use and the others put by until wanted. The blade is first shaped roughly by being struck with a hammerstone. Any stone of convenient shape and size to hold in the hand is used for this purpose. . . . The worker sits on the ground, either cross-legged, or with one or both legs extended. The hand holding the implement rests on one leg. Pieces are struck off both front and back of the blade by battering strokes, the hammerstone striking either the edge or the surface. The work is very rough, and no attempt at flaking is made at any stage. This may be connected with the kinds of stone used, most of which would not flake easily if at all. When the blade is thought to be sufficiently shaped, it is finished by grinding. The grind stone consists of any piece of suitable stone, which is found on the banks of the Watut river."

The neolithic cultures of Assam fall into six distinct zones:

1. Cachar Hills Zone,
2. Sadiya Frontier Zone,
3. Naga Hills Zone,
4. Khasi Hills Zone,
5. Garo Hills Zone, and
6. Brahmaputra Valley Zone.

x. Cachar Hills Zone

The main materials used in this zone are dolerite and a stone described as arenaceous clay (H. C. Dasgupta, 1913, Pp. 291-93), both of which, according to the geological reports, are locally available. Two specimens only are in fossil wood, a material which is plentifully found here as well as in north Burma. There is one specimen in gneiss, a rock fairly well distributed in the Assam Hills (See Pp. 22-23), while there is another of jadeite and a few of chert, neither of the latter materials being found in Assam. Generally the tools of this region
are fairly well manufactured and have regular forms and show a high degree of grinding. The types represented are remarkably like the developed neolithic tools of Upper Burma. (See Pp. 279-84.) The appearance of fossil wood tools further links the industry with that of Burma. There seems to be little doubt that the makers of these tools in the Cachar Hills and those of the developed neoliths in Burma were in communication probably through Manipur.

2. Sadiya Frontier Zone

In this zone the chief material is jadeite of one variety or another. This is not found locally. Its nearest source is Yunnan in South West China. However, a few tools are of gneiss and dolerite, both local rocks, while there is one each of limestone and bone. The tools found here also show markedly regular forms though there is less typological variation than in the Cachar Hills. The "facetted tool" has the closest link with the types of tools known from Yunnan (See Pp. 79-84), while another type, the rounded butt axe, though also known in Yunnan, has a wider circulation in the Indo-Pakistan sub-continent. The prolific use of jadeite further strengthens the link with Yunnan. In fact, with the discovery of a specimen (pl. 8, no. 24) in the Mishmi Hill the cultural contact of this region with Yunnan can hardly be doubted. Indeed the main tool types of Yunnan and the Sadiya Frontier Zone are identical and the use of the common material, jadeite, firmly establishes the identity.

3. Naga Hills Zone

In the Naga Hills the chief material is a greenish variety of gneiss; more than half the tools collected from this region in the Pitt Rivers Museum are of this material. Sixteen per cent. of the tools are of dolerite and eight per cent. of jadeite. Other materials used are limestone, black basalt, slate, chert, sandstone and what is described as reddish stone. The tool types of the Naga Hills are very varied, but they have a certain distinctiveness of their own. Quite in

* The Upper Burma jade mines were apparently not worked in this period as no jade tools have so far been found in Burma.
keeping with the geographical position of this region we also find here the common tool types known in the Sadiya Frontier and Cachar Hills Zones. Besides these, we have here a distinctive type of tool, pl. 10, no. 44, which comes closest to "gouge adze type" (the so-called beaked adze), so abundantly found in Burma, Malaya, Siam, Laos and Cambodia. Other types of tools, distinctive of this region, are the tanged axe-blade and wedge blade, classed here under categories F and G, and generally of gneiss. J. H. Hutton (1921, Pp. 405-9) has divided them into three classes: A. "triangular celt", B. "wedge-shaped celt", and C. slightly shouldered celt. Hutton's type C is classed here as F, and types A and B as G. Hutton believed that "the triangular celts were fitted into a hole in a wooden handle, while the wedge-shaped celts were bound to crooked sticks." However, functionally there does not seem to be any difference between the two varieties. Hence they have been grouped here under one general class. Such wedge blades are also known from Burma (See pl. 55, no. 19). The other type F comes closer to a specimen from Yunnan (pl. 18, no. 22). Examples of this type are also known from upper Burma. Some of these are preserved in the Museum of Archaeology and Ethnography, Cambridge. The function of the miniature tools, pl. 17, nos. 11 and 12 and pl. 18, nos. 26-29 from Yunnan seems to be the same as that of the smaller varieties of F in the Naga Hills. John Anderson (1871, p. 411) considered them to be "charms to be worn without inconvenience". This supposition is contradicted by the use marks visible in most examples. Thus the Naga Hills Zone, besides showing the common types of the Sadiya Frontier and Cachar Hills Zones, has not only distinctive tool types of its own, but appears to have a direct communication with countries east of Assam, possibly through the route of the Hukawng Valley. (See p. 16.) The large number of jadeite tools, obtained here, again suggests a connection with Yunnan.

4. Khasi Hills Zone

This zone lies between the Cachar Hills and the Garo Hills. Very few specimens have so far been collected from this region. Only three tools are figured here, all of slate. The types are derived from the Cachar Hills.
5. Garo Hills Zone

This is the most westerly of the regions in Assam. The material used is mainly sandstone. Only two specimens in black basalt, two in limestone and a few in chert have been collected, but this last material is not local. All the examples in sandstone are thin while those in other stones are somewhat thicker and better formed. However, sandstone tools are markedly weathered and worn. Some of them are so deeply stained red that they appear to have been extracted from lateritised soil. Though the tools have been collected from various localities throughout the Garo Hills, the commonest feature is the weathered appearance of the sandstone. Indeed they can be easily distinguished even in a confused jumble of Assam neoliths. All the types known here have parallels in the Cachar Hills, though the change in the material has resulted in the deformation of the contours and a general thinning of the tools. Angularity of forms is observed only in rare examples, while large numbers of them show rounded corners and sides.

6. Brahmaputra Valley Zone

This is a long narrow plain extending from one end of Assam to the other, and is flanked on the south by the hilly regions noted above, while the outcrop of the Mikir and Rengma Hills further narrows its breadth at one point. The geography would therefore suggest that the culture represented in this zone should show a blend of those features already noticed in the isolated hill-tops and the plateaus to the south. But the materials available for study are few and far between. Save for two “celts” from Dibrugarh and Sibsagar, all other tools come from the chance-discovery of Mr. W. Penny in Tezpur district. The majority of Penny’s tools are of sandstone. A good number are in quartzite, slate and a rock described as “decomposed volcanic ash” (Coggin Brown, 1917, Pp. 131-33), while there is one of gneiss and one of porphyrite. The sandstone examples are mostly smoothed fragments and pebbles. However, only three grooved hammerstones in this material are known, all other hammerstones are of quartzite. The tools, Coggin Brown’s “celts”, are made of slate (5 in all), gneiss or porphyrite. At least one “celt” appears to be of the wedge type so common
in the Naga Hills (Class G). Another is an irregular shouldered tool, a type well-known from the Cachar Hills (Class E). The small flat "celts" resemble those from the Garo Hills. But the grooved hammerstones are peculiar to this zone, that is to say, so far they have not been met with in the other regions of Assam. (For their distribution in other countries, See p. 54-55).

The typology of the stone tools

The typology\(^1\) of the Assam tools is simple. The two predominant types in almost all the zones are facetted tool and shouldered tool.

A. Facetted Tool

This facetted tool has a, more or less, rectangular cross-section. It is the type commonly termed in South East Asia "Quadrangular Adze" (Heine Geldern, 1928). Adzes are usually treated as being a specialised type of axe. In the words of H. H. Coghlan (1943, p. 29), "The adze may be defined as a tool for chipping or slicing away the surface of the wood. The cutting edge stands transversely, that is, at right angles to the handle. Its bevel is ground on the inner face only, while the entire outer face is slightly rounded." (Compare Childe, 1930, Pp. 60-61.) This definition is obviously derived from Petrie (1917, p. 5). It is difficult to be dogmatic about the use of these tools. It does not seem likely that their use was confined to wood-work or indeed that many of them are suitable for working wood. It is possible that they were also used as Hoes. To this day in the hilly areas of these regions Hoe-Terrace cultivation dominates. It is also important to note that the Hoe-Adze is the commonest tool in Assam, South East Asia and Yunnan. These tools are usually of a substantial thickness. Three of the sides are ground to a flat face, the fourth, which is always the upper broad face, is left somewhat curvilinear. The cutting edge is ground to this curvilinear face. It appears that these tools were first ground to a rough curvilinear shape. The narrow sides and one broad face were then ground to a flat surface (facet).

\(^1\) The classification, so nicely given by E. C. Worman (1949), for the neolithic celt types in India, and also for South East Asia, is hard to reconcile with the actual tools found. It is purely academic and theoretical.
The cutting edge is then ground between the flat broad face and the curvilinear face, the flat face being underneath during the work. It would seem that three stages of grinding are involved. The primary grinding produced a roughly shaped curvilinear implement such as pl. 8, no. 24. The secondary grinding of the facets produced the normal unedged hoe. Tertiary grinding produced the cutting edge. If the broad face (primary grinding) is markedly curvilinear the tertiary grinding may result in a median cutting edge. In pl. 6, no. 2 the median cutting edge has been produced by the tertiary grinding of both faces; any resharpening process would be likely to produce this result. It has repeatedly been asserted that an axe-blade has a median cutting edge and an adze-blade a unifacial cutting edge ("bevel"). It will be seen from the analysis given above that this distinction is not fundamental as far as stone tools of our region go. In discussing all types of tools it is necessary to consider the tool as a whole, that is to say, **haft and blade as used in the hand**. Moreover, it is necessary to envisage the total range of tools available in any culture. If adzes, which are carpenter’s smoothing tools, occur, it presupposes some kind of axe or felling tool. Assuming that a median cutting edge is a criterion of an axe-blade, it would seem from the figures given at the end of this chapter (p. 78) that they are incompatible with axe and adze wood-work. It is therefore likely that this facetted type was an all-job-doer.

**E. Shouldered Tool (Hache `a tenon)**

B. Laufer calls it "spade-shaped celt". It is also a facetted tool with the prolongation of the butt side into a tenon, thus giving a better haft. All the varieties of the former class are found in this type as well, except that the curved face examples are rare. The variation depends upon the regularity or the irregularity of the body, and the way in which the tenon is related to the body: in certain examples both tenon and body are square and the right angle between them is sharply cut by a process of wire (most probably of metal) cutting or sawing\(^1\), while in others they are formed by more or less haphazard chipping.

\(^1\) "Median" is used in the same sense as Petrie has used it, *i.e.*, "equal edged" (Petrie, 1917, p. 5).

\(^2\) V. Ball (1879, p. 397) suggested this process of sawing for the production of the shouldered tool as early as 1879. E. C. Worman (1949) does not talk of this process at all,
or grinding and the angle is obtuse, or at any rate the junction is curved. This
type E has so far not been found in the Sadiya Frontier Zone. In this class there
is one freak, pl. 11, no. 51, from the Naga Hills, which has a hole in one corner,
suggesting that it was used as an amulet. The regular type is found only in the
Cachar Hills Zone except for two specimens from the Naga Hills. Both the
regular and irregular varieties are common in the whole of South East Asia
as far north as Hong Kong (See chapter VI). Only two doubtful examples are
known from Yunnan (Pl. 18, nos. 21 and 22), and this explains the absence of
the type from the Sadiya Frontier Zone. It is therefore reasonable to suggest that
it came to Assam most probably from Burma. From North China four speci-
mens of the irregular variety much larger in size have been illustrated by J. G.
Andersson (1943, Pl. XXIII, 3 and Pl. XXIV, 1-3). These all come from the
province of Honan, and one of them is said to belong to "the Yang Shao Cul-
ture". But the commonest type is the "broad variety" (J. G. Andersson, 1943,
pl. XXV), which is not found in Assam or in South East Asia at all. These come
only from northern China, especially from the Mongol Zone¹ (See Appendix
p. 79). J. G. Andersson rightly calls them "agricultural hoes". The regular
variety in stone has not been found so far in the river valley cultures of North
China, but in bronze several specimens are known. They are generally regarded
as ceremonial axes.² Two specimens in iron have also been illustrated by Petrie
(1917, Pl. II, nos. 98 and 99), both coming from Egypt. A slightly differing variety
(with concave sides) is illustrated by Petrie in fig. 97, pl. II. It comes from Trans-
caucasia. Petrie (1917, p. 9) remarks, "These tanged axes may be all three Asiatic,
from one source; such a fastening is unknown in Europe or Egypt otherwise."

This tool seems to be the prototype of the modern garden implement used
in northern India, called Khurpi. George Grierson (1926, Pp. 12-13) writes,

¹ Teilhard de Chardin & Pei point out that these have been found at Hata and Kaokiatingze
and also near about Jehol in large numbers. But they are not found in the south-east of the
Mongol Plateau. (Teilhard de Chardin & W. C. Pei, 1944).

² V. Elisseeff, 1954, figs. 1-4; Leigh Ashton & Basil Grey, 1951, no. 2 b; B. Laufer, 1912, figs.
1-4 and 11-14; Percival David, 1952, pls. 4 and 5; P. Ackerman, 1945, pl. 63; Museum of Far
Eastern Antiquities, Stockholm, Bulletin No. 2 (1930), Pl. V, 1 and 2.; Bulletin no. 4 (1932),
pl. I, 4.
"The खुर्पा Khurpa is a sort of hoe used for loosening the earth round young plants or in weeding.... A smaller instrument for scraping grass or weeding is called, when the blade is curved, खुर्पी Kharpi, and (south of the Ganges), when it is straight, पसानी Pasani. An optional name for the curved variety in Gaya is बंकुआ Bankua." An invariable companion of this tool is a hook-ed implement, called दराती Daramti, the word being derived from the Rigvedic Sanskrit वात्र Datri (Rigveda, V.7.7.). If this modern garden implement is really a survival of the older tool form, then this should properly be called a Hoe rather than adze or axe, and the method of its hafting and use may have resembled that of the Indian kharpi. The tenon of the kharpi is fitted into a socketed wooden handle, which is generally round in section. The cutting edge is held away from the user, who sits on his feet. The movement is away from the body.

S. E. Peal long ago, in 1896, compared these tools with two iron hoes which he obtained in the Naga Hills (Peal, 1896, Pp. 20-24). Berthold Laufer fully agrees with Peal and connects them with the hoe-culture (Laufer, 1912, Pp. 73-79). Hutton and Mills (1929, p. 293) also connect them with iron hoes. This connection was suggested even by V. Ball (1879, p. 395).

