CHAPTER VI

THE LOWER PALAEOLITHIC
CHAPTER V
THE LOWER PALAEOLITHIC

The Lower Palaeolithic in Rajputana is represented by the Madrasian Culture which comprises handaxes, cleavers, pebble tools and flakes. The evidence for this culture has almost solely come from Eastern Rajputana. In this region thirty one sites have been discovered so far in the valleys of the Chambal, Banas, Berach, Gambhiri and some of their smaller tributaries. West of the Aravallis only one site has been discovered on the Sagarmati in district Ajmer.

The sites on the Chambal and Gambhiri were discovered mainly by S.R. Rao of the Archaeology Department, Government of India. In my own field work bulk of the evidence came from the Banas and only partly from the Berach and Gambhiri. Though there is general uniformity in the Cultural Data from the whole region, some differences in technique and typology were noted in the material from the three river valleys, namely the Banas, the Gambhiri and the Berach. It was, therefore, thought that separate treatment of material from the three river valleys will help to bring out their cultural features more clearly.

In the following pages, therefore, the Palaeolithic industries of the Banas, the Gambhiri and the Berach are first described individually and then at the end a comparative assessment is made.

RIVER BANAS

The river Banas was mainly explored in the middle reaches between Hamirgarh and Tonk. In the upper reaches exploration was confined to a small stretch around Nathdwara. Here a small triangular pebble tool similar to a
handaxe was found by me in my first visit to the site in January, 1960. This implement was unfortunately subsequently lost. Later in my second visit to the site in March, 1961 with Drs. H.D. Sankalia and B. Subbarao one flake was found by Dr. H.D. Sankalia from the cemented gravel. Earlier Sankalia had found here a pebble scraper on a pebble flake. Between Hamirgarh and Tonk, however, nine sites were discovered. In fact every place explored in this area yielded tools and it can be safely predicted that if a more thorough exploration of this area is carried out many more sites will come to light.

A total number of ninety seven tools was obtained from these ten sites. Of these twenty seven were recovered in situ from the cemented gravel layers. Besides at Bigod six implements were found from a gully cutting in the gravel deposit where it occurs almost on the level of the present land surface. The unusual height of this gravel bed is certainly due the high rock bench here. There is little possibility of these tools having been derived from any other source except the gravel bed in question and hence they may be also regarded as being in their original position.

**MATERIAL AND STATE OF PRESERVATION OF THE IMPLEMENTS**

All but one specimen in the present collection are made of quartzite. It is generally of medium to fine-grained variety. The common colour is whitish-grey but other shades such as dark-blue, reddish and light-brown also occur. Some of the specimens are made of highly micaceous quartzite. The source of the quartzite is rocks of the Aravalli and Delhi systems which occur near the source of the Banas whence the material is transported.

down by the river. The raw material is available in the form of highly rolled pebbles of all sizes which occur in abundance almost up to the lower reaches of the river.

The single non-quartzite specimen is made of whitish-grey limestone.

There is no evidence of patination in the implements. Some pieces specially those made of micaceous quartzite have undergone slight weathering. Nearly all the tools obtained loose from the river bed have undergone some rolling. Some of them have been so thoroughly rolled that all the flake scars have been effaced. In the majority although the original freshness and the sharpness of the edges have gone, all the flake scars can be easily recognised.

One of the reasons of this heavy rolling of the tools is probably the presence of the immense amount of bouldery gravel in the river bed which exercises a deep abrasive effect on the tools. However the degree of rolling of a tool has not been adopted one of the criteria of classification since there appears to be no relation between this feature and technological characteristics of an implement.

The tools recovered in situ from the gravel layers are remarkably fresh except one or two specimens. Some are almost in mint condition. Many of these had to be chiselled out of the gravel layers with great difficulty and bear hard and thick encrustations of the gravel matrix over them. This indicates that (i) the tools are contemporary with the gravel deposit, and (ii) the gravel is in its original position and not a redeposit.

**TECHNIQUE**

Technologically the Banas industry does not exhibit very advan-
ced features. Majority of the tools have been made by the stone hammer technique. In this two types can be distinguished:

(i) Heavy stone hammer technique; and
(ii) Light stone hammer technique.

The former was employed for manufacturing many of the flakes and a few crude handaxes. Flakes are generally big, measuring 10 to 15 centimeters in their longer dimension, and crude. They invariably have an unprepared striking platform and a wide angle varying from 100° to 120° between the platform and the flake surface. The bulb of percussion is generally quite prominent but sometimes very weak or almost missing. The cores in the collection also exhibit corresponding features but the negative bulb of percussion in them is often very deep. It is possible that flakes from some of these cores were knocked off by the block-on-block or anvil technique.

A few of the large pebble handaxes displaying large and deep

1. The expression block-on-block or anvil technique is here used in the sense defined by Oakley and Leakey (Oakley, K.P. 1956: Man the Tool Maker pp. 24-25; Leakey, L.S.B. 1953: Man’s Ancestors, pp. 40-41.) These authors contrast the block-on-block or anvil technique with the stone hammer technique. In the former the block of stone to be shaped into a tool is hit against a stationary anvil where as in the latter the block is held in the hand or against the knee or on a slab and hit by a stone hammer. The flakes removed by the anvil technique are unusually thick and crude and considering its primitiveness it is extremely doubtful, as Leakey believes, that this technique was ever widely used by the stone age man. The clarification of this distinction was thought necessary because by some prehistorians in India and Africa the expression block-on-block or anvil ... continued....
scar were also made by the stone hammer technique.

The light stone hammer technique would have been employed in the production of pebble tools, most of the handaxes, and cleavers. These are characterised by shallow and small flake scars except the cleavers in which the flake scars though shallow are relatively large.

Finally a small number of well-made handaxes show soft flaking done by what Leakey calls cylinder hammer technique. Thus two or three primary flaking techniques can be recognised.

1. Heavy stone hammer,
2. Light stone hammer,
3. Cylinder hammer; and possibly
4. Block-on-block or anvil.

One small flake core shows slight evidence of prior preparation along the sides but it is not a very convincing example of Levalloisian technique.

There is not much secondary flaking on the implements. Some handaxes exhibit step flaking along the lateral margins and a crude edge retouch can be seen on the flake scrapers. Both of these could have been executed by the cylinder hammer technique.

TOOL TYPES

(a) CHOPPERS AND SCRAPERS (Pls. Xj, XI, Figs. 2, 3; 1-4, 2, 5-7, 8)

Choppers and scrapers have been classified into two groups broadly technique is used either as a synonym for stone hammer technique or (when it is used in the sense given to it by Oakley and Leakey) as the technique which was actually used for making most of the handaxes.
(i) Made on pebble, and
(ii) Made on flake.

(i) Choppers and scrapers made on pebble are often designated as pebble tools. They have a cutting or scraping edge along one side or end of the pebble leaving the most of the pebble unflaked. The working-edge is often steep and the unflaked portion provides for a suitable hand-hold. Pebble tools of this type are the type tool of the Karuan and the Oldowan cultures of East Africa, the Soanian in North-west India and Pakistan, the Amphanian in Burma, the Choukantionian in North China, and the Patjitanian in Java. There are significant distinctions of size and technique in the pebble tools.

In Africa not much thought has been given to their terminology and these tools are often referred to as choppers. In south-east however, Movius has distinguished several tool types under this general category. Of these three are relevant for our present purpose here. These three tool types are chopper, scraper, and chopping tool.

A chopper, according to Movius, is an unifacial tool with a round, semi-oval or straight cutting edge on the side or end of a pebble. Occasionally choppers may be made on flakes as well and also worked bifacially.