D. Splayed Axe

The third type is so far known only from two of our regions, the Cachar Hills Zone and the Garo Hills Zone, though it is fairly common in Yunnan and other countries of South East Asia. It shows a bifacial median splayed cutting edge with concave sides terminating in a roughly cut narrow butt. The splaying of the edge due to the concavity of the sides is not natural to stone, that is to say, it does not necessarily result from the process of bifacial grinding. While speaking of the change from stone to copper celts, H. H. Coghlan writes, "An immediately noticeable feature is a gradual splaying out of the cutting edge of the axe: this was a natural result of the process of hammering the cutting edge of the copper in order to harden or temper the blade. When the cutting edge became notched or blunted in service, the owner (or more probably a copper-smith) would anneal the blade and afterwards treat it by hammering to restore
the edge and hardness; a succession of such operations would soon result in a well splayed-out blade.” (Coghlan, 1943, p. 42). When only the cutting edge is hammered, the form of parallel-sided tools with expanded cutting edge results (See Petrie, 1917, pl. I, figs. 10-11, 24, 31-36). When the hammering starts much above the cutting edge, the splay is greater and the sides become curved. The advantage in this type is to have a narrow butt, which is easier for hafting, and a wider cutting edge. When casting came into general use, this splay form was copied in moulds. Such moulds have been found in the excavation of “The protohistoric site of the Hong Kong culture at Shek Pek, Lantau, Hong Kong” (W. Schosfield, 1938, Pp. 248-251, pl. CIV). Such splayed axes, both in copper and bronze, are universal. It is from the metal type that the stone examples were copied, and this stone copy has a wide distribution in South East Asia and Eastern India.

It is important to note that all these three types have a wide distribution in South East Asia and Southern China (except the provinces of Kwantung and Kwangsi, where exploration has hardly begun). The Assam specimens, no doubt, belong to this general complex, and the problem of their origin and age is linked up with the existence of these neolithic tool types in all these countries. This problem will be stated fully in the concluding chapter. It may, however, be repeated that the splayed axes presuppose the existence of metal originals. The faceted and the shouldered tools also appear to develop first in a metal form and then as copies in stone. The northern Chinese variety of the shouldered type is, no doubt, very irregular, but the large majority of the specimens found in South East Asia are so regular in form that they imply a process of wire-cutting in order to obtain sharp angles and straight sides. Such a perfection is not natural to stone grinding. It seems reasonable to suggest that this procedure was adopted because it improves the technical efficiency of the tool by producing a better fit for hafting. The origin of this tool must, of course be attributed to “Hoe-Terrace” cultivation as B. Laufer (1912, Pp. 77-79) argues, but its place of origin cannot be South East Asia, as he maintains; because, as will be clear from the evidence given in chapter VI, this type belongs to the developed neoliths of South East Asia, where they are found as intruders in a cultural context in which agriculture was hardly known. Such “barbarous” cultures prevailed as
far north as the Kwangsi-Kwantung-Szechwan region, south of the river Yangtze, in South China (See Teilhard de Chardin & Pei, 1944). Hence the origin of this type must be sought for in Honan and the Mongol Zone, where a few stone examples have already been found. From China proper, i.e., the northern river valley cultures, only ceremonial specimens' in bronze have so far been recorded from graves. It is hard to believe that the Chinese would begin to bury these "ceremonial axes" in their graves without actually using them in life. It seems that this perfect type has been copied in stone in South East Asia with the only difference that the decorations of the bronze specimens have been omitted.

B. Rounded-Butt Axe

The next type is a form of long axe, varying from oval to lenticular in cross-section, with rounded butt sometimes narrowing to a point, the sides tapering slightly convexly, with one broad face almost flat and the other curved. The cutting edge is convex, usually unifacial, and very rarely medial. The majority of the specimens are thin, especially those found in the Garo Hills Zone. This type is also known from Yunnan and Burma. It is rare in Malaya and hardly known at all from other countries (mainland only) in South East Asia. On the other hand it has a very wide distribution in the Indo-Pakistan sub-continent (See the distribution map in Ancient India, no. 4, 1947-48; and no. 7, 1950, fig. 51), where it has been termed as "polished pointed butt stone axe". But this distribution map has to be re-checked as it does not take into consideration the important difference of the tool types of Assam. The technical difference will be discussed in the next chapter (See Pp. 91-94). Here it will suffice to mention that the rounded butt axe of Assam seldom has a median cutting edge and the longitudinal section is in almost all cases flat on one face and the other curved continuously from the edge to the butt. The cutting edge is formed by the junction of the ground curved face and the tertiary grinding of the broad flat face. This is the most common method of producing the sharp edge in Eastern Asia, and the

1 It must, however, be noted that the Chinese examples are much larger in size like the Indian Kudali.
Assam tools belong to this general group. In Assam the rounded butt axe is poorly represented in the Naga Hills. Heine Geldern has termed this type as "Round Axe" (Heine-Geldern, 1935 b, p. 35). On the odd specimens found in Malaya Van Stein Callenfels remarks that "in later neolithic times, perhaps even in the beginning of bronze age, the use of round axe was brought over" from India to Malaya. (Proceedings of the 3rd Congress of the Prehistorians of the Far East, 1938, Singapore, Pp. 131-32).

C. Axe with broad cutting edge

This is a variant of the type B, with the difference that its sides taper more acutely and the cutting edge is very broad. This type is not found in the Naga Hills, but one specimen, pl. 11, no. 46, appears to be a copy of this type. It is most predominant in the Garo Hills, but is not met with in other regions of South East Asia, with the exception of one specimen, which is in the Beasley collection of the British Museum, no. 1.6.38 (4639 B). It is of very thin slate, and is reported to have been found in the Malaya states. The examples pl. 6, no. 8 from the Cachar Hills and pl. 15, no. 93 from the Garo Hills, are typical of the large varieties, and they suggest a metal copy. Similar tools have been found elsewhere in India (See pl. 20, nos. 13-14). The "thin flat celt" type (no. 10) of Subba Rao (1948, Pp. 35-36) is similar to the Assam examples. Like these the Bellary specimens are also flat on one face and curved on the other (Subba Rao, 1948, XXI, nos. 9-13). But the Assam axes are different from the Bellary examples in so far as these are not made from flakes as the latter are. The extreme thinness of the tools goes against the possibility of their being used on wood. It is more probable that they were used on loose earth for weeding the grass. Major Godwin-Austen points out, "These softer kinds of stone implements ... were used as hoes, and some of the Kukis in the north Cachar Hills used a few years back stones set into a wooden handle in this way, for when the ground is soft during the rains they aid materially in tearing out the weeds. From the facility with which they can now get iron implements, stone will be scarcely or ever used. Col. McCulloch had told him that they are very frequently found in Manipur." (Godwin-Austen, 1875, p. 158).
F & G. Tanged Axe and Wedge-blades

These two types are known mainly from the Naga Hills Zone. They are peculiar to this region and stand as a distinct group by themselves. The tools of F type, which show slight shoulders at the butt, may have been influenced by the form of the shouldered tools. But, except for this apparent similarity, the two types are different in the actual form of the cutting edge as well as in technique of manufacture. Both types F and G hardly show any trace of flaking or even battering. The predominant feature in these tools is the mode of grinding. The cutting edge is produced by bifacial grinding of the greater length of the tool. In the case of type F the butt, termed here the tang, is further rounded by the same process of grinding and hence the general appearance is that of a shouldered tool. In other examples the original smoothness of the pebble surface is taken advantage of and left unground. These second type of tools form Class G. They may be either triangular in form or wedge-shaped according to the nature of the material originally selected. It is these two types of tools which have earlier been vaguely compared with some Yunnan specimens (See Pp. 44-45). It has not been possible for me to find parallels in India or in South East Asia, except in Burma. In other parts of India wedge-shaped axes have been found (See p. 94). But their form as well as the method of their manufacture are different from the specimens under consideration. It is possible that type F was used, hafted in a bamboo tube, as a digging stick. Coggin Brown (1931, p.38) remarks, “The small implements were probably fitted lengthwise into a handle and used as a pud for digging holes in the ground for rice and other seeds, or for purposes of weeding.”

H. Grooved Hammerstones

This type comes from only one site at Bishnath in Tezpur district. It has not been found anywhere else in Assam, nor is it known from South East Asia except for one example from Kim-B’ang in Annam (See pl. 38, no. 9). A single doubtful specimen is illustrated by J. G. Andersson (1943, p. 56, pl. XXIII, 3), while another of diorite from Shantung province is in the British Museum and illustrated by B. Laufer (1912, pl. XIII, 1). Some specimens are also known
from Hong Kong (W. Weinberger, 1948-49, pl. 18 b). Several examples have been found in other parts of India. Bruce Foote (1916, p. 86) found one at Hosahalli in the Kudligi taluk. Subba Rao has illustrated several examples from Bellary (Subba Rao, 1948, pl. XXIII, 20-21). Several others have been collected from Banda district (Rivett-Carnac, 1883 b, Pp. 221-230). About the Assam specimens Coggin Brown (1914 a, p. 108) writes, "There are 6 specimens in all, 5 of which are made from a fine close-grained, greyish, bluish or reddish-grey quartzite; one from a dark, fine-grained, schistose diorite. Each specimen has been formed by splitting an elongated, ovoid, water-worn pebble into two pieces, across its transverse diameter, and then grinding down the fractured end until it assumed a smooth slightly convex surface. The groove or belt is cut into the implement roughly two-thirds of the distance between the face and the pebble butt. In each case it is broad and well-marked though not deep. In two of the quartzite hammers the groove forms a complete ring around the stone; in the other three, it is not continued round the edge which evidently faced the hand when the implement was held in its withy. In the case of the diorite hammer the belt is continued around one face and two edges but not around the other side. The largest specimen measures approximately 10 cms. long by 7 broad by 3 thick. The smallest 6.5 cms. long by 6 broad by 3 thick. The others are intermediate in size though usually somewhat thinner than the largest one."

Another exceptional tool is pl. 16, no. 104 from the Garo Hills. It has been flaked and shaped like an aicheulean hand-axe without any trace of secondary retouch but with traces of grinding noticeable all over, more especially at the cutting edge.

Besides, we have 2 chisel-end tools from the Sadiya Frontier Zone, pl. 9, nos. 32 and 33, both of which are square in section and have sharp cutting edge at either end, one edge being perpendicular to the other. From the Naga Hills have been collected a few more types: 2 long whetstones obtained by J. H. Hutton; 2 so-called nut-crushers, which are merely oval pebbles with a depression on either flattish face; one pestle; and another pebble turned into a chisel end. From Bishnath in Tezpur district ordinary hammerstones have also been found.

The description of the tools follows region by region.
1. Cachar Hills Zone

Class A:—Facetted Tool:

The distinctive feature of these tools is the facets which show very clearly in all the specimens, and they are produced mainly by the process of grinding. The shape is more or less rectangular as also the cross-section. They are very thick except Pl. 6, no. 6. They have been divided here into 3 varieties on the basis of the cutting edge.

Variety A.I:—Curvilinear Type:

Pl. 6, no. 1:—Collected by J. P. Mills. Kitaui. 1937. Jadeite, with bluish stains. Correctly speaking it is trapezoidal in shape with faceted sides tapering towards the flat butt. The cutting edge is formed by the meeting of the ground convex face and the broad flat face showing tertiary grinding. It is ground all over but some roughness is still visible on the body. A typical example of the facetted tool so well known in South East Asia, it is the only specimen found in N. Cachar Hills.

Variety A.II:—Bifacially ground median edged type:

Pl. 6, no. 2:—Collected by J. P. Mills. Thangpui. 1928. Gneiss. In this example the tendency has been to narrow the butt by additional grinding in its upper part. The butt end is square in section. The cutting edge is median produced by bifacial grinding. This is the only specimen found in N. Cachar Hills.

Variety A.III:—Unifacially ground edged type:

In this variety the cutting edge is produced by sharp unifacial grinding, commonly termed as “bevelled edge”, giving the shape of the adze- or chisel-blades.

Pl. 6, no. 3:—Collected by J. H. Hutton. Ranji. 1921. Dolerite. It is very broad and thick.

Pl. 6, no. 4:—Collected by J. P. Mills. Paija. 1928. Dolerite. It is also very broad and thick. The butt is little rough.

1 The description first gives the name of the donor, then the place where it was obtained, next the date of its presentation to the museum, the material of which it is made, and finally the special characteristic.
Pl. 6, no. 3:—Collected by J. P. Mills. Lungkho. 1928. Dolerite. It is of a long sub-variety with straight edge. The butt is rough.

Pl. 6, no. 7:—Collected by J. P. Mills. 1929. Chert? It is very thin in section with the butt end snapped off. Its thinness links it up with a large number of such tools found in the Garo Hills.

These are the only 6 specimens in this Class out of a total of 28 tools in the collection of the Pitt Rivers Museum, Oxford.

Class B:—Rounded Butt Axe:

There is only one variety in this Class in this Zone. The cutting edge is always off the median, but is sometimes hard to mark because of the thinness of the section. The butt is rounded.

Pl. 6, no. 6:—Collected by J. P. Mills. Lungkho. 1928. Arenaceous clay (slate?). One face is somewhat flattish while the other shows grinding from three directions leaving a ridge in the middle.

There are two more examples of this type, 1 in arenaceous clay and the other in jadeite.

Class C:—Axe with broad cutting edge:

There are two varieties in this class distinguished on the basis of size:

Variety C.I:—Large type:

Pl. 6, no. 8:—Collected by J. P. Mills. Thaijuari. 1937. Sandstone. It is a large variety of this type with the sides and one broad face ground flat while the other is curvilinear. Some chips have been removed later. Marks of use are visible at the cutting edge. It is substantially thick and could well have been used on wood. It is the only specimen of its type in the North Cachar Hills.

Variety C.II:—Small type:

These are comparatively thinner in section.

Pl. 7, no. 9:—Collected by J. H. Hutton. Indulgo. 1929. Basalt. Its sides converge slightly convexly to meet the pointed butt. One broad face is irregularly curved while the other is ground almost flat with the cutting edge formed by unifacial grinding.
Pl. 7, no. 10:—Collected by J. P. Mills. Robi. 1928. Arenaceous clay. The two sides, which are ground flat, curve slightly to meet the flattish butt, and the two broad faces have also been ground almost flat, whilst the cutting edge is formed by unequal bifacial grinding.

There are 3 more specimens in the Pitt Rivers Museum, 1 in chalk and 2 in slate.

One more specimen of this variety is listed in Coggin Brown’s Catalogue (1917, p. 131, no. 866). It was collected by Mr. C. Brownlow at Terabeg, near Michabri, Cachar. Its sides and two broad faces have been ground flat, while the butt is worn and the shoulders are constricted.

In all there are 7 specimens in this Class so far known.

Class D:—Splayed Axe:

Pl. 7, no. 11:—Collected by J. P. Mills. Paija. 1928 slate. It is thin in section and asymmetrical in form. The cutting edge is produced by equal bifacial grinding and the sides inwardly curve to meet the rough butt at one end while at the other produce a markedly splayed cutting edge. This is the only specimen in this Class in this Zone.

Class E:—Shouldered Tool:

The varieties have been distinguished on the basis of the regularity or the irregularity of the tenon and the body, and secondly on the proportion of the length of the body to its breadth. Accordingly we have four main varieties: E.I, Regular and broad type; E.II, Regular and long type; E.IV, Irregular and broad type; E.V, Irregular and long type. There is one more variety in this Class, which we have called E.III, distinguished by its crescent-shaped body and long tenon.

Variety E.I:—Regular and Broad Type:

Pl. 7, no. 12:—Collected by J. P. Mills. Bara Hazlong (Naga village). 1937. Fossil wood. It is square in section with the tenon slightly inclined to one side. Both the broad faces are ground flat while the cutting edge is formed by unifacial grinding. The right angles between the tenon and the sides are sharply cut.
Pl. 7, no. 13:—Collected by J. P. Mills. Paija. 1928. Chert. Similar to no. 12 but smaller in size. The tenon is not exactly in the middle of the body while the sides are slightly divergent. The tertiary grinding in order to produce the cutting edge starts roughly from three-fourths the length of the body.

There are 2 more examples in this variety, 1 in limestone and the other in chert. These are smaller in size.

Variety E.II:—Regular and Long Type:

Pl. 7, no. 14:—Collected by J. P. Mills. Gunjong: Chert. The sides, which are divergent, make sharp angles with the tenon. The broad faces are ground flat, the cutting edge unifacial. Some chips have come away later.

There is one more example of chert in this variety. It is smaller in size.

Variety E.III:—Regular with crescent-shaped body:

Pl. 7, no. 15:—Collected by J. P. Mills. Paija. 1928. Chert. This is a unique specimen found in this region. It has a small crescent-shaped body bifacially ground to produce a sharp cutting edge. The tenon is square in section, slightly narrowing towards the butt. It is much longer in comparison to the body. The angles are sharply cut. Similar examples, though socketed, in bronze come from Burma and South East Asia. One example in the British Museum, numbered 1926, 2.10.4, comes from Trans-Salween. One stone example was found at Tham Pong in north Annam (E. Saurin, 1938, Pp. 81-82, Pl. XXII. 4).

Variety E.IV:—Irregular and Broad Type:

Pl. 7, no. 16:—Collected by J. H. Hutton. Waichong. 1929. Limestone. Very coarsely made. The sides are rough, and the angles are obtusely curved. It is thin in section.

Pl. 8, no. 17:—Collected by J. P. Mills. Chaikambo. 1928. Fossil wood. The shoulder is very irregular, the angles are very obtusely curved, while the body retains roughness. The cutting edge is produced by unequal bifacial grinding.

Pl. 8, no. 18:—Collected by J. P. Mills. Haflong. 1929. Slate. Very thin in section. The sides are ground flat. The tenon is negligible. The cutting edge is formed by unifacial grinding.
Pl. 8, no. 19:—This specimen has been described by H. C. Dasgupta (1913, Pp. 291-93). It came from Konarpara in Cachar. Arenaceous clay. The cutting edge is formed by unifacial grinding, while the shoulder is very irregular.

There are 2 more examples in limestone and 2 in arenaceous clay. Coggin Brown has listed a ring-stone (no. 6321) of “fine polished sandstone”, collected by W. Townsend Smith in the jungle near Narainpur, Dewan Cachar.

In all 31 tools from this Zone are so far known:

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<th>Class</th>
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<tr>
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2. Sadiya Frontier Zone

Class A:—*Facetted Tool*:

In this Zone we have only two varieties, A.I and A.III corresponding with the types known from the Cachar Hills.

Variety A.I:—*Curvilinear Type*:

Pl. 8, no. 20:—Collected by J. P. Mills. Ningru, north of Noa Dihing river. 1933. Talcose rock, with serpentine veins, white in appearance. It is slightly longish in form with rectangular cross-section. The sides are ground flat. One broad face is also ground flat while the other is curvilinear, with the cutting edge produced by unequal bifacial grinding.

Pl. 8, no. 22:—Collected by J. H. Crace. 1935. Bone. Similar to no. 20, except that the sides are rounded. It is very finely ground, but the butt is rough. The cutting edge is obliquely convex.

Pl. 8, no. 23:—Collected by J. H. Crace. 1935. Black basalt. Similar to no. 22, but smaller in size with the difference that the cutting edge is less convex, and symmetrical.
Variety A.III:—*Unifacially ground edged type*:

Pl. 8, no. 21:—Collected by J. H. Crace. 1935. Black basalt. It is a broad sub-variety, with the faces ground flat, though one slightly curves near the cutting edge.

There is 1 more example of dolerite, variety A.I. In all there are 5 specimens in the Pitt Rivers Museum. Coggin Brown’s no. 865 (1917, p. 131), collected by Mr. Healy of the Geological Survey, belongs to this Class, variety A.I. It is of streaked and mottled jadeite. The find-spot is not known. Typologically it appears to have come from this Zone.

Class B:—*Rounded Butt Axe*:

Three varieties have been distinguished in this Class on the basis of the cutting edge.

Variety B.I:—*Bifacially ground median edged type*:

Pl. 9, no. 25:—Collected by J. P. Mills. Tigra (Minyong) Abor Hills. 1937. Gneiss? It is of a long form, lenticular in section. The cutting edge is deeply crescentic. Some chips have come away later.

Pl. 9, no. 26:—Collected by J. H. Crace. 1935. Jadeite. It is a smaller variety of no. 25, with the difference that the sides are flat and the section rectangular.

Pl. 9, no. 28:—Collected by J. P. Mills. Ningru near Noa Dihing river. 1933. Jadeite, with bluish stains. It is a smaller variety of no. 25, lenticular in section.

Variety B.II:—*Unifacially ground edged type*:

Pl. 9, no. 27:—Collected by J. P. Mills. Ningru near Noa Dihing river. 1933. Gneiss. In cross-section it is lenticular, with broad faces ground slightly convexly.

Pl. 9, no. 29;—Collected by J. P. Mills. Ningru near Noa Dihing river. 1933. Jadeite, with bluish stains. It is a smaller variety of no. 27, but is slightly broader.

There is 1 more example of gneiss in this variety.
Variety B.III:—*Curvilinear Type*:

In this variety one face is ground flat and the other is curvilinear, with the cutting edge produced by tertiary grinding at the broad flat face.

Pl. 8, no. 24:—It is Coggin Brown’s no. 993 (Brown, 1917, p. 133), and is illustrated by John Anderson (1871, pl. I. 4). It was found in the Mishmi Hills by Capt. Gregory. Its sides are rounded, while one face is ground flat and the other is curvilinear.

Pl. 9, no. 30:—Collected by J. H. Crace. 1935. Limestone. It is a roughly hammered pebble turned into a cutting tool by unifacially grinding the edge.

Pl. 9, no. 31:—Collected by J. H. Crace. 1935. Jadeite. Very roughly worked, showing battering scars on the body. The butt is pointed.

In all there are 9 specimens in this Class.

Besides these, 2 long implements with cutting edge at either end have been collected by J. H. Crace. Pl. 9, no. 32 is of gneiss and is little rough. The cutting edges, which are perpendicular to each other, are produced by unifacial grinding. Pl. 9, no. 33 is of jadeite, square in section, and completely ground. It was found at Ningru near Noa Dihing river. These appear to be altogether different from what is generally known as “bar-celt”.

In all there are 17 specimens so far known from this Zone:

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3. Naga Hills Zone

There are several tribes of the Nagas living on the hill tops, but there is hardly any distinction in the stone tools collected in different tribal areas. Archaeologically speaking, all these areas form one zone, and hence the whole collection from the Naga Hills is here dealt with together.

Class A:—*Facetted Tool*:

Besides the three varieties noticed in the Cachar Hills and Sadiya Frontier Zones, we have here 2 more varieties, one distinguished by side notches for hafting and the other a long variety with parallel sides.
Variety A.I.—*Curvilinear Type*:

Pl. 10, no. 34:—Collected by J. P. Mingsemdi, Ao country. 1923. Jadeite, speckled with yellow and black spots. Correctly speaking, it is trapezoidal in shape with the sides ground flat. The cutting edge is produced by tertiary grinding on the broad flat face.

Pl. 10, no. 35:—Collected by C. R. Pawsey. Sema country. 1926. Limestone. It is a narrower variety of no. 34 with the difference that the tertiary grinding on the broad flat face starts from about the middle of the body. The sides are ground flat.

Pl. 10, no. 36:—Collected by J. P. Mills. Lhota country. 1922. Jadeite. Similar as no. 35, but the sides are rounded and they taper more prominently to meet the flat butt.

Pl. 10, no. 37:—Collected by J. H. Hutton. Sema country. 1917. Gneiss. Very flat and thin in section. The sides have also been ground flat. It is much smaller in size.

Pl. 10, no. 40:—Collected by J. P. Mills. Lhota country. 1923. Gneiss. It is the smallest specimen in this variety with flat sides and cutting edge almost straight.

There are 5 more specimens of the bigger sub-variety: 2 of jadeite, 1 of gneiss, 1 of "reddish stone" and 1 of basalt. Of the smaller sub-variety there are 22 in all: 10 of gneiss, 6 of jadeite, 2 of sandstone and 4 of dolerite.

Variety A.II:—*Bifacially ground median edged type*:

Pl. 10, no. 38:—Collected by J. H. Hutton. Rokimi. 1929. Gneiss. It is trapezoidal in shape with rounded sides, flattened butt and faces ground flat.

Variety A.III:—*Unifacially ground edged type*:

Pl. 10, no. 39:—Collected by J. H. Hutton. Karami (Kalyokengyu country). Gneiss. It is of very thick and broad type. The butt is also very thick. The faces are ground unequally and hence the cutting edge is off the median.

Variety A.IV:—*Facetted tool with side notches*:

Pl. 10, no. 41:—Collected by J. P. Mills. Lazami (Sema country). 1937. This is the usual type of the facetted tool with rectangular section and unequally
ground broad faces, the cutting edge is off the median. In addition it shows semi-circular notches at either side, produced by grinding, in order to strengthen the hafting of the tool. These notches clearly show that the tool was hafted like an adze with the handle perpendicular to the cutting edge.

Variety A.V: *Long Type with parallel sides:*

This type is illustrated by E. H. Steel (1870, Pp. 267-68). It has a bifacially ground median cutting edge with almost parallel sides and roughly flat top. There are 3 examples in all.

There are 35 tools of this Class in the Pitt Rivers Museum. 2 more have been illustrated by Lt. Barron (1872, Pp. 62-63), and 3 more by E. H. Steel (1870, Pp. 267-68).

Class B: *Rounded Butt Axe:*

There are very few rounded butt type of axes found in the Naga Hills. They all belong to one variety, B.III, curvilinear type, the cutting edge is always unequally ground on the broad flat face and the curvilinear face. There is one exceptional variety, gouge adze, which has also been put in this class.

Pl. 10, no. 42:—Collected by J. H. Hutton. Phuyetomi. 1929. Slate. It is a long axe with rectangular cross-section and obliquely deep convex cutting edge. The butt is rough. Apparently it seems to be a faceted type of tool, but its extraordinary length in comparison to its width brings it closer to the tools of the present class.

Pl. 10, no. 43:—Collected by J. P. Mills. Tichipani (Sema country). 1923. Dolerite. This is the typical rounded butt type of tool, lenticular in section with the sides converging on to the rounded butt. The cutting edge is off the median. There are 2 more examples similar to this specimen, 1 of jadeite and 1 of dolerite.

Pl. 11, no. 45:—Collected by J. H. Hutton between Jorsama and Kohima villages (Angami country). Slate. It is of a pointed butt type with straight cutting edge, one face curvilinear and the other flat, the cutting edge is produced by tertiary grinding. There is one more similar example of dolerite.

Pl. 10, no. 44:—Collected by J. H. Hutton. Siromi. 1915. Gneiss. It is an exceptional type of tool with one broad face ground flat whilst the other, slightly
curving, shows deep tertiary grinding to produce the cutting edge. The final shape appears like a gouge adze except that the usual ridge is not seen here. It is rectangular in cross-section. This term, gouge adze, is given by H. D. Noon (1941, Pp. 215-16). Heine Galdern calls it pick adze (1945, p. 140). It has more vaguely been described as beaked adze. There is more poor copy of this type in the museum.

In all there are 8 specimens in this Class, of which 2 are gouge adzes.

Class C:—Axe with broad cutting edge:

Only 2 doubtful specimens are placed in this class.

Pl. 11, no. 46:—Collected by J. P. Mills. Lhota country. 1925. Sandstone. It is a very broad type of axe with very thin section. The butt is broken. Both the broad faces show rough chipping. Later still some more chips have come away. Only the cutting edge is ground.

There is another example of sandstone, collected by C. R. Pawsey in Lazimi. One face is entirely chipped, while the other shows some grinding.

Class D:—Splayed Axe:

It is not represented here.

Class E:—Shouldered Tool:

Variety E.I:—Regular and Broad Type:

Pl. 11, no. 47:—Collected by J. P. Mills. Sanis (Lhota country). 1925. Chert. It is a well-cut tool, but the body is asymmetrical. The tenon is broad and makes a sharp angle with the sides. One face is slightly curving while the other flat, showing tertiary grinding at the cutting edge.

There is another better example illustrated by J. H. Hutton (1924, no. 15). It is of “reddish stone”, and comes from Bapugwena. The body is a perfect square with some breakages at the corners. The tenon is small and narrow and makes a sharp right angle with the sides. One face is ground flat while the other is slightly curving. The cutting edge is produced by tertiary grinding on the flat face. Comparatively it is thinner in section.

Variety E.II:—Regular and Long type:

It is not represented here.
Variety E.III:—Irregular with crescent-shaped body:

Pl. 11, no. 48:—Collected by J. P. Mills. Tsingaki. 1929. Gneiss. Irregular in form, it has distant similarity with pl. 7, no. 15. The body is very irregularly formed and the tenon, which makes an obtuse curve angle with the sides, is narrow and comparatively long.