(c) 1957: "Pebble-tool Terminology in India and Pakistan" Man In India. Vol. 37, No. 2., pp. 149-56.
A scraper differs from a chopper only in size. A small chopper is a scraper. A chopping tool on the other hand is a bifacial tool worked by alternate flaking from two faces producing a sinuous, wavy or broad W shaped cutting edge.

The distinction between chopper and chopping tool is only of form and technique and that between chopper and scraper only of size. It does not signify any distinction in function which, according to Movius, for a period as remote as Pleistocene is mainly a matter of speculation.  

An alternative terminology has been proposed by Dharani Sen. He says that the distinction of gross size between chopper and scraper is not a sufficient criterion. Instead he suggests that what Movius calls chopper and scraper should both be designated by a single term viz. scraper and the term chopper should be used for Movius's chopping tool. Further a distinction should be maintained between a pebble scraper and a flake scraper.

It seems to me that scraper and chopper are essentially functional terms and their use purely in a formal and technological sense will create confusion. For the latter purpose descriptive terms such as unifacial and bifacial will be more appropriate. The criterion of size which Movius has introduced to distinguish between chopper and scraper is quite useful. Further between chopper and chopping tool since the only distinction is that of unifacial and bifacial flaking, it hardly requires terminological recognition. Both can be described as chopper with the prefix 'unifacial' or 'bifacial'.

In the present study therefore only two terms, chopper and scraper are retained and they are used in a functional sense. It is admitted that for a remote period such as Pleistocene it is difficult to determine the exact function of an artefact but it is not an impossible task. In fact most of the artefact terms are functional terms only. The small tools which can be used effectively by applying pressure against them by hand are here regarded as scrapers and all scrapers which are large enough to be used for cleaving are treated as choppers. The technological distinction is expressed by prefixing these terms with 'unifacial' and 'bifacial'. Sen's distinction between pebble scraper and flake scraper is also retained.

Pebble choppers and scrapers from the Banas are divided into three groups.

(i) Unifacial pebble tools.

These are further divided into two sub-groups.

(a) These tools have their working-edge along one side or end made by flaking only in one direction and on one face only. The pebbles utilized for this purpose have a flat base which except in one case is always natural. Upper face is well-rounded. The working-edge is made by removing flakes from the flat face upwards. It is markedly steep, sometimes at right angle to the base of the tool but generally between 90° and 110°. Flake scars though small and shallow are crude. In one case flaking from the flat base has left a number of stepped scars. Working-edge is either straight or slightly convex but never concave. The side or end opposite the working-edge is rounded and can be firmly grasped in the hand. Excepting the working-edge the entire surface on both faces is left unflaked. The size of the specimens varies from 8.5 centimeters by 15.5 centimeters to 15.5 centimeters by 14.5 centimeters. The bigger
specimens are thick and massive and the smaller ones are light and thin.

There are twelve specimens in this group.

**HMG 5** (15.5 x 13.6 x 9.2) \(^1\) Pl. XIII Fig. 5

A chopper on a large, thick flat-based pebble of micaceous quartzite; slightly rolled. It has a very steep and convex edge worked from the bottom upwards.

**BGD 5** (8.7 x 5.6 x 4.0) Pl. XIII Fig. 3; 5.

A scraper on a small flat-based pebble of micaceous quartzite; slightly rolled. Working-edge less steep than in HMG 5 described above. Flaking from base upward has left a number of stepped scars.

**BGD 6** (12.3 x 9.4 x 5.8) Pl. XIII Fig. 4

A medium-sized chopper/scraper on a pebble of micaceous quartzite; rolled. Flat base due probably to a natural fracture; working-edge very steep and continues partly along the sides as well.

(b) There is only one specimen in this sub-group. It differs from specimens in sub-group(a) in two respects. (i) It differs is made on a thinner and flatter pebble; and (ii) Flaking is not very steep and besides the working-edge the entire upper surface is also worked.

**DOL 3** (12.3 x 9.9 x 4.3) Pl. XIII Fig. 2

A chopper/scraper on a thin pebble of greyish quartzite; slightly rolled. Flaked along the left margin as well as the dorsal face. Working-edge made by the intersection of a sloping pebble surface with two flake scars on the dorsal surface. Back thick and unflaked.

---

\(^1\) The measurements of this and all other implements that have been described and illustrated in this thesis are given in centimeters.
(ii) Bifacial pebble tools.

These are three divided into two sub-groups (a) and (b).

(a) In these tools also the flaking is confined only to the working-edge and the rest of the tool remains unflaked. The working-edge is, however, made by the intersection of flake scars from two faces in two directions along one end or side of the pebble. The pebbles utilized for making them are not flat-based but rounded so that the resultant working-edge is central-equidistant from both the faces unlike in the unifacial specimens where it is nearer to the flatter face. The working-edge is either straight or slightly wavy but not markedly sinuous as would result when the placement of scars is alternate. There is no difference in size from the specimens in the unifacial group.

BDG 7 (8.5 x 9.1 x 5.2) Pl. X Fig. 3

A scraper on a round pebble of dark-brown quartzite; found in situ and almost fresh. Working-edge convex. Almost identical with an Oldowan pebble tool from Uganda.

MDP 9 (13.3 x 8.6 x 6.7) Pl. X Fig. 1

A chopper/scraper on an elongated pebble of pinkish quartzite; unrolled. Found in situ and fine gravel matrix still adhering to the tool. Lower face has only one scar; upper face marked by a number of stepped scars detached at a high angle. It bears great similarity to a specimen of

1. This specimen comes from the N horizon of the 100 ft. terrace of the river Kagera near Nsongezi, in Uganda and was part of a small collection of palaeoliths and microliths recently received by the Deccan College Archaeology Museum from M. Posnansky of Uganda.
the Early Soanian illustrated by De Terra and Paterson.

(b) In general shape these tools are similar to the specimens in sub-group (b) of the unifacial tools. Here it is not only the working-edge that is flaked but also both the faces of the main of the tool. Only the butt-end is left unworked. This type finally leads to the fully flaked specimens such as BTL 8 illustrated in Pl. XLI Fig. 1. Being thinner these implements are better suited for scraping than for chopping.

MDP 3 (10.9 x 8.6 x 4.7) Pl. XIX Fig. 4

A scraper on an elongated pebble of micaceous quartzite; slightly rolled. Found in situ. Working-edge is along the elongated side. Both faces of the working-edge the dorsal is fully flaked. Ventral surface retains pebble cortex along the back.

(c) A slight variation of the bifacial flaking produces a tool in which the working-edge instead of being straight or convex is pointed. There does not, however, seem any difference in function between these tools and those considered above. The three specimens in this category are comparatively small and could be better used for scraping.

JHP 12 (9.4 x 8.3 x 3.7) Pl. XIX Fig. 2

A scraper on a thin small oval pebble of grey quartzite; much rolled. Pointed edge by flaking from both faces.

(iii) Trifacial pebble tools.

These are of elongated shape, have a flat base and a thick upper surface. The upper surface is worked steeply along the sides to a point leaving a ridge in the centre. One of the two specimens in this category is roughly like a rostro-carinate.

1. De Terra, H. and Paterson, T.T. (1959) Studies on the Ice Age in India and Associated Human Cultures. Pl. XXIV Fig. 1.
A pointed chopper on a very thick flat-based pebble of quartzite; slightly rolled. Upper face worked steeply along the sides by removing large but shallow flakes; it has a zigzag median ridge. Section across the centre triangular.

(ii) Flake choppers and scrapers.