Variety E.IV:—Irregular and Broad Type:

Pl. 11, no. 50:—Collected by J. H. Hutton from the bed of Chebi river. 1915. Gneiss. The tenon is rounded by hammering. There is no proper angle between the tenon and the sides. The cutting edge is formed by the meeting of the curved face and the flat face ground at a slope.

There are 2 more examples of sandstone and 2 of basalt in this variety.

Pl. 11, no. 51:—Collected by J. H. Hutton. Lhota Country. 1935. Slate. It is a very flat variety of shouldered tool, very thin in section, with a circular hole pierced in one corner probably for putting a string through it. The whole make-up is very rough. It seems that it is a rough copy of the shouldered tool produced not very long ago.

Variety E.V:—Irregular and Long Type:

Pl. 11, no. 49:—Collected by J. H. Hutton. Intuma village. 1928. Dolerite. The butt is slightly rounded. There is no proper angle between the tenon and the sides. The cutting edge is produced by tertiary grinding at the broad flat face. It is almost straight.

There are 4 more examples of gneiss, 1 of sandstone and 2 of jadeite in this variety.

In all there are 12 specimens of this Class so far known from this zone.

Class F:—Tanged Axe:

This class includes a large number of small cutting tools with narrow, i.e. small, tenon. The cutting edge is formed by deep unequal bifacial grinding. In form they resemble the smaller shouldered tools. But the similarity is only superficial. (See comment on p. 54.) The tenons are mostly round in section, though some are square, while the body is roughly rectangular in shape. There is no proper angle between the tenon and the sides. The motive behind this
form was probably to have a narrow butt for hafting. Most of these are of gneiss. The cutting edge is almost straight in all cases. Four varieties have been distinguished.

Variety F.I:—Broad Type with square or rectangular tenon:

Pl. 12, no. 52:—Collected by C. R. Pawsey. Sema country. 1926. It is very irregular in longitudinal section. One face is bulging and the other is slightly concave. The shoulder is just noticeable.

Pl. 12, no. 53:—Collected by J. P. Mills. Seromi (Sema country). 1923. The tenon is square in section and the cutting edge is very broad.

Pl. 12, no. 56:—Collected by J. P. Mills. Lozami. 1925. Dolerite. The tenon is rectangular, and the cutting edge is formed by equal bifacial grinding.

Pl. 12, no. 57:—Collected by C. R. Pawsey. Lokhumi. 1926. It is thin and flat. The tenon is rectangular.

There are 24 examples in this variety: 16 of gneiss, 7 of dolerite and 1 of limestone.

Variety F.II:—Broad Type with round tenon:

Pl. 12, no. 58:—Collected by J. P. Mills. Okotso village (Lhota country). 1921. Black basalt. The cutting edge is unifacially ground.

There are 7 examples in all: 4 of gneiss, 1 of jadeite, 1 of dolerite and 1 of black basalt.

Variety F.III:—Long type with flat topped round tenon:

Pl. 12, no. 54:—Collected by J. H. Hutton. Seromi. 1917. The shoulder is well marked, and the cutting edge is formed by deep bifacial grinding.

Pl. 12, no. 55:—Collected by J. P. Mills. Sema country. 1925. The faces are unequally ground, and hence the cutting edge is off the median.

In all there are 8 examples in this variety: 5 of gneiss and 3 of dolerite.

Variety F.IV:—Long or Broad with pointed tenon round in section:

Pl. 12, no. 59:—Collected by J. P. Mills. Themokedima (Rengma country). 1921. Long body with unifacially ground edge.
In all there are 18 examples of this variety in the collection of the Pitt Rivers Museum: 15 of gneiss and 3 of dolerite.

To this may be added 1 illustrated by J. H. Hutton (1926, p. 133), copied here in Pl. 12, no. 60. Fossil wood. Found at the foot of the Naga Hills when making a road at Nichuguard. Size 4 × 2.

In all there are 58 examples of this class.

Class G:—Wedge-blades:

This class includes a large number of tools all showing narrow rounded butt, naturally smoothed and very rarely dressed by hammering, and a broad or narrow cutting edge, generally produced by bifacial grinding. The majority of the tools have a rough triangular shape. They differ widely in size. Four varieties have been distinguished.

Variety G.I:—Large in size with pointed butt:

Pl. 12, no. 61:—Collected by C. R. Pawsey. Natami. 1929. Limestone. One face is slightly concave while the other is bulging.


Pl. 13, no. 63:—Collected by J. H. Hutton. Siromi. 1929. Dolerite. One face is curvilinear while the other is almost flat showing tertiary grinding at the cutting edge, which is broken. The butt is rounded.

In all there are 18 examples: 2 of dolerite; 2 of limestone; and 14 of gneiss.

Variety G.II:—Medium in size with broad cutting edge and rounded butt:

Pl. 13, no. 64:—Collected by J. H. Hutton. Yahemi (Sema country). 1917. Gneiss. One broad face is curvilinear while the other is ground flat showing tertiary grinding at the cutting edge. The butt is roughly shaped.

Pl. 13, no. 65:—Collected by J. P. Mills. Siromi. 1925. Dolerite. The cutting edge is formed by unifacial grinding.

There are 40 examples of this variety: 26 of gneiss and 14 of dolerite.

Variety G.III:—Medium or small with straight cutting edge:

This variety has its broad cutting edge straight. Some are thick with one face
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curvilinear, while others are thin and have flat faces. They are triangular in shape. On the basis of size they fall into two sub-varieties:

Sub-variety G.III-a:——Medium in Size:

Pl. 13, no. 69:—Collected by G. R. Pawsey. Shahp-sini. 1926. Limestone. It is of flatter variety and is rather irregular.

Pl. 13, no. 68:—Collected by G. R. Pawsey. Sema country. 1926. Gneiss. It is very thick. The cutting edge is formed by unequal bifacial grinding.

In all there are 32 examples of this sub-variety: 30 of gneiss, and 2 of limestone.

Sub-variety G.III-b:——Small in size:

Pl. 13, no. 70:—Collected by J. P. Mills. Lazami. 1930. Gneiss. It is bifacially ground, slightly longish in appearance.

Pl. 13, no. 71:—Collected by J. P. Mills. 1925. Limestone. It is somewhat broad. The cutting edge is bifacially ground.

In all there are 8 examples of this sub-variety: 7 of gneiss and 1 of limestone.

Variety G.IV:——Longish with parallel sides:

These appear like miniature chisels with almost parallel sides. They are found in two sub-varieties:

Sub-variety G.IV-a:——Narrow cutting edge:

Pl. 13, no. 66:—Collected by J. P. Mills. Rochagahmi (Sema country). 1924. Gneiss. The cutting edge, which is straight, is unifacially ground. The sides are parallel and the butt is rounded.

There are 10 examples of this sub-variety: 8 of gneiss and 2 of dolerite.

Sub-variety G.IV-b:——Broad cutting edge:

Pl. 13, no. 67:—Collected by J. H. Hutton. 1915. Gneiss. The sides are divergent and the butt is rounded. The cutting edge is produced by unequal bifacial grinding.

There are 11 examples of this sub-variety: 8 of gneiss and 3 of dolerite.

Leaving aside the miscellaneous tools, the total number found in the Naga Hills is 236:
Class A  ...  37  
Class B  ...  6 with 2 more gouge adzes.  
Class C  ...  2  
Class D  ...  
Class E  ...  12  
Class F  ...  58  
Class G  ...  119  

4. Khasi Hills Zone

Very few tools have so far been collected from this zone. The Pitt Rivers Museum has no specimen from this region. Only 4 implements have so far been published: 2 by Cockburn (1879, Pp. 133-43), 1 by V. Ball (1875, Pp. 158-59) and 1 by Godwin-Austen (1875, p. 158). They have also been listed by Coggin Brown in his Catalogue (1917).

Pl. 13, no. 72:—is a faceted tool of variety A.V. It is made of slate and has parallel sides with broken butt and a crescentic cutting edge produced by bifacial grinding. It is rectangular in section.

Pl. 13, no. 73:—It is an irregular and long variety of the shouldered tool. The butt is flat. It is made of slate.

Pl. 13, no. 74:—is a tool of class C, axe with broad cutting edge. It is very thin in section. The sides are ground flat. It is made of slate. One more example of this class is published by Godwin-Austen.

Class A  ...  1  
Class C  ...  2  
Class E  ...  1  

5. Garo Hills Zone

Class A:—Faceted Tool:

In this class we have here only two varieties, A.I and A.III, but owing to the change of material there is slight difference in form.

Variety A.I:—Curvilinear Type:

This is sub-divided into 2 sub-varieties on the basis of form:
Sub-variety A.I-a:—Rectangular in shape:

These have regular shape with rectangular cross-section, butt flat and cutting edge slightly convex. Angularity of the corners is well marked.

Pl. 14, no. 75:—Collected by G. D. Walker. Fakhre Adap. 1931. Basalt. The butt is rough. The cutting edge is off the median.


Pl. 14, no. 77:—Collected by G. D. Walker. Molmegiri. 1931. Sandstone. It is slightly broken on one side. The cutting edge is deeply convex and the sides are rounded.

In all there are 8 examples: 7 of sandstone and 1 of basalt.

Sub-variety A.I-b:—Trapezoidal in shape:

These vary widely in form. They have flattened butt and convex cutting edge, very thin in section. They degenerate into long varieties. All but one are of sandstone.

Pl. 14, no. 82:—Collected by G. D. Walker. Molmegiri. 1931. Slightly blackened by black soot. The sides are rounded. The cutting edge is less convex.

Pl. 14, no. 83:—Collected by G. D. Walker. 1931. It has a very narrow butt. The sides are ground flat and the cutting edge is deeply convex.

Pl. 14, no. 84:—Collected by G. D. Walker. 1931. It was found when old P.W.D. office at Tura was being demolished. The sides are ground flat.

Pl. 14, no. 85:—Collected by J. P. Mills. Rangop-Adingiri village. 1937. The cutting edge is slightly broken. Some chips have come away later.

Pl. 14, no. 86:—Collected by J. P. Mills. Adingiri village. 1937. It is very narrow at the butt and broad at the cutting edge, which is deeply crescentic.

Pl. 14, no. 87:—Collected by G. D. Walker. Rongjeng. 1931. Limestone. Similar as no. 86, but longer in size. The cutting edge is not so convex, while the sides are ground flat.

In all there are 29 examples in this sub-variety: 28 of sandstone and 1 of limestone.
Variety A.III: — Unifacially ground edged types:

Pl. 14, no. 78: — Collected by G. D. Walker. 1931. Black basalt. It is rectangular in section with flat butt, rather broad in size.

Pl. 14, no. 79: — Collected by G. D. Walker. 1931. Limestone. It is of longer variety. The sides are rounded and the cutting edge is almost straight.


Pl. 14, no. 81: — Collected by G. D. Walker. 1931. Sandstone. The butt is slightly narrow and the sides are ground flat.

There are 8 examples in this variety: 2 of limestone, 1 of basalt, 1 of chert (?) and 4 of sandstone.

Class B: — Rounded Butt Axe:

There is only one variety, B.III curvilinear type, found here. The cross-section varies from lenticular to oval. The most important distinguishing feature of the tools of this zone is that they are comparatively thinner and flatter.

Pl. 15, no 88: — Collected by G. D. Walker. Molmegiri. 1931. Sandstone. It is very long with oval section. The cutting edge makes a deep curve continuous with the sides. There are 5 more examples of this long size: 1 from Rongkhonggiri, 1 from Fakhre Adap and others from Molmegiri. These are all of sandstone.

Pl. 15, no. 89: — Collected by G. D. Walker. Molmegiri. 1931. Sandstone. It is a smaller variety of 88, lenticular in section and cutting edge less convex.

Pl. 15, no. 91: — Collected by G. D. Walker. 1931. Sandstone. It is rather regular in form with the sides ground flat. The butt is rough. It is slightly thicker.

Pl. 15, no. 90: — Collected by G. D. Walker. Molmegiri. 1931. It is asymmetrical, has a pointed butt and the cutting edge corroded.

Pl. 15, no. 92: — Collected by G. D. Walker. Molmegiri. 1931. Sandstone. It is a smaller variety of no. 91. The butt is rounded.

There are 11 more examples in this class. All are of sandstone. They may be subdivided into 2 sub-varieties: (a) those having rounded sides, and (b) those having flat sides.
Class C:—*Axe with broad cutting edge*:

Both the varieties are extremely thin in section, and have rounded butt.

Variety C.I:—*Large Type*:

Pl. 15, no. 93:—Collected by G. D. Walker. Rongjeng. 1931. Sandstone. The cutting edge is corroded. The butt is very narrow.

There is 1 more example from the same locality in slate. A third specimen is of sandstone, slightly narrower at the cutting edge.

Variety C.II:—*Small Type*:

Pl. 15, no. 94:—Collected by G. D. Walker. Dilmagiri. 1931. Sandstone. It is a pointed butt. The cutting edge is produced by unequal bifacial grinding.

Pl. 15, no. 95:—Collected by G. D. Walker. Rongkhongiri. 1931. Sandstone. Similar as no. 94 but slightly thicker and broader.


In all there are 23 examples in this variety, all of sandstone.

Class D:—*Splayed Axe*:

Pl. 15, no. 97:—Collected by G. D. Walker. 1931. Sandstone. It is a rough copy of the splayed axe type. The cross section is lenticular. The cutting edge is produced by unequal bifacial grinding and the butt is also ground flat. There is one more example of sandstone, but the concavity of its sides is hardly noticeable.

Class E:—*Shouldered Tool*:

No regular variety of this class has so far been found in this zone.

Variety E.IV:—*Irregular and Broad Type*:

Pl. 16, no. 98:—Collected by G. D. Walker. 1931. Slate. The body is broader at the cutting edge, which is much corroded. The sides are rounded. One face is curvilinear and the other flat showing tertiary grinding at the cutting edge.

Pl. 16, no. 99:—Collected by G. D. Walker. Rongkhongiri. 1931. Slate. The tenon is very small and rounded while the angle is almost gone. It is thin in section.

Pl. 16, no. 100:—Collected by G. D. Walker. 1931. Sandstone. Smaller
in size. The butt is rounded. The sides curve inwardly to produce the narrow tenon. It is also thin in section. Some chips have come away later.

In all there are 10 examples in this variety: 3 of slate and others of sandstone.

Variety E.V:—Irregular and Long Type:

Pl. 16, no. 101:—Collected by J. P. Mills. 1937. Sandstone. The body is exceptionally long while the tenon is short and flat-topped. The cross section is lenticular.

Pl. 16, no. 102:—Collected by G. D. Walker. 1931. Chert, burnt black. The tenon is produced by rough chipping while the body is somewhat regular. The cutting edge is produced by unifacial grinding. It seems that an older faceted tool has been reshaped to produce the present form.

Pl. 16, no. 103:—Collected by G. D. Walker. 1931. Slate. The tenon is very thick and has a rounded top. The cutting edge is produced by unifacial grinding. The shoulder is just marked.

In all there are 6 examples: 1 of chert, 2 of slate, and 3 of sandstone.

There is one more exceptional type of tool, pl. 16, no. 104, of sandstone, a roughly shaped hand-axe, collected by G. D. Walker. It is chipped all over and shaped like an acheulean tool. It does not show any retouch, nor pecking, but bears traces of grinding all over. The cutting edge is produced by bifacial grinding.

9 more examples of nondescript type, roughly chipped, have also been collected in this region.

In all there are 120 tools so far known in this zone:

<table>
<thead>
<tr>
<th>Class</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>45</td>
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<tr>
<td>B</td>
<td>21</td>
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<tr>
<td>C</td>
<td>26</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
</tr>
<tr>
<td>E</td>
<td>16    (Not a single one of regular variety).</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>10</td>
</tr>
</tbody>
</table>

6. Brahmaputra Valley Zone

One so-called “celt” listed by Coggin Brown (1917, p. 131, no. 867) comes from Dibrugarh. It is of slate and of the rounded butt class (Class B.).
Another axe (Brown, op. cit., no. 868), also of slate, was found 3' below the surface at Sibsagar. It is very thin in section and has a flat appearance. Other finds in this zone are Penny's tools, discovered while digging a trench at Bishnath in Tezpur district. These have been listed by Coggin Brown in his Catalogue (1917). The total number of finds made there was 136, counting each fragment as one. Of these 6 are described as “grooved hammerstones”; 3 ordinary hammerstones; 8 “celts” including one shouldered tool; 9 “small and flat ovoid pebbles of sandstone notched for binding”; 59 pieces of smoothed stone; 65 ordinary pebbles and 6 worked pieces.

26 are clearly recognisable as tools, including grooved hammerstones, ordinary hammerstones, pebbles with notches and the so-called “celts”. The grooved hammerstones, which are illustrated here (pl. 16, nos. 105-11) have already been described (See Pp. 54-55). Of the “celts” one, pl. 16, no. 112, is an irregular and broad variety of shouldered tool type E.IV. Another, pl. 16, no. 111, is a wedge-blade, Class G. Both of them are of slate. A third axe is very thin in section and is of pointed butt type, Class B. There are 4 more examples of this class. The last specimen is an axe with broad cutting edge, Class C.

The following main classes occur in Bishnath:

- Class B: 5
- Class C: 1
- Class E: 1
- Class G: 1

**Summary and Conclusion**

When the evidence of the tools, so far found in the various zones of Assam, is considered as a whole, some important conclusions can be tentatively drawn. In the chart given at the end of this chapter a statistical summary of the figures is given. The total number of tools is 575, of which 130 are merely pebble fragments. The actual tools known are 445. Of these 37 are of miscellaneous class of tools including hammerstones, nondescript types, whetstones etc., and 178 are of Class F and G, tanged axes and wedge-blades probably used for digging purposes, which are distinctive of the Naga Hills Zone except for one specimen which comes from Bishnath. The wedge-blades and tanged axes
are not found in South East Asia with the exception of Burma. Though some of them may be paralleled in Yunnan, it is fair to assume that these types are local to Naga Hills and Upper Burma. As has been pointed out before, in these examples the important technique is the process of grinding, and there is hardly any trace of flaking or battering. Technologically this tool type appears to be of a very late appearance. This fact is further supported by the fact that they are special to the Naga Hills Zone in Assam. The Indian type of wedge-shaped axes, as has been said before, is different in form and technique of manufacture.

Of the remaining tools, numbering 230, only 40% of the total, 39 are of Class C, an axe with broad cutting edge, a type which is not met with in South East Asia and Yunnan, except for one specimen in Malaya. But it has many parallels in other parts of India.

43 tools are shouldered, Class E: 9 are regular in form and 34 are irregular, suggesting that these are rough copies of the original specimens. At least one of them, which has a hole (pl. 11, no. 51), has been used as an amulet. Its whole make-up suggests that it is a recent product. This type is altogether absent from the Sadiya Frontier Zone. In the Garo Hills the regular type has not been found. In the Cachar Hills more than half are of regular variety, while in the Naga Hills there are only 2 out of 12. On the other hand the shouldered tool class is absent from Yunnan except for 2 doubtful specimens. But in South East Asia it is the predominant type in the developed neolithic group. The regular variety is most common in Burma. It appears that the shouldered tool type came to Assam through the Cachar Hills Zone from Burma. In the interior it degenerated into the irregular variety as in the Khasi Hills, Brahmaputra Valley and the Garo Hills Zones.

Only 3 examples are of Class D, i.e., Splayed axe type, which is accepted by all to be a metal copy. This type is known from Yunnan as well as from South East Asia. In India proper it comes from Bihar and Orissa. The Assam specimens are very rough and irregular. They come from the Cachar Hills and Garo Hills Zones.

98 examples are of Class A, facetted tool, of which 29 irregular specimens come from the Garo Hills Zone. Of the regular variety 40 come from the Naga Hills Zone, 16 from the Garo Hills, 6 each from the Cachar Hills and Sadiya
Frontier and 1 from the Khasi Hills. This facetted type is common throughout Eastern Asia. They have been found in large numbers in Chinese graves of the 1st millennium B.C. In India they are confined to the Eastern provinces.

The remaining tools, numbering 47, are of Class B, rounded butt axe. 2 of these are gouge adzes, the so-called "beaked adze" type. Only 3 of them show median cutting edge, 3 have unifacial ground edge and 41 are of curvilinear type. In the Naga Hills they are very poorly represented less than 4%. In the Sadiya Frontier they are more than 50%.

On the basis of the formation of the cutting edge the figures stand as follows. In Class A only 3 out of 98 have bifacially ground median cutting edge, 1 from each of the Naga, Cachar and Khasi Hills Zones. In Class B 3 out of 47 have bifacially ground median cutting edge, all of them coming from Sadiya Frontier Zone. In Class C and F none have median cutting edge. 1 in Class D and 1 in Class E from the Cachar Hills Zone show this cutting edge; while all the tools of Class G from the Naga Hills Zone show unequally ground bifacial cutting edge.

This analysis of tools suggests that the neolithic cultures in Assam, as represented by these stone tools, are of late origin. The earliest possible date is linked up with the chronology of the developed neoliths in the countries of South East Asia and Southern China.
Appendix to Chapter IV

Stone Implements from Yunnan

It has been remarked earlier (p. 44) that the stone tools of the Sadiya Frontier Zone in Assam have a marked resemblance with those from Yunnan, a province in South West China. In order to understand fully the relationship between the two regions, this appendix on the stone implements from Yunnan is added.

In 1868 John Anderson (1871, pp. 410-15), who accompanied the British expedition under Major Sladen from Burma into Yunnan, was first to discover stone implements in Yunnan. About 150 specimens were obtained during this expedition by different members. Most of them were purchased in Tengueh (Tengyeh), and a few in the Sanda valley. Following in Anderson’s track, in 1909 Coggin Brown (1909, pp. 299-305; 1914 b pp. 265-274) was able to procure numerous specimens of similar tools in Tengueh. A large collection was also made from other localities. From the available material and literature it seems that no other person has dealt with the neolithic problem of Yunnan.

Teilhard de Chardin and W. C. Pei, in their work entitled Le Neolithique de la Chine, have divided the neolithic culture of China into three zones; Mongol Zone, Huangho Zone, and Yangtse Zone. In the last zone the cultures of the extreme south are included. They are referred to as “Primitive Culture and almost savage”. Even this section includes only three regions: the region of Kwangsi cave, Szechwan, and Hsikang on the border of Tibet. The stone tools of Szechwan have been fully studied by Mr. Cheng Tek’un (1942, pp. 1-16). In these three regions chipped “pebble tools” have been found along with ground tools. The backwardness of these regions in comparison to the river valley cultures of northern China is marked by their coarsely made stone tools and unpainted pottery. But that the influences from northern China was slowly penetrating into these far off regions, may be inferred from the find of painted sherds from Wei Chow (D. C. Graham, 1938, p. 229), as well as from the very technique of grinding and the better forms of ground tools which recall the specimens of the north.
# Neolithic Finds in Assam

<table>
<thead>
<tr>
<th></th>
<th>Class A</th>
<th>Class B</th>
<th>Class C</th>
<th>Class D</th>
<th>Class E</th>
<th>Class F</th>
<th>Class G</th>
<th>Class H</th>
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<td>Regular</td>
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<td>Usual</td>
<td>Special</td>
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<tr>
<td>6</td>
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<td>6</td>
<td>x</td>
<td>9</td>
<td>x</td>
<td>x</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Khasi</td>
<td>Hills</td>
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<td>x</td>
<td>3</td>
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<td>Brahmaputra Valley</td>
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<td>9</td>
<td>34</td>
<td>58</td>
<td>120</td>
<td>6</td>
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</tbody>
</table>

Hammerstones 12+ Pebbles 130
As far as Yunnan is concerned, unfortunately only a partial picture of the neolithic culture is known to us. So far only well-developed ground tools have been made available. No field archaeologist has yet gone into the interior of the province to discover the neolithic sites; hence the “pebble tools” and pottery, which are likely to be found here, are not known to us.

The following study is based on the published materials and a few tools preserved in the British Museum and the Pitt Rivers Museum, Oxford. The classification, given here, follows that of Assam except the varieties of Class G.

Class A:—Facetted Tool: Variety A.I:—Curvilinear Type:

Pl. 17, no. 2:—This is Anderson’s no. 9. Slate. It is trapezoidal in shape with irregular butt while body retains roughness. One face is slightly convex and the other concave showing tertiary grinding at the cutting edge.

Pl. 17, no. 3:—This is Anderson’s no. 10. Black basalt. Similar to no. 2 but narrower, butt slightly rounded and one face flat showing tertiary grinding at the cutting edge.

Pl. 17, no. 4:—This is Anderson’s no. 13. Dark reddish brown jade. Similar to no. 3 but smaller in size.

Pl. 17, no. 5:—This is Anderson’s no. 15. Greenish speckled jade. It is a short and broad variety of this type with one face bulging to a curve and the other irregular.

Variety A.II:—Bifacially ground median edged type:

Pl. 17, no. 1:—It is from Major Sladen’s collection in the British Museum. Jade with brown patches. The sides and the butt are ground flat while the faces have been unequally ground but edge median.

Pl. 17, no. 6:—This is Anderson’s no. 3. Schist with faint traces of mica. It is a short and broad variety. The cutting edge is deeply crescentic produced by bifacial grinding.

Variety A.III:—Unifacially ground edged type:

Not illustrated here. Anderson’s no. 18 is of this type. He describes, “It has divergent, slightly convex, flattened, ground edges, and an exceedingly narrow flat head.”
Variety A.IV:—Tool with side notches:
Not represented here.

Variety A.V:—Tools with parallel sides:
Pl. 17, no. 7:—This is Anderson's no. 2. It is of bifacially ground edged type with parallel sides and faces flat and butt blunt.
Pl. 17, no. 8:—This is Anderson's no. 8. Slate. It retains the flaking scars on the body. The butt is broken. The parallel sides are ground flat. One face is flat showing tertiary grinding at the edge, and the other is slightly curving.

Variety A.VI:—Short and Broad type trapezoidal in shape:
This is a new variety in this class. In length it is very short. The cutting edge is broad and always off the median. It is found in various sizes, ranging from miniature to medium. This type has been found in Indochina. The smaller variety of Class C in the Garo Hills Zone comes closer to this type.
Pl. 17, no. 9:—This is Anderson's no. 16. He describes: "A very rough and seemingly unfinished implement of a highly calcareous, soft, shaly-like rock, of so little consistence that it is difficult to conceive to what practical use it could have been put. One side is slightly convex, but nearly straight, while the other is much divergent, forming an acute angle with the cutting edge. It is convex on one face and flat on the other above the sharpened edge, and the sides are more or less flattened."
Pl. 17, no. 10:—This is Anderson's no. 20, which he rightly recognised as allied to no. 9. He describes, "It is almost square and only a little longer than broad. Its sides are unequal, one diverging more than the other and both are ground to a flat surface. One face is not so convex as its fellow and is prolonged the cutting edge, while the opposite one is more convex and broadly ground of to it. This face also shows, besides the bevelled area, three distinct facets, the result of grinding probably of the stone against another."
Pl. 17, no. 11:—This is Anderson's no. 21. It is a miniature variety, with its sides symmetrical. One face is deeply convex while the other gently curves.
Pl. 17, no. 12:—This is Anderson's no. 22. Greenish jade. Sides are flat, one being more divergent than the other while the cutting edge is bifacially ground.
Class B:—Rounded Butt Axe:

There are only two varieties present here.

Variety B.I:—Bifacially ground median edged type:

Pl. 18, no. 13:—This is Anderson’s no. 1. He describes it “is distinguished from all others by its long, narrow, tapering form and by the convexity of its four surfaces, which make it almost cylindrical. The blunt end is also carefully rounded.”

Variety B.III:—Curvilinear Type:

Pl. 18, no. 14:—This is Anderson’s no. 5. He describes it as “an axe-edged tool, with parallel, faintly bulging, smooth sides, and a rounded, blunt end, flat on one face, but convex on the other. The cutting edge is worn away obliquely on one side.” The flat face shows tertiary grinding at the cutting edge.

Pl. 18, no. 15:—This is Anderson’s no. 6. It is a flattened broad axe of Lydian stone with ground divergent sides with deeply convex cutting edge and rounded butt. The cutting edge is produced by unequal bifacial grinding.

Pl. 18, no. 16:—This is Anderson’s no. 11. He describes it as “a well-formed broadish flattened implement of Lydian stone, and is slightly convex on one side and more so on the other, which is more bevelled than the former, with its sides bulging and nearly equilateral”.

Pl. 18, no. 17:—It is from Major Sladen’s collection in the British Museum. Jade. It has a deeply convex cutting edge formed by unequal bifacial grinding.

Class D:—Splayed Axe:

Pl. 18, no. 18:—This is Anderson’s no. 19. Dark bluish jade. It has a broad deep crescentic cutting edge formed by bifacial grinding. The sides are slightly concave and the butt is rough.

Pl. 18, no. 19:—This is Coggin Brown’s (1914 b.,) no. 15. Brownish volcanic rock. 10×7 cms. It has a broad cutting edge, almost semi-circular with concave sides, while the butt is rough.