Of the twenty flakes in the collection seven are secondarily worked to produce a cutting or scraping edge. Two of these are hollow scrapers, one an end-scraper and the rest side-scrapers. Of the seven only two may be called choppers. One specimen is on an oval flake which is worked on both sides and has the appearance of an ovate. Another specimen, also worked on two sides, has a rounded tip along one end and may be a precursor of the more refined scraper-points or scraper-borers of the Middle Palaeolithic. The general characteristics of the flakes utilized for these specimens are the same as those of the flakes considered under the latter heading.

(iii) Side-scrapers.

BTL 8 (13.2 x 8.6 x 4.6) Pl. XI Fig. 1

A chopper/scaper made from an elongated oval pebble of micaceous quartzite; unrolled. Lower face, originally a flake surface has been reworked by detaching soft, shallow flake flakes. Upper face has rather deep scars. A long sinewous edge along one side made by bifacial flaking. Fully worked leaving very little cortex.

BTL 12 (10.8 x 8.5 x 3.3) Pl. X/I Fig. 2

A side-scraper on a flake of fine-grained dark-brown quartzite; rolled. It has working-edge along two sides which are inversely retouched to
a rounded point. It may be a forerunner of the specialized scraper-borers of the Middle Palaeolithic.

DOL 5 (11.5 x 10.1 x 4.2) Pl. X111 Fig. 3

A hollow scraper along the end of a thick side flake of brownish quartzite; residual fresh. Bulb of percussion and striking platform are along the left corner of the working-edge. Upper face marked by two large flake scars; working-edge slightly retouched along one corner.

(b) HANDAXES (Pls. X11; XVII Figs. 1, 6; 2-3; l-4; l; 2

On the basis of technique these may be divided into two groups. (i) Incompletely-flaked or pebble handaxes, and (ii) Fully-flaked handaxes.

(i) Pebble handaxes.

Under this heading are considered those specimens, which, although they possess generally the characteristics of a handaxe, still retain a large part of the pebbly surface over them. They have a roughly triangular or pear-shaped outline and a working-edge along two sides that ends in a tip. The reason why they have been here designated as pebble handaxes is not that they are made on pebbles - which is true for all the tools of this industry - but that (i) they retain large areas of pebble cortex over them and (ii) that their evolution can be directly traced from the pebble tools considered earlier. In other words they are transitional between the pebble tools and the fully-flaked handaxes. They can be further divided into two sub-groups: (a) Unifacial, and (b) Bifacial.

(a) Unifacial

In the text books of Prehistory handaxe is generally defined
as a bifacial tool and on that basis often called biface. That definition is certainly valid for most of the handaxes. However often there are very typical specimens which though worked only on one face not only fully simulate the shape of a handaxe but can effectively perform its function as well. Such specimens usually occur on flakes and have been described as unifacial handaxes from several areas in India. If such an appellation is valid for flake specimens then it may be applied to pebble specimens as well.

There are only four specimens of this type. One of them has an elongated oval shape and the remaining three are pointed with rounded butts. All are nearly fully worked on the upper face but lower face remains unworked surface. The pointed specimens have a working-edge along both the margins and the oval one has it all round the way. It is true that this edge will be much more effective if worked from two faces, but still the tools could have been and possibly were used as handaxes. Flake scars are not very deep and large but small and shallow. Two of the specimens which have a symmetrical outline are heavily rolled while the other two though comparatively crude are fresh.

MDP 1 (12.2 x 8.8 x 5.8) Pl. XI Fig. 6

A round-butted pointed handaxe of greyish quartzite; slightly rolled and encrusted with clay and lime. Upper face is fully worked. It has acquired a greenish-black stain because of prolonged stay in water. Butt and lower face left unworked.

(b) Bifacial

This group comprises thirteen specimens. In two of them lateral


margins are worked by flaking from two faces but the rest of the tool is left unworked on both faces. These may not be strictly speaking called bifacial. Others are however worked on both faces. There is very little variety of shape among them. The specimen have a roughly rounded butt which consists of the original pebble surface and the sides taper off to a narrow tip. Some pieces are made by bold flaking producing large and deep scars; others though exhibiting shallow scars are nevertheless crude. Another feature of these handaxes is their unusual thickness since little attempt was made to reduce it. Many of the specimens are so thoroughly rolled that the number of scar beds on them cannot be exactly determined.

**BTL 1e** (17.4 x 13.6 x 9.8) Pl. XI Fig. 1

A large thick handaxe of grey quartzite; slightly rolled. It is unusually broad and thick. Sides are worked by alternate flaking from two faces. The result is a sinuous edge along both lateral margins. The rear half of the tool is unflaked. It is a fine example of a tool transitional between a chopper and a fully-flaked handaxe. Also similar to what Movius calls a proto-handaxe.

**DOL 8** (11.5 x 7.1 x 3.2) Pl. XV Fig. 3

A small thin pebble handaxe on a pebble of dark-grey fine-grained quartzite; very slightly rolled. On the upper face only the front half is worked; it is marked by flat flake scars detached from the tip inwards. The dorsal face is almost fully flaked; butt left unflaked from both faces. The tip is tongue-shaped.

(ii) **Fully-flaked handaxes.** These may also be divided into two groups: (a)

---

1. Movius, Hallam L. Jr, (1949) *op. cit.* Fig. 7, No. 4.
and (b).

(a) In the first group are handaxes which though fully flaked or very nearly so have not attained a symmetrical shape. Areas of pronounced thickness remain here and there and the lateral margins do not have a symmetrical outline. Some of the flaking is decidedly of the cylinder hammer variety, and a little more finish work could have given a good finish to the tools.

SPG 10 (13.0 x 7.9 x 4.6) Pl. XIV Fig. 2

A thick lense-shaped handaxe on grey quartzite; found in situ and quite fresh. Lower face was originally a flake surface and is fully worked except along the lower half of the right side by cylinder hammer technique; there is much step flaking on this face. Upper face has a median ridge to which flakes converge from all sides. Original pebble cortex has been left along the butt and near the tip.

Cross section near the tip roughly triangular.

(b) This group comprises very carefully worked pieces. They all have a symmetrical shape. Though some of them still retain considerable thickness, they have been worked exhaustively on both faces. Some of the flake scars are large but not deep and they do not spoil the overall appearance of the tool. There is extensive step flaking on many pieces to make the edges sharp and reduce the thickness. Lateral margins when seen in profile are either straight or slightly wavy and one specimen shows a $S$ twist. Cross sections are $\ldots$ Only two or three specimens are made on flakes; the rest are all on cores. There is wide variation in size. The biggest specimen is 17 centimeters in its longer dimension whereas the smallest is only 8 centimeters. The average length is, however, 12 centimeters. The tiny specimen from Tonk (Pl. XIV Fig. 3) is very small and thin and may
even be called a point. Cross section is generally irregular but in some specimens it is symmetrically biconvex and reaches a lenticular form. The thirteen pieces may be divided into following shapes.

(i) **Almond-Shaped.**

**TNK 5** (17.9 x 10.3 x 5.7) Pl. X\text{vii} Fig. 2

A large, thick, almond-shaped handaxe of dark-brown quartzite; very slightly rolled. It is fully worked on both faces by the removal of large butt shallow flakes. Extensive step flaking along the margins. Lower face thickly encrusted with fine gravel and coarse sand. It has a thick butt and a biconvex cross-section. Lateral margins slightly wavy in profile.

**BTL 4** (12.2 x 7.5 x 3.0) Pl. X\text{vi} Fig. 1

A small, thin almond-shaped handaxe on greenish-black quartzite; slightly rolled. Lateral margins as well as butt worked by detaching small and thin flakes from both faces. The centre of the tool is flat on both faces and unworked. Edges slightly wavy and section symmetrically biconvex.