Pl. 18, no. 20:—This is Coggin Brown’s (1914 b.,) no. 14. Greyish quartz porphyry. 15.5×10.5 cms. It has a broad deeply convex cutting edge produced by bifacial grinding. The butt is flat.
Class E:—*Shouldered Tool*:

We have here only two specimens so far known. Both show new varieties. They have been doubtfully assigned to this class.

Variety E.II:—*Regular and Long Type*:

Pl. 18, no. 21:—This is from Major Sladen’s collection in the British Museum. Black basalt. It is a very long tool rectangular in section with a sharp unifacially ground cutting edge. The tenon is slightly narrower than the body and the shoulder is just visible. Similar long type of shouldered tools have been found in southern Burma (See pl. 56, nos. 28 & 30). This type is not known in Assam.

Variety E.IV:—*Irregular and Broad Type*:

Pl. 18, no. 22:—This is Anderson’s no. 24. Green Jade. It is flat on one face and curved on the other. The cutting edge is almost straight. The butt is rounded. This may belong to class F of Assam.

Class G:—*Wedge-blades or chisels*:

There are a number of miniature tools found in Yunnan with flat faces and unifacially ground cutting edge, while the sides are (a) in larger examples parallel and (b) in smaller specimens slightly tapering. The cutting edge is always straight. Many of them appear to have been used for digging. Hence they have been classed as G, though in actual form they differ widely from the Assam tools of this class.

Variety G (a):—*Those with parallel sides*:

Pl. 18, no. 23:—This is Coggin Brown’s (1914 b) no. 17. Indurated shale. It is thin and elongated.

Pl. 18, no. 24:—This is Anderson’s no. 23. Quartz. It has rounded sides.

Variety G (b):—*Short with tapering sides*:

Pl. 18, no. 25:—This is from Major Sladen’s collection. Jade. The cutting edge is formed by unequal bifacial grinding.

Pl. 18, nos. 26-29:—These are Coggin Brown’s (1914 b.) nos. 24 to 27. He describes, it is "a type in which both back and front faces are ground down to
produce the blade. The sloping of the back face is done at a high angle, and it proceeds only a very short distance above the edge. The result is a straight remarkably sharp blade. The remaining portions of both faces are flat, though slightly bevelled off to meet the flat sides which taper a little towards the butt.” They are all of slate.

Besides, 6 hammerstones and 1 polisher have been illustrated by Coggin Brown (1914b).
Chapter V

NEOLITHIC CULTURES OF BENGAL, BIHAR AND ORISSA

Neolithic cultures of these provinces are said by H. C. Chakladar to be represented by ground tools, pottery and cultivation of cereals. The ground tools collected as surface finds in large numbers have been described by several persons. But so far no attention has been paid to pottery discovered in association with them, that is to say, no one has figured, analysed or properly described the types of pottery found. H. C. Chakladar writes, “Pot-sherds indicating pottery of two distinct types, one pretty thick and the other comparatively thin, have been discovered with the Neolithic implements at Baidipur in Mayurbhanj, and at other stations also. Pot-sherds collected with the tools in the valley of the Sanjai, show on examination that in the preparation of the paste for manufacturing pots, husks of grain (paddy) have been used with the clay for giving it greater binding strength.” (Chakladar, 1952, p. 140). He further mentions on p. 162 (ibid), footnote 70, “Murray has found pottery in various well-authenticated strata with Neolithic artifacts, and in various stages of development.” But from Murray’s (1940, Pp. 87-95) own description it is clear that the pottery that he found, cannot be called neolithic. At one place (Murray, 1940, Pp. 87-88) the pottery relates to the burial urns of a late historical period,1 and at three other places (ibid., Pp. 90, 91 and 95) the pottery was found along with copper and iron slags, and apparently belongs to the period when the copper mines were worked. It is true that in the neighbourhood of the copper mines and along with the copper and iron slags some neolithic implements were also discovered by Murray, but as all these were surface finds, we can say nothing about the relationship of the burial urns or the pot-sherds with the ground tools. It is probably on account of the surface collections of ground tools in the neighbourhood of copper seams that Col. Gordon has called this complex “a chalcolithic culture similar to that of Maski and Brahmagiri”.

1 Murray speaks of the find of a Kushan coin inside a burial urn.
(Gordon, 1950, p. 83). While at these two sites Brahmagiri (Wheeler, 1947-48) and Maski (Gordon, 1943) actual excavations have produced evidence for the use of copper tools with the ground stone implements, in Bihar, Bengal and Orissa no such excavated material is available from any neolithic site. From the surface finds it is hard to draw any definite conclusion. Murray is inclined to believe that the copper mines were worked at least from the 3rd century A.D. (datable on the evidence of a Kushan coin obtained here). The presence of ground tools and microliths in the neighbourhood of these mines and some in the actual pits, does not necessarily imply a complex characterised by the use of stone and copper. This whole material has to be judged against the background of the Indian social and economic system, where, as Prof. K. de B. Codrington (1937, Pp. 70-99) has rightly put, the town, the village and the market play an important role, each maintaining their own way of life, with the market supplying the barest need of the village.

This suggestion implies the existence of communities of people in the neolithic stage at a late historical period. This is not purely hypothetical. Actual evidence has been produced by the excavations carried out at Bhita near Allahabad by Sir John Marshall and at Bangarh in Dinajpur district by K. G. Gosvami. Marshall observes, "A singularly interesting problem is presented by the discovery in this house of Naga as well as in several other buildings on the site, of a number of celts and other neolithic implements of slate, sandstone and diabase. They were found in the Kushana (2nd century A.D.) and Early and Late Mediæval strata, and there can be no mistake as to the people which they belong." (Marshall, 1911-12, p. 35). At Bangarh the implement, pl. 23, no. 97, was found in a layer which was considered to be just below the Sunga level (2nd—1st century B.C.) (K. G. Gosvami, 1948, p. 32). These discoveries attest the prevalence of the use of ground tools in this region up to a very late historical time.1 However, no stratified material is available from this region to fix the lower limit of the neolithic culture. In the absence of stratified data it is very difficult to associate pottery types with particular types of ground tools.

However, recently Mr. M. N. Deshpande (A. Ghosh, 1955, Pp. 19-20) has

1 Their scarcity suggests that their use must have been very limited.
produced stratified data by his excavation at Tamluk in Midnapur district, West Bengal. Here the lowest level has yielded "neolithic celts (facetted tool type) and an ill-fired pottery". In the next stage above this level has been discovered cast copper coins and terracotta figurines of decidedly Sunga style, which suggest a date not earlier than second century B.C. Hence the upper limit of the level is the end of the 3rd or the beginning of the second century B.C. As the materials still remain unpublished, it is not possible to give detail about the pottery discovered.

The distribution of ground tools is very significant. As the map (no. 2) shows, the main neolithic sites in this region lie south of the river Ganges in the forest belt of the gneissic plateau of Chota Nagpur and its extensions into West Bengal and Orissa. The exceptions are: (1) the neolithic finds in the district of Darjeeling, which form a separate group by themselves; (2) the solitary find of a rounded butt axe during the excavation of the historical site of Bangarh in Dinajpur district just below Sunga level; and (3) a "piece of fossil wood, pointed, elongated, one side flat, truncated butt, beautifully polished" (Coggin Brown, 1917, p. 130) from Sitakund1 in Chittagong district. Leaving aside these exceptions, the northern boundary of the neolithic finds is Rajgir in Patna district (J. H. Hutton, 1931, p. 360), Sahebganj in Gaya district (Coggin Brown, 1917, p. 130) and Jamalpur in Monghyr district (Brahmachari, 1928, p. 136). The eastern boundary turns through the Dumka sub-division of the Santal Parganas and goes on to Raniganj in Birbhum, Durgapur in Burdwan, some sites in Bankura (not yet published, but referred to by H. C. Chakladar, 1952, p. 130), Tamluk (A. Ghosh, 1935, Pp. 19-20) and Bamal in Midnapur (D. Sen, 1948, Pp. 252-53). So far no neolithic finds have been reported from the banks of the Ganges River. The main river valleys, which have produced neolithic artifacts, are the Ajai, Damodar, Kasai, Rupnarayan, Suvarnarekha and its tributary the Sanjai, and the Burhabalanga, all of which originate in the high-land of Chota Nagpur. On the west this forested belt continues south of the Jamuna-

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1 There are four more specimens preserved in the British Museum. All are varieties of facetted tools of Assam. One is of limestone, another of chert and two of fossil wood. These examples suggest that this zone really belongs to the Assam culture complex. But the material is scanty, and it is hard to be dogmatic.
Ganges valley, incorporating the central ranges of the Kaimurs, the Vindhayas and their offshoots, and the valleys of the rivers Son, Tons and Chambal. A glance at the map (Map no. 7) will show that the Ganges from Allahabad to Rajmahal and the Jamuna from Delhi to Allahabad flow close to the southern margin of the great alluvial plain, and mark a dividing line between the undulating hilly ranges of the south and the alluvial flat of the north. J. Cockburn (1894, p. 27) remarks, “All along the southern border of the Gangetic valley in the older alluvium fringing the Vindhians and the Kymores and as far south of these hills as I have been in Sergoojah and Rurah (possibly Rewa), the soil teems with fragmentary remains of ancient stone weapons.” To the south of the hilly ranges of Orissa, again, the neolithic sites abound in the valleys of the rivers Godavari and Krishna, down to Kaveri. The only portion of the Peninsular region, which is so far blank, is the north-western Maratha block of Deccan trap, where microlithic industries predominate (Gordon, 1950, see his map), that is to say in the trap region no ground tools have been found. Further to the north west ground tools have been found at Burzahama in Kashmir, and in a late historical context at Taxila. It is clear that the distribution of neoliths in Peninsular India is almost continuous and homogeneous, with only rare gaps probably due to want of exploration. This distribution is founded upon a more or less homogeneous geographical and geological background (See map 7). Indeed this background must always be taken into account when considering the neolithic problem of India as a whole. On this basis as well as others, which will be discussed shortly, Sir R. E. Mortimer Wheeler’s assumption from “the distribution of stone axes as plotted on the map as indicating a probable movement from north-east to the south-west” is hardly justifiable. (Wheeler, 1947-48, p. 295; Gordon 1950, p. 79).

The mode of the occurrence of ground tools in our region may also be noted profitably in order to get some idea of the environmental background. Captain Beeching (1868, p. 177), who was the first person to discover implements in Singbhum district, says, “They were generally to be seen on or near the banks of the river and attracted the eye at once by the striking difference they presented to the other stones lying near them. Some were lying loose on gravel, others in the sandy depressions and ravines near the river, and in one instance the
chips appeared to radiate from a small rocky mound, becoming more numerous as one approached the central part.” This was later confirmed by V. Ball (1870, p. 268). C. W. Anderson made a detailed survey of this area in 1917 and reported the discovery of ground tools and microliths buried under a recent alluvial deposit about 18’ thick (See Pp. 34-35). He makes the important observation that from the highest point near Chakradharpur a contour 18’ below the level of the plateau, when followed, led to the discovery of many neolithic sites. D. Sen, again, visited this area and noted “a rich celt-site on the Sanjai valley four and half miles south-east of Chakradharpore, near the Barda bridge on the Sanjai by the Chakradharpore-Chaibasa road”. (D. Sen, 1930, p. 7). He observes, “The celt-site is on a high ground above the alluvial flood plain, overlooking the river and is more than fifty feet above the present level of the river. The alluvial deposits which bank against the celt high-ground have not yielded any artifacts.” This observation would seem to confirm Anderson’s conclusion that the neolithic finds are not associated at all with the recent alluvium in this region. D. Sen makes a similar observation at another celt-site near the village of Bamal, about three miles south of Lalgarh in the Jhargram sub-division of Midnapur district. He says, “There is a deep meander of the Kasai River about a mile west of this place. The site is about 50’ high above the present level of the river and the contour height round this place is 200’ above sea-level. The soil is blackish at the top and seems to be fairly rich in humus and the soil below is reddish yellow. Gully erosion is fairly strong here, and it is possible that the tools have been eroded away.” (D. Sen, 1948, p. 232). Two implements were found here in situ, one at a depth of 1’ below surface and the other at 2’ 10’. Recently a microlithic site at Bimbhanpur in the district of Burdwan was excavated. The implements were found to lie in the upper terrace away from the recent alluvial deposit (See Pp. 36-37). In Manbhum district near the village of Bonga, another neolithic site was discovered on a hill terrace, high above the surrounding flood plain (See p. 36). These observations indicate that the makers of the neolithic artifacts selected high plateaus and terraces above the flood level as their habitation sites and that since the occupation of these sites recent alluvium has been deposited by the later action of the rivers. If the observation of C. W. Anderson in the valley of the rivers Sanjai and Bijai is correct, one is
tempted to postulate an older land surface on which the neolithic people lived. In any case, all the observers agree on the point that the neolithic artifacts have not been found so far in the recent alluvium in this region.

Valuable information is also given by E. H. C. Walsh on the occurrence of neolithic artifacts in Darjeeling district. He writes, “Stone implements are fairly frequently found in parts of the Darjeeling district and in Sikkim. In the Darjeeling district they are most frequently found in the Kalimpong sub-division lying to the east of the Teesta river which formerly (upto 1865) was part of Bhutan. They are also found on the slopes of the hills which run down to the Teesta on its western bank. In other parts of the hill portion district they are found more rarely, as it was, doubtless, less inhabited by people using such weapons, and further down on the lower slopes of the hills in the Kurseong sub-division, and where the plains are reached in the Tarai they have, as far as I am aware, not been found at all.” (Walsh, 1904, p. 20). This evidence is quite in keeping with what we know of the geology and geography of this part of the country. As in southern Bihar and West Bengal, here also neoliths are absent from the recent alluvium of the plains, but they abound on the hill terraces and slopes of the higher regions.

The concentration of neolithic finds, in this region, in the upland of the Chota Nagpur plateau (understood in its widest sense, i.e., inclusive of its extensions into West Bengal and Orissa), and in the hill slopes of Darjeeling speaks of a homogeneity of geographical conditions (See chapter I for description). However, surface collections on the hill terraces or on the high river banks can hardly lead to any definite chronological conclusions. The age of the recent alluvium under which some of the neolithic finds have been made, may vary considerably in this part of the country. Large areas are still covered by the “Older Alluvium” of the Pleistocene and at places this is overlaid by the post-pleistocene “New Alluvium”, which gives place gradually and imperceptibly to the recent alluvium.