**TNK 4** (8.0 x 6.0 x 2.7) Pl. X\text{iv} Fig. 3

A thin, tiny almond-shaped handaxe of brownish quartzite; slightly rolled and patinated. Fully flaked over the two faces by the cylinder hammer technique. It is probably made on a flake but no trace of its flake origin now remains; section lenticular.

(ii) **Pear-shaped**

**BGD 12** (12.3 x 6.7 x 3.9) Pl. X\text{v} Fig. 1

A round-butted, pear-shaped handaxe of grey quartzite; much rolled. Upper face has a straight median ridge; right side of the ridge is
steeply flaked. To the left of the ridge is probably an area of original cortex. Lower face also worked by the removal of shallow flakes. Right margin has a straight edge but the left has a S twist. Section biconvex.

(iii) Ovate

JHP 4 (9.1 x 5.9 x 2.6)  Pl. XV  Fig. 4
A small ovate on a flake of rose-coloured quartzite; almost fresh. Fully flaked on both faces by cylinder hammer technique. Edges slightly bruised due probably to use.

SPG 1 (11.6 x 8.5 x 3.6)  Pl. XV  Fig. 2
A round-butted small handaxe of white-grey quartzite; completely fresh. It was found in situ and is thinly encrusted with lime and sand. It is marked by beautiful, even-sized, shallow round scars along the butt on the upper face. A small flat area in the centre retains original cortical patch. The lower face which was originally a flake surface is worked along the sides by soft flaking. It has a sharp edge along the butt. The front half suffered two large fractures - one on either side-in antiquity; originally the specimen must have been a very fine ovate. Section plano-convex.

(c) CLEavers  (Pls. xil, xvi  Figs. 4; 2, 3)
There are seven specimens in the present collection. All are made from pebbles and though they have been extensively flaked, part of the original pebble surface still remains on them. Nearly in all the specimens the cleaver edge is made by the intersection of the main flake scar with a large flake scar from the upper face. Additional flaking has been done on some specimens to reduce the thickness and to make the lateral
margins sharp. The butt portion is generally left unworked. This might have been purposely done so that the smooth and rounded pebble butt could be used for a hand-hold. The section across the breadth of the specimens is either biconvex or plano-convex except in one case where it is a parallelogram. The maximum breadth of the tool is along the cleaver edge. Technologically the tools do not display signs of an industry. The size of the tools is smaller than would be in a primitive industry such as this. The biggest specimen is 12.5 centimeters long and the smallest one is only 8.5 centimeters. On the basis of the shape of the butt and the cleaver edge following three types may be recognized.

(i)  **U shaped butt and straight edge** - Axe type.

**SPG 9** (11.0 x 8.8 x 4.2)  
Pl. XIII  
Fig. 4

A roughly rectangular cleaver of brownish quartzite; it was found in situ and is quite fresh. It has a straight and sharp cutting edge made by the intersection of the main flake surface with a large sloping flake scar on the upper face. Upper face has two more scars along the left margin; the rest of it is original pebble cortex. Lower face has a large side flake scar along the right margin and some step flaking along the left. Section roughly biconvex.

(ii) **Round butt and oblique edge** - Guillotine type.

**TNK 3** (13.2 x 7.2 x 3.2)  
Pl. XVI  
Fig. 2

A round-butted, oblique-edged cleaver made on a whitish-grey quartzite pebble; slightly rolled. On account of the peculiar nature of the raw material the flake surfaces are so rough that it is difficult to determine the exact number and nature of the flake scars. Both faces are fully worked; only the round, ball-shaped butt is left unflaked. The
obliquity of the cleaver-edge is so pronounced that the longer lateral margin has developed a rounded tip. The implement may be regarded a cleaver-cum-handaxe.

(iii) Pointed butt and oblique edge - Guillotine type.

BGD 8 (10.7 x 7.0 x 2.6) Pl. XVI Fig. 3

A tiny cleaver of brownish quartzite; completely unrolled and unpatinated. Found in situ. It has an oblique edge and a borer-like tip along the longer margin. Flaked over both surfaces by detaching shallow but large scars. Butt left unflaked; section triangular.

(d) FLAKES (Pls. XV, XVI, Figs. 1, 4)

The number of flakes in the present collection excluding those considered earlier as scrapers is thirteen. They form a homogeneous group in size and technique. With one exception all the flakes measure between 10 and 15 centimeters. Their technological features have been described earlier (See Technique p. 96-98). Many of them have been worked on the upper face subsequent to their removal from the core; still they remain quite thick.

All the specimens are end-flakes. In one of them the bulb of percussion is not exactly opposite the tip but situated obliquely to it. In some pieces lateral margins are battered though it is difficult to say whether battering is due to use or natural agencies.

On the basis of shape and working-edge flakes may be divided into two groups:

(i) Broad and pointed flakeS. These have their working-edge along the lateral margins.
A big, oval flake of bluish quartzite; partly rolled. It has a natural striking platform, a large but diffused bulb of percussion, and a flake angle of 10°. Two big flakes have been removed from the upper face. Edges battered either due to use or natural damage.

(ii) Long rectangular flakes:

These pieces have a straight transverse edge opposite the bulb and striking platform similar to that of a cleaver. They cannot however, be regarded as cleavers since their cleaver-edge is fortuitous rather than deliberately made.

A large, rectangular end-flake of brown quartzite; slightly rolled. It has a small, unprepared striking platform, a large, diffused bulb of percussion and a striking angle of 10°. Upper face has one large scar along the left side; rest of it retains original pebbly cortex. It has cleaver-like transverse edge made by the intersection of the main flake surface with the sloping pebbly surface.

There are eight simple pebble cores and one a small flake core in the present collection. The former are made from huge pebbles measuring as much as 20 centimeters in one dimension, and 10 centimeters or more in thickness. The scar beds left on them by the detachment of flakes are also large, measuring as much as 15 centimeters in their longer dimension and have very deep negative bulbs of percussion. There is no evidence of preparation of the core prior to the removal of the flakes from it. Only one or two flakes from have been detached from these pebble cores. In the specimens in which more...
than one flake has been taken off, the earlier flake scar was utilized as a striking platform for the next one. The probable technique for their manufacture has already been pointed out.

The one flake core in the collection is a thin and small specimen. Though it shows some evidence of preparation along the sides, it is not very convincing example of a Levalloisian core.

SPG 5 (20.5 x 14.3 x 10.2) Pl. X; XVII Fig. 1

A huge pebble core of grey quartzite; it was very embedded in the gravel and could be removed with difficulty. Part of its gravel matrix is still adhering to it. In all only three flakes have been removed from it - two from one face and one from another. Of these two have left large scars with very deep negative bulbs and the third one has left a small and nearly flat scar.

SPG 18 (8.3 x 6.2 x 2.8) Pl. X/’ Fig. 3

A small, squarish flake core of whitish-grey limestone; fresh. On one face there are three tiny flake scars along the sides and one large scar in the centre. The opposite face is a flake surface.

It will be seen from the description of the various aspects of the Banas palaeolithic industry that it exhibits technologically primitive features. The emphasis in general is on core tools rather than on flake tools. Out of sixty five tools (excluding flakes and cores) only sixteen or 25% have been made on flakes and the rest on cores. Now it is common place that in any advanced palaeolithic industry the proportion of flake tools to core tools is considerably larger. Flakes themselves are large and crude and there is little evidence of the Levalloisian or Prepared core
technique. Pebble tools are crudely made; no specimen has the fine zigzag edge that results by alternate flaking from two faces. Handaxes are generally thick, asymmetrical and incompletely flaked; majority of them are of the Abbevillian type and some can be ascribed to an early to middle Acheulian stage. Cleavers are also made by a simple technique; only one specimen has a roughly parallelogrammatic cross section but it is not made by the classic side-blow technique. There is very little secondary flaking on the tools and primary flaking is also incompletely done leaving large areas of the unflaked original cortex on the artefacts. In general it can be said that very little attempt has been made to give a beautiful appearance to the tools.