The study of the materials collected under the conditions noted above does throw some light on their typology. This study is based on four collections: (1) Anderson’s finds in the valley of the river Sanjai (Anderson, 1917, pls. 1-9) have been treated with some doubt as they include materials from under the
recent alluvium as well as those buried in the recent alluvium; (2) D. Sen's discovery in the same valley (Sen, 1950, nos. 1-26); (3) G. S. Ray's finds in the hill terrace near Bongara in Manbhum district (Ray, 1954, pl. II); and (4) implements collected at Bamal in Midnapur district by D. Sen (1948, Pp. 252-253). These collections will be referred to as group I.

The artifacts consist of axes, wedges, chisels, perforated stones, and hammerstones or pounders. Three different techniques, chipping, pecking or hammering, as well as grinding,¹ have been used either singly or in combination to produce these tools. The implements found display various stages of manufacture. Some show merely chipping as in pl. 19, nos. 1 and 2; some are roughly shaped by chipping, dressed by hammering or pecking, while the cutting edge is formed by bifacial grinding, as in pl. 19, nos. 3 and 4. Still others are completely ground, as in pl. 20, no. 15. All these are finished tools as they show marks of use, and they belong to one and the same period as they have been found together. Col. Gordon (1950, p. 79) has rightly corrected the assumption of Dr. C. Von Furer Haimendorf (1948 b, p. 206) "that the chipped axes with only the cutting edge ground and polished preceded by sometime the axes ground and polished all over." Such an assumption is clearly groundless for this region.

The typology of these tools is given below:

Rounded Butt Axe with bifacially ground median cutting edge:

The predominant tool in the neolithic culture of this region (as well as in Peninsular India) is the axe form with its butt narrowed to facilitate hafting. All of them have the common characteristic of the narrow butt being rounded. Typologically they fall into two main classes: (I) Axe-blades with median cutting edge formed by bifacial grinding, and (II) Axe-hammers broad end flat or blunted. The axe-blade may be sub-divided into four sub-classes:

(I-a):—The predominant feature of this sub-class is that the rounded butt is somewhat pointed, as in the examples illustrated on pl. 22.

¹ The term, "polishing", which is generally used, and has been taken by D. Sen (1950) to be a distinct technique, is not considered suitable to describe the smoothing process shown by these tools. This depends upon the degree and extent of grinding rather than on actual polishing as this term is commonly understood.
(I-b):—In this sub-class the rounded butt is thick and blunt, as in pl. 19, nos. 8 and 9.

(I-c):—The distinguishing feature of this sub-class is in its cutting edge, which is exceptionally broad. The length of the tool is generally reduced, while the rounded butt is usually pointed. This type has been found in large numbers in the Kaimur Hills (Rivett-Carnac, 1883 b, pl. XIX, no. 12) and in Banda district (W. Theobald, 1862, pl. II, r, 3-5), a region which lie to the west of Chota Nagpur.

(I-d):—This sub-class includes axes markedly thin in section, generally of slaty material (See pl. 19, nos. 5-7). It is because of this extreme thinness that they are usually found broken as in the illustrated examples. One such broken piece is figured by G. S. Ray (1914, pl. II), and two complete specimens by C. W. Anderson (1917, pl. VI, nos. 42 and 44).

The cross-section of these implements differs widely, being, of course, related to the wide selection of raw material used. The stones, most commonly used, are trap, schist, slate, and quartzite. Other stones used occasionally are basalt, epidiorite, sand-stone, gneiss, phyllite, hornstone and limestone. It is plain that the form in which these stones were obtained, generally dictated the shape of the tool. Hence the cross-section varies from ovoid to lenticular. The cross-section of some examples differs widely between the butt and the cutting edge. These can be described only as irregular.

Col. Gordon (1930, p. 79) makes a special reference to an axe found in the I-A, i.e. the lower stratum of the stone axe culture at Brahmagiri (Wheeler, 1947-48, pl. CXIII. 18), which, he describes as “a flat square-sided axe of the north-eastern type, deriving via Bihar from Burma and Malaya”. On the same page he cites another solitary example from the Shevaroy Hills (Foote, 1916, p. 59, pl. 3, 97). He cites the authority of Dr. C. V. Von Furer Haimendorf (1948 b, p. 207) for considering them as of South East Asiatic type. But, as has been remarked earlier, the forms of these solitary examples are dependent upon the type of material available rather than on any particular model. The only Eastern Asiatic type which comes closer to them, is what we have called Facetted tool (See Pp. 47-48). The distinctive feature of this type of Eastern Asiatic tool is its method of manufacture, which involves a process of sawing.
Its cutting edge, which is always bifacial but unequally ground, is a characteristic common to almost all the neolithic tools of South East Asia. The Indian examples can hardly be said to be identical with this type. It should be noted that tools of this type have been found in Assam, but not in Group I in Bengal, Bihar and Orissa.

It is clear that the rounded narrow butt axe with bifacially ground median cutting edge is the predominant tool in the neolithic culture of India. This is the only type included in the collections of Group I made by C. W. Anderson, D. Sen and G. S. Ray. So far no adze form with a unifacially ground cutting edge (bevel) has been found. In the Brahmagiri excavation report (Wheeler, 1947-48) only one example is described as an adze, while Subba Rao (1948, pl. XXI, nos. 7 & 8) illustrates two examples of “adzes”, one of which is broken towards the butt and the other hardly shows any “bevel”. The only feature which is noticeable in these illustrated examples is the flatness of the underside. Whether this flat surface is obtained by primary grinding (See p. 47 for its definition), or is natural to the material selected, it is difficult to determine. I am informed by Subba Rao that in his examples the flatness is due to the flake surface, and not to grinding. In the Eastern Asiatic examples this lower surface shows primary grinding, the cutting edge being formed by tertiary grinding (See p. 47-48 for definition). Such a feature does not occur in the Indian examples quoted.

The rounded butt axe of the Indian type is present in Assam in very small numbers, and in the mainland of South East Asia it is exceedingly rare (See p. 52). This type is well-known in the river valley cultures of northern China (Anderson, 1943, pls. 8, 12, 13, 63-66), Szechwan, and also in Yunnan (See pl. 18). However, it must be noted that in these countries axe and adze forms are found together. As far as the available materials go, we cannot think of a separate axe or adze industry in these countries. On the other hand in India the axe' is the dominant tool in the neolithic culture, while the true adze is totally absent. Therefore E. C. Worman’s (1949, p. 199) argument that China is the source of the Indian neolithic “celt” is hardly credible. If the neolithic cultures

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1 It may be pointed out that axe and adze blades have been distinguished on the basis of the cutting edge. However, it should be remembered that axe blades could be mounted as adzes, i.e. transversely to the haft.
of India and China were related at an early stage, we should expect to find in India adze blades along with axes so commonly in use. The available material contradicts this expectation. In the mainland of South East Asia adzes have been found along with axes, which have unequally ground bifacial cutting edge.

Wedge-shaped axe:

This appears to be a development from the earlier type of axe. It may be derived from (I-c) sub-class, which, like the wedge-shaped axe, is characterised by a broad cutting edge. The only difference is that the pointed butt end of (I-c) is chipped transversely and ground, thus producing a flat butt. The cutting edge is median and bifacially ground, and is generally straight, while the other axes usually have convex cutting edge. The cross-section is generally rectangular (See pl. 20, nos. 15 and 16) and the tools are well-formed. No. 17, on the same plate, most probably belongs to this type, though it shows a slight “bevel” at the cutting edge. This type is illustrated in reports from Bellary.

Chisel:

In this region the chisels are generally rectangular in cross-section with a flat butt (pl. 20, nos. 18-20), the cutting edge being bifacially ground, or rarely unifacially ground, as in pl. 20, no. 22. This last example has a pointed butt and was probably hafted. Pl. 21, no. 24 appears to have originally had a splayed cutting edge, like pl. 20, no. 21. The other type of chisel with oval cross-section is also known (See pl. 22, nos. 71-73). The chisels of this region, though formed mostly by chipping and edge-grinding, are generally different from the South Indian specimens, the Bihar and Bengal examples inclining to rectangularity.

Perforated Stones:

The perforated stones of this region are circular or oval flat stones with a hole in the centre made by working from both faces. They show hardly any grinding, their edges being blunt. Another type, known from South India is elliptical in form (Madras Museum, no. 176), triangular in cross-section, thus having an edge at both ends. Both these types differ from the Burmese (Coggin Brown, 1917, pl. IX, no. 10) and Malayan (M. W. F. Tweedie, 1953, figs. 28-30) examples, which are always circular in shape, uniformly thin in section and generally
have a sharp edge (one example from Burma is preserved in the British Museum). There are differences in the technique of manufacture as well. The Burmese and Malayan examples (except Tweedie, 1953, fig. 30, which is unfinished) are completely ground, and the regularity of their form suggests that they have been produced by sawing. They are most probably derived from the very similar jade ring-stones of northern China (See Andersson, 1943, pl. 1, nos. 1 and 2). Similar specimens have also been found from Graham's excavation at Hanchow in Szechwan (D. C. Graham, 1933-35, Pp. 114-131).

Hammerstones or pounders:

These are generally elongated pebbles which hardly show any working. However, C. W. Anderson (1917, pl. III, no. 27) has illustrated a well-worked pounder. In the Kaimur Hills, outside our region, a number of grooved hammerstones have been found (Rivett-Carnac, 1883b, pl. XVIII, no. 1 and pl. XX, nos. 12-16).

These are the only types known in the collections of Group I. However, when these are compared with others made by local purchase or by chance-find in the fields, we find, over and above them, a few altogether new types, which are fundamentally different from those described so far. These latter collections will be referred to as Group II. P. O. Bodding collected his specimens in the Santal Parganas. On pl. 22 are illustrated examples of rounded butt axes from Bodding collection. Pl. 22, nos. 49-62 illustrate various sizes of wedge-shaped axes from the same collection, and pl. 22, no. 70 is a thick butt axe; while pl. 22, nos. 71-73 are forms of chisel. The other examples from this collection belong to new types. From the Darjeeling collection of E. H. C. Walsh we get the rounded butt axe (pl. 23, nos. 84-86), wedge-shaped axe (pl. 23, nos. 77-78), chisel (pl. 22, no. 75) and hammerstones (pl. 22, nos. 74 and 76). Pl. 23, nos. 90-92 are broken specimens of thin sectioned axe. Others are of new types. The collection of S. C. Roy (1916, pp. 61-77, pls. I-IV) shows the rounded butt axe, the wedge-shaped axe, the thick butt axe, perforated stones, hammerstones and at least one new type (facetted tool).

Among the new types three are most important: the facetted tool, the shoul-dered tool, and the splayed axe; and the fourth, the so-called "bar chisel", has
been found in some numbers in Orissa and Bihar. To these types may be added a fifth, the thin-sectioned broad axes from the Santal Parganas (pl. 20, nos. 13-14), so abundantly found in the Garo Hills of Assam, (pls. 14-15), recall the thin-sectioned axes of Group I of this region (already described). The “bar-chisel” (pl. 20, no. 23), which is generally produced by rough chipping, bears close similarities to the examples from Malaya (See Tweedie, 1953, figs. 5-8), with the difference that some of them in Malaya are ground. Tweedie calls them “neolithic adze”. One fine unground specimen from Pahang (Malaya) is in the British Museum (no. 1935, 10.22.29). It is exceptionally long, about 19 inches. The Malayan examples are all surface finds as are those of Eastern India. Besides, there are three specimens from Lohadurga in Ranchi district in the collection of the British Museum, all three miniature variety of the faceted tool. They are made of green jadeite stone. They bear the British Museum nos. 90.7.19.1 to 3. One more miniature jadeite tool from India is in the Museum of Ethnography and Archaeology, Cambridge. Its locality is not known, but presumably came from our region. In the Indian Museum, Calcutta, some more whitish jadeite tools have been recently acquired. Nineteen of them were obtained from Ranchi district, of which 12 are faceted tools of the trapezoidal variety and 6 of the triangular variety, and 1 is a long nondescript type. Two more faceted tools (locality unknown) are preserved there. Such miniature varieties of jadeite tools have not been reported from India before. I have not seen any examples of this type in the mainland of South East Asia. In Yunnan as well as in the river valley cultures of Northern China this type occurs in large numbers. The Lohadurga specimens were, no doubt, imports probably from Yunnan as objects of trade. These jadeite miniature tools thus seem to establish a connection between Ranchi in Bihar and Yunnan in South West China. The thin sectioned broad axes, mentioned above, further links up the Santal Parganas with the Garo Hills. Similarly, the rounded butt axe of the Indian type, found in small numbers in Assam, speaks of a counter-influence from the main neolithic culture zone of India.

All these new types of tools are surface finds. None of them have so far been reported from the collections of Group I. It is, no doubt, that three important types of tools, mentioned above, came to India from outside. Before discussing
their chronology and context, further details concerning their occurrence in India are given below.

The faceted tool with unifacially ground cutting edge (bevel) has been found in small numbers in the Santal Parganas, the Ranchi district and Mayurbhanj. The specimens from the Santal Parganas are illustrated on pl. 22, nos. 63-67. No information is given as regards the material of which they are made, it being merely said, “The implements are made of different kinds of stone, such as flint, porphyry, basalt and other hard kinds, mostly abundant in this district.” (Bodding, 1901, p. 21). The Walsh collection from Darjeeling also includes this type (pl. 23, nos. 80-83, pl. 23, nos. 88-89). Two varieties of this type can be distinguished: (i) rectangular-shaped (See pl. 22, nos. 63-66), and (ii) triangular-shaped (See pl. 22, no. 67). Many examples of both these varieties are said to have been found in Mayurbhanj and deposited in the local museum, but they have not yet been published. The triangular variety has so far not been found in Assam, nor it has been reported from Burma, Malaya, or Siam. A single specimen is known from the Pho-Binh-Gia cave of the Bacsonian culture in Indo-China (pl. 32, no. 30). But the Bihar specimen can hardly be derived from the Bacsonian culture. It may, however, be noted that the Bihar specimen, except for its unifacially ground cutting edge (bevel), is hardly distinguishable from the rounded butt type of axe. The Mayurbhanj specimens are said by E. C. Worman (1949) to be rectangular in cross-section. It seems likely that the triangular variety developed from the local rounded butt axe as a result of contact with the rectangular variety of the faceted tool. This suggestion is based on the fact that the distribution of this triangular variety is limited to Orissa, except for a single specimen from the Santal Parganas. The distribution of the rectangular variety is much wider. It is well-known in Assam (See chapter IV) and Darjeeling. Many examples have been found in southern Bihar and Orissa. Three specimens are in the Haimendorf collection of the Institute of Archaeology, London. The find-spots of these are not definitely known, as the whole collection was made in different parts of the Gondawana land in the district of Adilabad (Hyderabad). The distribution of this type, however, seems to be limited, more or less, to Eastern India. The materials of which they are made, are all local stones. It seems most probable that they were locally manufactured.
But the three jadeite specimens from Lohadurga in Ranchi district indicate the possibility of this type coming from Yunnan.