Part of the explanation for the crudeness of the implements from the Banas may lie in the readily available and plentiful supply of raw material which led to the tools being easily fashioned from the job in hand and just as easily being discarded. Such an explanation has been suggested by M. Posnansky for a similar phenomenon at Nsongezi on the Kagera river in Uganda.

### TABLE V

**INVENTORY OF TOOL TYPES**

<table>
<thead>
<tr>
<th>SITES</th>
<th>NTD</th>
<th>HMG</th>
<th>SPG</th>
<th>MDP</th>
<th>BGD</th>
<th>JHP</th>
<th>DOL</th>
<th>ETL</th>
<th>TNK</th>
<th>MHW</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artfact Types</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choppers and Scrapers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) On Pebble</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unifacial</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bifacial</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trifacial</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) On Flake</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HANDAXES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Pebble Handaxes</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) Fully-flaked handaxes</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleavers</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Pebble Cores</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) Flake Cores</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flakes</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|     | 1 | 10 | 21 | 10 | 14 | 12 | 9 | 12 | 5 | 3 | 97 |
1. Large pebble core. 2. Trifacial pebble tool. 3. Small unifacial tool.
1-4. Bifacial pebble choppers.
1. Large, rectangular flake. 2. Double pointed handaxe. 3. Small, almond shape handaxe.
4. Ovate. 5. Unifacial pebble chopper.
1. Large pebble core. 2. Thick almond shape handaxe.
From the Gambhiri one hundred and thirty five tools were collected near Chitorgarh. Fifteen of these came from the gravel section in the erosion gully below the southern end of the Chitorgarh fort (Pl. X Fig. 7) and the rest from a gravel spread in the river bed just at the foot of the town. The in situ specimens included three handaxes, two scrapers, one tortoise core and nine flakes. Thus the number of in situ specimens though small is yet quite representative in typology.

Raw Material and State of Preservation of the Implements

The material employed is consistently quartzite. It is grey of medium- to fine-grained variety and commonly of bluish-grey colour. A few pieces of dark-grey or black colour are of highly fine-grained variety.

Though nearly all the tools that have come from the loose gravel in the river bed have undergone some rolling none is as heavily rolled as many of the tools from the Banas. One of the probable reasons of the better preservation of the implements is the small quantity of gravel in the Gambhiri when compared to the Banas. These implements have also acquired a light-brown or chocolate coloured patina of pleasing appearance.

 Implements that were obtained in situ from the gravel layer are unrolled and unpatinated but highly weathered.

TECHNIQUE

Although there are no huge pebble cores from the Gambhiri similar to those of the Banas, there are many crude and thick flakes. Some of these are indeed massive and much more crude than any flakes from the Banas.
(See Pls. XXX/XXX Figs. 1; 2-3). Though most of the flakes could have been detached by the stone hammer technique, such massive specimens were, in all likelihood knocked off by the block-on-block or anvil technique. In the handaxes and cleavers besides the stone hammer technique, there is also the evidence of the use of cylinder hammer technique. Of special mention however, in the Gambhiri industry is the use of the prepared core technique; this feature marks it out from both the Banas and the Gambhiri industries.

Secondary flaking is more common and of an advanced type than in the Banas. Cleavers and handaxes have been lightly trimmed along the margins after primary flaking. Some of the flake-scrapers are so well retouched that they appear to be ancestral to the highly evolved scrapers of the Middle Palaeolithic.

<table>
<thead>
<tr>
<th>ARTEFACT TYPES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHOPPERS AND SCRAPERS (Pls. XXX/XXX Figs. 2; 3; 3; 4)</td>
</tr>
</tbody>
</table>

(i) Made on pebble
(a) Unifacial:

They are similar to unifacial pebble tools of group (a) from the Banas. Only in the present collection the flatness of the undersurface in several specimens is artificial rather than natural; they are also better made than the specimens from the Banas.

CHG 35 (11.8 x 8.9 x 5.0) Pl. XXX/XXX Fig. 4

A chopper/scaper of greyish quartzite; slightly rolled. The lower face is actually a flake surface but on account of its thickness, presence of considerable amount of pebble cortex and workmanship it
is more appropriate to describe it a pebble tool. The working-edge is made by step flaking but it is not very steep.

CHG 118 (14.2 x 12.2 x 6.6) Pl. XX/11 Fig. 3

A chopper on a flat-based round pebble of grey quartzite; much rolled. It has a convex working-edge which is very steeply flaked.

(b) Bifacial:

Bifacial pebble tools from the Gambhiri are technologically far superior to those of the Banas. They are made by alternate flaking from both faces. Flakes are deep and convergent and the resultant edge is markedly sinuous. The regularity and precision with which the alternate flakes are removed gives a beauty to the tool. Some of the specimens are excellent examples of what Movius calls chopping tools. One specimen is also worked along two sides besides the end by removing rather large and deep scars; this might originally have been a core.

CHG 105 (11.5 x 10.6 x 5.8) Pl. XX/XXIII Fig. 2j 3

A chopper/scaper on a rounded pebble of dark-brown quartzite; fresh but slightly stained with clay. Three flakes have been detached from each face alternately. Working-edge is sharp and remarkably sinuous. It is a perfect example of Movius's chopping tool.

CHG 108 (12.5 x 9.9 x 6.1) Pl. XXV Fig. 3

A rounded chopper of grey-brown quartzite; fresh. It is worked along one end and two sides by alternative flaking leaving original pebble cortex only along the butt. Flakes scars are relatively large and it is likely that the specimen might have been originally a core.

(ii) On flake

These generally occur on rather thick, wide-angled flakes of
various shapes. The flakes are nearly always worked on their upper surface and considered by themselves would belong to the flakes of group II described below. At least one specimen has on its upper surface flake scars reminiscent of the levalloisian technique though it is too thick and crude to be a genuine levalloisian piece. The scraping edge is made by the adoption of two techniques:

(i) by steep flaking along a side or end of thick flakes;
(ii) by shallow edge retouch on thin flakes. This is of a very high order on one of the specimens but on the whole the former type of work is more common.

The specimens may be divided into two types.

(i) Working-edge along the side

CHG 149 (15.3 x 13.4 x 3.7) Pl. XXIV Fig. 3
A side-scraper on a thin long triangular flake of grey quartzite; patinated dark-brown and slightly rolled. The flake has a faceted platform, a striking angle of 100° and a very pronounced bulb.
From the upper face only one large triangular flake has been detached and the rest of it retains pebble cortex. Both lateral margins are retouched by shallow trimming from two faces. Such fine secondary work rarely occurs in the Lower Palaeolithic and the implement may well be regarded as a forerunner of the Middle Palaeolithic scrapers. The implement was originally longer; the tip has been broken.

CHG 52 (11.3 x 11.0 x 4.5) Pl. XXIV Fig. 1
A side-scraper on a thick, round flake of grey quartzite; slightly rolled and patinated dark-brown. Bulb of percussion and striking
platform removed. It is worked in the manner of the specimen described above. Left margin has three concavities all of which are retouched. The retouched tip at the end makes the tool a prototype of the later Middle Palaeolithic borer-scrapers.

(i) Working-edge along the end

CHG 20 (12.9 x 11.2 x 5.3 ) P1. XIXI Fig. 2

A chopper/scaper on a thick, oval flake of grey quartzite; slightly rolled. Upper face marked by centrally directed large flake scars. Working-edge opposite the bulbar-end is made by step flaking. The bulbar-end is thick and suitable for hand-hold.

(b) HANDAXES (P1s. XVIII; XIX, Figs. 1; 1; 1; 2; 1; 1; 2; XIX; XXVII)

Handaxes comprise the largest group of artifacts next only to flakes. They may be divided into three groups on the basis of their technological characteristics.

(i) Handaxes in this group are characterised by bold flaking producing large and deep scars and a relatively symmetrical shape. There is no evidence of the use of the cylinder hammer technique. Areas of cortical surface are left unflaked and no attempt is made to remove the unnecessary thickness. In so far as the flaking is more comprehensive on them they are an improvement on the pebble handaxes from the Banas.

CHG 2 (16.9 x 9.9 x 7.7 ) Pl. XVII Fig. 2

A very thick, pointed handaxe of grey quartzite; patinated light brown and slightly rolled. It is flaked almost fully on both surfaces leaving only a small patch of cortex in the centre on the upper surface. Upper face has a central keel to which flakes converge from all sides. Flakes
scars are large, deep and limited in number. Lower face is flatter than the upper; lateral margins wavy and irregular and cross-section irregularly bi-convex.

(ii) The distinctive features of this group are: (i) the specimens have a bilateral symmetry of outline; (ii) they are generally thin in relation to their size; (iii) they are seldom fully worked seldom leaving a patch of original cortex; and (iv) they are worked by controlled flaking. Though much of the flaking has been done by stone hammer technique, specimens have acquired a symmetrical shape and finished outlook. Flake scars are sometimes large but not deep and consequently the surface of the tools is smooth and flat and not uneven. In several specimens an effective working-edge and fine shape has been achieved with very limited flaking (\textit{P_1, XVIII} Fig. I).

This group also includes a number of specimens made on flakes in which ventral surface is either worked only along the margins or not worked at all. Upper surface is, however, carefully worked all over to make the tool effective as a handaxe. Such specimens are usually referred to as unifacial handaxes but in the present collection all such specimens can not be called unifacial for generally they have some work on the lower face as well. Even among the true bifaces it is probable that the slender ones were made on flakes but since no trace of the bulb of percussion and striking platform is left it is difficult to determine their flake origin. In the section fully-worked specimens the cross-is generally biconvex though biconvexity is more pronounced on the upper surface than on the lower. In the flake specimens with ventral surface almost unflaked it is plano-convex.

Another special feature of this group is the presence of a small number of diminutive handaxes of narrow, elongated shape. They are extremely
 uniform in size and shape and measure on average ten centimeters by six centimeters by four centimeters. They are generally pear-shaped and have a pointed tip. They are in fact miniature handaxes. Diminutive handaxes occur both in the Banas and the Gambhiri but in the latter they are not narrow and elongated but short and broad (Pls. XIV; XXXI Figs. 3; 5). Outside Rajputana they occur in Kurnool, Orissa, Karnataka, and Gujarat and can in fact be regarded a feature of the Madrasian Culture all over India. All the specimens in this group are true Acheulian forms despite the fact that in some of them cylinder hammer technique has been only sparingly used. This is however, not surprising for even at Olduvai the earliest Acheulian handaxes are not always made by cylinder technique. The specimens are grouped under following types.

(a) **Triangular**

CHG 102 (20.1 x 10.4 x 6.2) Pl. XVII; XXII Fig. 1

A long triangular handaxe of grey quartzite; completely unrolled, but much encrusted with lime and clay on both faces. It is fully flaked on both faces by detaching large but shallow flakes by stone hammer technique; only the butt portion retains the cortex. On the detached upper face a few flakes along the right margin have been struck by cylinder hammer technique. Lower face has a central longitudinal ridge running from the tip to near the butt. The butt is straight and the sides taper to a thin point. In profile the margins are wavy and the left one is more so due to alternate flaking from two faces. Cross-section symmetrically biconvex. The implement has a fine appearance and is an index of the artificer’s skill who could attain such fine results with limited flaking.
(b) **Pear-shaped**

CHG 101 (10.5 x 5.4 x 3.9)  Pl. X1V  Fig. 2

A small pear-shaped handaxe of quartzite; unrolled but slightly weathered and encrusted with lime. Fully flaked over both faces; flake scars are shallow on the upper surface but deep on the lower. It has a wavy edge running all round the way including the butt; section biconvex.

(c) **Almond-shaped**

CHG 87 (13.3 x 8.4 x 3.6)  Pl. X1V  Fig. 1

A roughly almond-shaped handaxe on a side-flake of greyish quartzite; flaked unrolled but patinated brown. It is steeply along the margins on the upper face; rest of the surface is a flake surface. Lower face is slightly worked along the left margin. Section trapezoidal.

(d) **Point-butted triangular**

CHG 9 (12.2 x 7.3 x 3.5)  Pl. X1V  Fig. 2

A double-pointed handaxe on a side-flake of grey quartzite; very slightly rolled and sparsely encrusted with clay and lime and patinated brown. Upper face from which originally a large side-flake had been struck off is worked very steeply along the full length of both margins; lower face also steeply worked along the left margin. Flaking has been done by cylinder hammer technique. Pointed butt could have been hafted. Tip broken; section an irregular trapezium.

(iii) Though there is only one specimen in this group, its fine and delicate workmanship is sufficiently distinctive to warrant its exclusion from the rest. It is described below.
A fine, thin handaxe on a flake of bluish-grey quartzite; patinated brown and slightly rolled. Fully flaked over both faces by soft cylinder hammer technique leaving extremely shallow and small stepped scars. It is oval in outline and has a sharp edge all round the periphery. The left margin is slightly wavy and the right one has a S twist. Butt-end is very thin and a large and relatively deep scar on the upper face makes it still more thin. This was probably done to facilitate hafting. Cross-section lenticular. Because of its perfection and thinness it would appear more to be an aesthetic expression of the artificer than a purely utilitarian object.

(c) CLEAVERS (Pls. XX; XXIII, Figs. 1, 4, 2, 3; XXVII)

Like handaxes cleavers from the Gambhiri also exhibit technologically advanced features. They are consistently made on flakes. Of the eighteen specimens in the present collection eleven are made on side-struck flakes and six on end-struck flakes and in the remaining one case the original nature of the flake can not be determined as it is fully worked on the main flake surface. On the basis of technique of manufacture three main types can be distinguished among the specimens. In the first group are three specimens made on levalloisian-type flakes. Very little work has been done on them subsequent to their removal from the core. One of the flakes has a faceted platform but in the other two the platform and in one the bulb also has been removed. All these have a transverse edge which is made by the intersection of the main flake surface and a sloping trapezoidal or rectangular scar on the upper surface. This produces an edge-like working-
edge. The cross section in two specimens is trapezoidal and in one specimen parallelogrammatic. These indeed are specimens of beauty because of their small size and symmetrical shape. The second type includes specimens made by double side-blow technique. They invariably have a parallelogrammatic section and an elongated rectangular shape. The third type includes specimens in which the lower face is a clean surface of a side or end flake but the the upper surface is well worked. They have a parallelogrammatic, or trapezoidal or plano-convex section and a V or U shape.

Like the handaxes in the cleavers also there is great variation in size. The biggest specimen of the group measures 17.7 centimeters by 10.8 centimeters by 6.1 centimeters and the smallest one measures 8.5 centimeters by 6.0 centimeters by 1.9 centimeters. On the basis of the shape of the butt and the cleaver edge the following types may be recognised.