The splayed axe, of which three rough imitations are known from Assam (See pl. 7, no. 11 and pl. 15, no. 97), have not yet been reported from Bengal and Bihar. J. H. Hutton (1931, pl. 362, nos. 2, 4 and 5) has illustrated three examples of this type preserved in the Indian Museum, Calcutta. Their locality is unknown, but he doubtfully attributes them to Santal Parganas. Some examples have, however, been found in Mayurbhanj state, but they have not yet been published. On such scanty material it is difficult to establish the relationship of this type with similar types known from Yunnan, Burma and Malaya. But, as this type may well be a copy of cast metal originals, it could easily develop locally from the local flat "copper celts" of very similar form.

The shouldered tool has a very wide distribution (See map no. 7). As has been said before (See Pp. 48-49), it has two main varieties, regular and irregular. Both these varieties have been found in the Cachar Hills and the Naga Hills of Assam. From the Sadiya Frontier Zone the shouldered tool has not yet been reported, nor do we so far know any definite example (but see p. 83) from Yunnan. From the Khasi Hills, Garo Hills and the Penny’s collection from Tezpur only the irregular variety is known. From Bengal proper, also, no specimen has so far been obtained. Several examples have been found in southern Bihar. P.O. Bodding (1904, Pp. 27-31) collected some specimens (pl. 21, nos. 26-28) from the Santal Parganas. These are all made of chert. In Bodding’s first collection from the same district there are two examples (pl. 22, nos. 68-69) of this type. Bodding describes no. 68 as "one with a small notch on both sides, hence something similar to the shoulder-headed celts". (Bodding, 1901, p. 22). It is of regular variety. Pl. 22, no. 69 is very irregular. One example was obtained from the village of Bongara in Manbhum district by D. Sen (G. S. Ray, 1934). From Dhalbhum V. Ball (1875, Pp. 118-20) collected two specimens (pl. 21, nos. 29-30). The material of no. 30 is described thus: it "is formed of dark green, excessively dense and hard quartzite with a wavy structure and some included pebble-like masses of different composition.” No. 29 is "made of black igneous rock”. Ball further remarks, "in reference to the origin of these implements, their mineral composition is not, I believe, inconsistent with the view that they
may have been manufactured originally in the part of the country where they were found. The source of the material from which the flakes I formerly exhibited to the Society were manufactured, occurs within the district of Singbhum. It is a bed of chert-like quartzite and from it the material of the large adze might very possibly have been obtained. Again the very numerous dykes and intrusive masses of trappean rocks in Singbhum may contain a material identical with that from which smaller adze was manufactured.” J. H. Hutton (1931, p. 360, no. 1) illustrates an irregular variety of shouldered tool from Rajgir in Bihar, and another (no. 2) of an exceptionally long and narrow blade from Madras, locality unspecified, Agency tracts (? Ganjam and Vizigapatnam districts?). From the valley of the Godavari one regular type was found and illustrated by Burkitt and Cammiadec (1930, Pp. 327-339). Some examples were also found on the surface inside the fortifications of Sisupalagarh in Orissa. From Mayurbhanj the regular variety has been collected. Another regular example, made of chert (?), was found by Cunningham as a surface find at Kausambi within the walls. It is preserved in the British Museum (no. 87, 717.178). One broken example of basalt “with a well defined shoulder” from Banda district is mentioned by Rivett-Carnac (1883b, p. 229). One small variety of limestone is listed by Coggin Brown (1917, p. 139, no. 1763) as coming from the river bank, Tambavati, Nagri, near Chitor. E. C. Worman (1949, p. 185) writes that he “found an apparently unfinished specimen in northern Mysore State in 1939”, but this specimen has not been illustrated, nor the occurrence of this type in Mysore is noticed by any other writer. This distribution of the shouldered tool is almost co-extensive with the neolithic finds in Peninsular India, though it must be noted that it occurs only sporadically and in small numbers in India, except in Assam. It may also be noted that the majority of the Indian shouldered tools are made of chert or chert-like material. Another important feature is that in Peninsular India the majority of the shouldered tools found are of the regular variety, while in Assam this variety is known only in the Cachar Hills and Naga Hills. Elsewhere in Assam only the irregular variety has so far been found. It has been suggested before (p. 76) that the shouldered tool type came to Assam from Burma where only the regular variety is known (See the section on Burma). It must be noted that the exceptionally long variety from Madras, illustrated
by Hutton (1931, p. 360, no. 2), is also known from the southern districts of Burma (See pl. 36, nos. 28 and 30). If the shouldered tool types of Peninsular India came through Assam, as is generally supposed, it is hard to understand how only its irregular variety is found in the Brahmaputra valley, Khasi Hills and Garo Hills, i.e. those Zones which are further removed from the borders of Burma. On the other hand, in the Naga Hills and Cachar Hills, close to Burma, both regular and irregular varieties have been found. Can this be held to mean that the regular variety of Peninsular India was derived directly from the regular specimens of Burma? The answer to this question cannot be definitely given so long as details concerning the possibility of early communication between the Burma coast and the East Indian coast are not available. Such a possibility, however, should not be dismissed without further research.

The sporadic finds in India (except in Assam) of these three Eastern Asiatic types of neolithic tools are very difficult to explain in the present state of our knowledge. As these tools have not been found in excavations except at Tamluk, it is difficult to relate them archaeologically. But the occurrence of the shouldered tool inside the fortifications of Kausambi, Sisupalagarh and Rajgir is highly suggestive. In Assam, where these types are dominantly present, the available material suggests that they slowly permeated from the neighbouring countries into the hilly regions, where they were integrated with the local indigenous stone industry. The chance-discovery of three jadeite tools at Lohadurga in Ranchi district and other similar discoveries further suggest a connection with Yunnan, and it is possible that this connection was established through Assam. But the difficulties arise when other points are taken into consideration. These may be summed up as follows:

1. So far no distinct shouldered tool type has been found in Yunnan.
2. No miniature tool of green jadeite is known from Assam.
3. The regular variety of the shouldered tool is found only in the Naga and Cachar Hills of Assam, where they appear to have been derived from Burma.
4. In the interior of Assam, the Brahmaputra valley, the Khasi Hills and the Garo Hills, only the irregular variety of the shouldered tool is found. These apparently were local imitations of the regular variety found in the Naga and Cachar Hills.
(5) In other parts of India the majority of the shouldered tool found are of
the regular variety and these show likeness with the shouldered tools of Burma,
rather than with those of Assam.

(6) It is not absolutely true to say that the shouldered tool is limited to Eastern
India.

(7) It seems that there is a concentration of these types in the highlands of
Orissa, where, however, unfortunately, exploration is only in its early stages.

It would seem that the available evidence is not sufficient to draw a definite
conclusion about the way these types came to India. One thing is certain that
their appearance in India must be later than the time they are known in Eastern
Asia. This is, to a certain extent, corroborated by the total absence of these
types in the first group of neolithic collections made in Bihar and Bengal, which
include only the typical neolithic tools of Peninsular India. The facetted tool
discovered in the lowest level at Tamluk also suggests a date terminating at the
end of the 3rd century B.C. The sporadic nature of the finds of these types in
India further suggests that they may better be regarded as imports, or at best
local imitations of foreign types rather than the products of a separate and dis-

tinct cultural grouping in India. In the absence of sufficient excavated material,
it is, however, not possible to date the arrival of these foreign types in India
with any accuracy. The evidence, as a whole, does indicate that both in Penin-
sular India as in South East Asia, neolithic cultures survived until a very late
date.

In passing, it may be noted that historians have linked up the shouldered type
of tools with the linguistic problem of the Austro-Asiatics. Some, like Von R.
Heine Geldern (1932), have gone a step further and attempted to distinguish
three cultures in South East Asia on the basis of three main types of tools, "Oval
axe" 'quadrangular adze' and "shouldered adze". But, as will be shown in
chapter VI, the archaeological evidence is clear on the point that these three
types of tools belong to one and the same cultural grouping. There is no evi-
dence to show that any one type of these tools forms a distinct and separate
culture by itself. Heine Geldern (1945) has also tried to date the appearance of
the shouldered tool in India on the supposed connection of this type with the
Austro-Asiatics. He writes, "The latter (i.e., tanged adze) could, to a certain
extent, be dated, as it occurs, with other adze types of South East Asiatic origin, in the region of Munda languages of India. Therefore, it seemed probable that it had been introduced in India by the same people who had introduced the allegedly Austro-Asiatic Munda languages. Since we assumed that this Austro-Asiatic migration from South East Asia to India must have antedated the immigration of the Aryans in India, and as it was obvious that the development of the tanged adze in South East Asia must have preceded the westward migration of the Austro-Asiatics, both Van' Stein Callenfels and the author came to the same conclusion, i.e., that the migration of the Austronesians to Indonesia and the introduction of the full neolithic in the Archipelago could not have taken place later than around 2000 B.C.” (Heine Geldern, 1945, p. 138). This dating assumes that the Aryan migration into Eastern India took place round about 1500 B.C. and hence the shouldered tool is dated round about 2000 B.C. As has been pointed out before, the archaeological evidence available in India hardly justifies a connection of these types of tools with the so-called “Austro-Asiatics”. There is nothing in the nature of these implements or the manner in which they are found in India to show that they were introduced here before 1500 B.C., or, for that matter, before the migration of the Aryans. It is beyond doubt now that a neolithic culture in this region continued till long after the Christian era. Foreign neolithic types could have been imported or copied at any time in the obviously long duration of the neolithic culture of the Peninsular India and South East Asia. In fact, the available evidence suggests the appearance of these types of tools in India later than the local neolithic types.

Dr. C. Von Furer Haimendorf (1945, Pp. 73-83) has confused the specific problem of these tools with the question of the introduction of what he calls “the eastern type of megalithic ritual”. He says, “this fully developed neolithic culture was probably responsible for the introduction into India of several elements of eastern origin, and in particular the eastern type of megalithic ritual.” (Von Furer Haimendorf, 1948 b, p. 207). Without digression into the question of megalithic culture, which is beyond the scope of this thesis, it may be remarked that the neolithic association of the megalithic culture of Eastern India, or even of the countries of South East Asia, still remains to be proved. It is beyond dispute that the pottery types, iron tools and other datable materials associated
with the kinds of burial called "megalithic" in Peninsular India survived into the first centuries a.d. (F. R. Allchin, 1954, chapter II).

The tools illustrated on plates 19-23 are described below:

Pl. 19, nos. 1-4 are rounded butt axes from the valley of the river Sanjai in the district of Singbhum, Bihar. Nos. 1 and 2 show only chipping, while nos. 3 and 4 have their cutting edge ground bifacially.

Pl. 19, nos. 5-7 are thin sectioned axes from Singbhum, broken in the middle. No. 5 is made of slaty stone and is only edge-ground as is also no. 6. No. 7 shows grinding of the faces.

Pl. 19, nos. 8 and 9 are examples of thick butt axe from Singbhum. No. 8 is very regular, thin in section, while no. 9, which is broken at the tip, shows rough chipping.

Pl. 19, nos. 10 and 11 are examples of wedge-shaped axe. Both are surface finds. No. 10 from Ranchi still shows roughness on the body, and no. 11 from Singbhum is completely ground.

Pl. 19, no. 12 is made of trap rock and was found below the recent alluvium in the valley of Sanjai by Anderson. He describes it as an adze simply because the cross-section is flat on one face and curvilinear on the other. This form is probably more due to the material rather than to grinding as the rough chipping is seen all over the body except the cutting edge, which is ground. It should not be mistaken for the faceted tool of Group II.

Pl. 20, nos. 13-14 are examples of thin sectioned axes with broad cutting edge, both these are preserved in the Pitt Rivers Museum, Oxford. No. 13 is of sandstone and was collected by P. O. Bodding in the Santal Parganas. No. 14 is of slaty stone and was originally collected by S. C. Ray in Chota Nagpur.

Pl. 20, nos. 15-17 are very regular and symmetrical examples of wedge-shaped axe with rectangular cross-section. All of them come from Singbhum. The section of no. 17, as copied from D. Sen, is defective. It shows unifacially ground cutting edge (bevel).

Pl. 20, nos. 18-22 are examples of different varieties of chisels all from Singbhum. They have all been made by chipping. Only the cutting edge is ground. The striking feature is the rectangularity of their shape, which differentiates them from the South Indian chisels, which are generally oval in section (Subba
Rao, 1948, pl. XXIII. 1). No. 21 shows a splayed form, while no. 22 has a pointed end. Another example of splayed cutting edge is illustrated on pl. 21, no. 24. Pl. 20, no. 23 is the so-called "bar chisel" or "celt" formed entirely by chipping.

Pl. 21, no. 25 is a unique axe by itself. One of its sides is slightly concave while the body shows roughness. The median cutting edge is formed by bifacial grinding.

Pl. 21, nos. 26-28 and pl. 21 nos. 29-30 are regular type of shouldered tools from Bihar. Nos. 26-28 are of chert and were collected by P. O. Bodding in the Santal Parganas. No. 29 is of volcanic rock, and no. 30 of chert-like quartzite, both collected by V. Ball from Dhalbhum.

Pl. 22, nos. 31-48 are rounded butt axes from Santal Parganas collected by P. O. Bodding.

Pl. 22, nos. 49-62 are wedge-shaped axes from the same collection. Pl. 22, nos. 63-66 are unifacially ground edged (bevelled) faceted tool of rectangular shape from the same collection, while pl. 22, no. 67 is a triangular variety of the same type. Pl. 22, no. 68 is a shouldered tool of regular variety, and pl. 22, no. 69 is irregular variety of the same type. Pl. 22, no. 70 is a thick butt axe and pl. 22, nos. 71-73 are chisels.

Pl. 22, nos. 74 and 76 are hammerstones, no. 75 a chisel, pl. 23, nos. 77-79 wedge-shaped axes, nos. 80-83 are faceted tools of rectangular shape, all belonging to Walsh collection from Darjeeling district.

Pl. 23, nos. 84-87 are rounded butt axes, nos. 88-89 are faceted tools with unifacially ground cutting edge (bevel) and nos. 90-92 are broad type of axes, all from Walsh collection.

Pl. 23, no. 93 is a chisel and nos. 94-96 are rounded butt axes from Bimal in Midnapur district. Pl. 23, no. 97 is a rounded butt axe from Bangarh in Dinajpur district, found just below the Sunga level in actual excavation.