(i) **Pointed butt and straight edge - V shape**

CHG 23 (14.0 x 7.8 x 4.2) Pl. YXVII Fig. 2

A V shaped cleaver on a side-flake of greyish quartzite; slightly rolled and encrusted with clay and lime. Lateral margins as well as the butt are steeply worked by cylinder hammer technique. There is much step flaking along the margins. Lower face left unworked. Section trapezoidal.

(ii) **Straight butt and straight edge - rectangular shape**

CHG 81 (8.4 x 6.0 x 2.1) Pl. XXV Fig. 3

A miniature cleaver on a rectangular levalloisian flake of bluish-grey quartzite; slightly rolled and patinated light brown. The flake has a neat faceted platform, a diffused bulb and a flake angle of 90°. On the upper face slight trimming has been done along the butt.
and left margin. On the lower face left margin is steeply worked by cylinder hammer technique; the rest of it is a clean flake surface. Section a parallelogram.

(iii) **Straight butt and oblique edge.**

CHG 16 (13.2 x 7.1 x 3.5) Pl. X\(X\)\(X\) Fig. 1

An elongated narrow cleaver on a side-flake of quartzite; slightly rolled. The lower face is steeply flaked along the margin from which the main flake was removed. Upper face has a large scar of an end-flake; sides are steeply flaked partly by step flaking. Section a parallelogram;

(iv) **Rounded butt and straight edge. - U shaped.**

CHG 63 (11.7 x 6.8 x 3.0) Pl. XXV Fig. 2

An U shaped cleaver of bluish-grey quartzite; deeply patinated greyish-brown. Lateral margins on the upper surface are steeply worked. Butt rounded and cleaver edge transverse; section parallelogram

CHG 64 (11.2 x 9.0 x 3.5) Pl. XX;XXIII Fig. 4

A cleaver on an oval levvalloisian flake of pinkish quartzite; slightly rolled and patinated brown. On the upper face some flaking has been done along the margins by the cylinder hammer technique subsequent to the removal of the flake from the core. On the lower face striking platform and bulb have been removed and left lateral margin has been slightly worked by step flaking. Sharp adze-like transverse edge is made by the intersection of the main flake surface with a trapezoidal sloping scar from the upper surface. Butt has been thinned and the implement could be hafted; section parallelogrammatic.
(d) **Discs** (Pl. XXVI, Fig. 3)

There are two specimens only. Both are of the same size. One which was found in situ is worked only on one face and is rather crude. The second better specimen is described and illustrated.

CHG 46 (9.6 x 8.1 x 2.7) Pl. XXVI, Fig. 3

A disc made from a thin, faceted platform flake of greyish quartzite; slightly rolled. On the upper surface it is worked all round the periphery mostly by step flaking; lower face only is partly worked. It has a sharp straping edge all around except along the striking platform which is left unworked. Section across the longer dimension will be roughly lenticular.

(e) **FLAKES** (Pls. XXVI, XXVII, Figs. 4, 7; XXVIII, Figs. 3, 12, 13.)

On the basis of technique of manufacture these are divided into three groups. (i) Large coarse and thick flakes, (ii) Small thin flakes, and (iii) Prepared or Levalloisian flakes.

(i) **Large, coarse and thick flakes**

These are generally very large and extremely thick. Some of them measure about twenty centimeters in length and one is almost equally wide. The average length is, however, is about thirteen centimeters. They have very large and prominent bulb of percussion; the striking platform is invariably plain and often cortexed and the angle between it and the main flake surface is wide — above 100°. Upper face in many cases remains unflaked. They are on the whole coarser than the flakes from the Banas. Many of these were probably produced by the block-on-block technique. On the basis of shape these flakes may be divided into two groups.
(i) With transverse edge

CHG 75 (19.5 x 18.7 x 6.4)  Pl. XIX Pl. XLI Fig. 1, 1

A large, thick and coarse flake of reddish quartzite; slightly patinated and much weathered. Found in situ. It has a plain striking platform, a prominent bulb of percussion and a flake angle of 102°. Two or three large flakes have been taken off from the upper surface. It has a wide transverse cutting edge.

(ii) Pointed

CHG 96 (18.1 x 9.9 x 6.4)  Pl. XXVIII Fig. 3

A large, coarse triangular flake of quartzite; much weathered. Found in situ. It has a cortexed striking platform, a prominent bulb and a flake angle of 108°. From the upper face a long flake parallel to the longer axis of the main flake, was detached.

(iii) Small and thin flakes

These flakes are smaller and thinner compared to the flakes in group (i). The average length of these flakes is about ten centimeters. Generally they have plain striking platform but in two or three specimens it is faceted. Upper face is invariably worked - fully or partly. In some of the specimens part of the flaking seems to have been done prior to their detachment from the core. Bulb of percussion is not always very prominent and the flake angle ranges between 90° and 100° though in exceptional cases it may be slightly more. A few of these flakes even approach blade-like forms. They are technologically superior to most of the specimens from the Banas.

CHG 124 (13.2 x 8.9 x 3.1)  Pl. XIX Fig. 4

A pointed flake of grey quartzite; heavily weathered. Found in situ.
It has a faceted platform, a prominent bulb and a flake angle of 106°. Upper face is marked by relatively large flake scars.

**CHG 123 (10.4 x 6.1 x 2.3)** Pl. XXV Fig. 4

A thin triangular flake of grey quartzite; patinated dull brown. It has a narrow plain platform, a diffused bulb and a flake angle of 80°. On the upper face one long blade-like flake parallel to the longer axis of the main flake has been detached from the left margin.

**CHG 127 (13.6 x 5.5 x 2.9)** Pl. **XXI** Fig. 5

A thick elongated blade-like flake of grey quartzite; patinated reddish brown. It has a narrow striking platform, a slightly diffused bulb and a striking angle of 90°. Upper face unflaked and cross section triangular. The tip has been broken recently.

(iii) **Prepared or Levalloisian flakes**

There are three flakes in the collection which appear to have been detached by the prepared core technique. They have typical centrally directed flake scars on their upper surface and almost no secondary work. One of these is very thick and it is possible that it could have been worked even after it had been struck off the core. The other two are thin and more typical and one of these described below is indeed a specimen of beauty.

Besides these there are three more levalloisian flakes in the collection which have been shaped into cleavers; and three these have already been mentioned. However only one specimen among these flakes has a faceted platform. I have, therefore, used the expression 'prepared' or 'Levalloisian' flakes advisedly instead of 'faceted platform' flakes. Since there appears
to exist a considerable confusion regarding the relationship of the 'faceted platform' and the 'Levalloisian technique' the subject is discussed in detail in an appendix at the end of this thesis. Here it may suffice to say that the faceted platform is not taken to be an essential trait of the Levalloisian technique.

CHG 85 (12.1 x 8.6 x 3.4) Pl. xxvii, Fig. 2; 3

An almond-shaped flake of bluish-grey quartzite; slightly rolled and patinated chocolate-brown. It has a plain platform, a beautiful conoid bulb and a flake angle of 100°. The upper surface is marked by shallow scars detached from margins inwards. The implement has a beautiful appearance because of its symmetrical shape and fine workmanship. Lateral margins have been fractured here and there recently. It looks very similar to a prepared flake, the N horizon of the Kagera at Nsongezi in Uganda; only the latter specimen is slightly flaked along one margin on the lower face.

(f) CORES (Pl. xxvii, Figs. 4; 2)

No cores similar to the huge pebble cores of the Banas were found in the Gambhiri. They may, however, be found in future since there are a good number of flakes removed from such cores. In the present collection there are only five cores. These can account only for smaller flakes. They may be divided into three types: (i) Discoidal, (ii) Tortoise, (iii) Irregular.

1. Van Riet Lowe, C (1952) Pleistocene Geology and Prehistory of Uganda: Part II. Prehistory. Pl. XXI., Fig. 1.
CHG 113 (9.9 x 7.8 x 5.9)  Pl. xxi, Fig. 4

A thick, roughly discoidal core of quartzite; slightly rolled.
Several flakes have been detached from it from all sides.

CHG 72 (16.9 x 11.6 x 5.7)  Pl. xxviii Fig. 2

A large, oval core of bluish-grey quartzite; unrolled but patinated white and slightly weathered. The upper face is dome shaped; the right side on this face has been steeply flaked by detaching very shallow flakes, probably to prepare the striking platform for the main flake. A blow was given at the edge of this side to remove a large flake from the opposite face. Lower face bears a deep negative scar, and three or four negative scars around that.

The table on the following page gives the number of different tool types and sub-types.
TABLE VI

INVENTORY OF DIFFERENT TOOL TYPES

Choppers and Scrapers

(1) Made on pebble

(a) Unifacial 8
(b) Bifacial 6

(ii) Made on flake

(a) Worked along side 8
(b) Worked along end 6

Handaxes

(a) Group I 3
(ii) Group II

Group

(a) Triangular 8
(b) Pear-shaped 11
(c) Almond-shaped 5
(d) Double pointed 3

Cleavers

(a) Pointed butt and straight edge 2
(b) Straight butt and straight edge 5
(c) Straight butt and oblique edge 8
(d) Rounded butt and straight edge 3

Discs

2

Flakes

(i) Large, thick coarse flakes 24
(ii) Small and thin flakes 24
(iii) Prepared and Levalloisian type flakes 3

Cores

(i) Discoidal 2
(ii) Tortoise 1
(iii) Irregular 2

Total 135
Besides my own collections two more collections from the Gambhiri from the site of Chitorgarh made by the superintendent of Western Circle of the Department of Archaeology, Government of India were also studied by me at Delhi and Baroda. No particular differences were noted in these collections. They only support the conclusions reached at JMM by the study of my own collection. At Delhi the total number of tools studied was only thirty four. This may be divided into following types.

(a) **Pebble tools**: 4

These comprised following sub-types.

(i) 1. **Side chopper**
   2. Side scrapers
   1. End scraper

   Though all these were bifacial, there was no specimen which was made by the alternate flaking technique and could be called a chopping tool.

(b) **Flake scrapers and choppers**.

(i) 3. **End** side scrapers
   1. End-scraper
   1. Huge chopper.

(c) **Discoids**

(d) **Handaxes**

   **Group I**
   1. Crude handaxe
   1. Small triangular handaxe

   **Group II**

   (i) 2. **Pemr-shaped**
   (ii) 4. Triangular, two small-sized.
(i) 2. Almond shaped, one with a broken tip.

(ii) 2. Irregular, one with a broken tip.

(2v) **Gleavers** : 5

(i) 3. Rounded butt and oblique edge, one having plano-convex section and two parallelogrammatic.

(ii) 1. U shaped and parallelogrammatic section.

(iii) 1. V shaped with parallelogrammatic section.

(f) **Flakes** : 6

(i) 2. Small triangular flakes.

(ii) 2. Thick end flakes.

(iii) 2. Thin flakes.

The collections studied at Baroda consisted of ninety three specimens. These may be divided into following types.

(a) **Pebble Choppers and scrapers**.

(i) 1. Alternately worked bifacial chopper

(ii) 1. Unifacial scraper

(b) **Core choppers and scrapers**.

These are made on pebbles but too completely worked to be called pebble tools.

(i) 4. Bifacial

(ii) 2. Unifacial

(iii) 1. Scraper or chopper with a cleaver edge.

(c) **Flake choppers and scrapers**.

(i) 2. Side-scrapers with borer-like tips. These are more near to Middle Palaeolithic forms than any other specimens I have seen from a Lower Palaeolithic industry.
(ii) 7. Side-scrapers - two very small and one elongated and with a handaxe like tip.

(iii) 1. Rectangular side-scaper or chopper with working edge along both margins; broad and thick.

(iv) 1. Trapezoidal scraper or chopper on a side flake with working edge along the right margin and end.

(d) Discoids 4.

(e) Handaxes

Group I. 9 specimens, roughly triangular but ill-defined.

Group II.

(i) 6. Almond-shaped. 3 small sized and 3 medium sized; cross section plano-convex to bi-convex.

(ii) 13. Pear-shaped. 3 are very small, 3 to 4 in length; 1 is a pick like form; 3 have a flake undersurface which is worked only along the margins.

(iii) 2. Elongated pyriform type, one with a S twist.

(iv) 5. Elongated ovates.

(v) 3. Small pointed ovates with a broad butt.

Group III. One very fine specimen of reddish quartzite; extremely thin and worked over both faces by detaching numerous tiny shallow flakes; a sharp edge around the entire periphery; margins slightly wavy in profile; section lenticular; the implement is a specimen of beauty because of its symmetrical shape, fine workmanship and pleasing colour; it is much better than the only specimen of group III in my collection.
(f) **Cleavers.**

(i) 4. U shaped; one with a side flake scar on the under surface and parallelogrammatic section and three with end flake scars and trapezoidal section.

(ii) 1. Elongated narrow with a side flake scar on the under surface and parallelogrammatic section; butt crude and retaining pebble cortex.

(iii) 8. V shaped; three with end flake scars on the under surface and the rest bifacially worked; three with oblique edge and the remaining with straight edge; section; two parallelogrammatic, two trapezoidal two lenticular, two biconvex one of them very irregularly so.

(g) **Flakes.**

There were sixteen flakes in all. All can be ascribed to Group II. (Small and thin flakes) as defined for the flakes in my own collection.

besides, at Baroda specimens from the site of Sigoh on the Kadamali, a tributary of the Gambhiri in district Chitorgarh were also studied. These comprised following forms.

(a) **Handaxes**

3. Pear-shaped. All are very small in size, hardly bigger than the small handaxes in my own collection (Pl.XIV Fig. 3) one specimen is very finely worked on the lower face by cylinder hammer technique though upper face retains some cortex; section plano-convex. One more has a plano-convex section and the third has a biconvex section. All can be ascribed to group II, the first one approaching group III. of the Gambhiri.
(b) Cleavers

(i) 2. U type. One with a more rounded butt than the other and having a biconvex section; bifacially worked, and working edge slightly oblique. The other one is on an end flake and has a plano-convex section. Comparatively thin and better worked.

(ii) 2. V type. One a crude specimen retaining much of original cortex and having an irregularly biconvex section. The other one more symmetrical with a larger triangular flake on the upper face along the front; section triangular with base of the triangle slightly concave.

(iii) 1. Triangular butt and oblique edge; section biconvex.

(iv) 1. Triangular butt and straight edge; made on an end flake; section triangular.

It will be seen from the description of the various tool types that the Gambhiri assemblage exhibits features of a highly advanced lithic industry. Pebble choppers are made by alternate flaking from the two faces producing a fine W shaped zigzag edge. Among the flake choppers and scrapers some are very finely retouched and appear to be proto-types of the scrapers of the Middle palaeolithic. Of special interest among these is the scraper with a borner-like tip illustrated in Pl.XXIV Fig.1. The handaxes except a few specimens are thin and symmetrical. Unlike the Banas specimens they are completely flaked seldom leaving areas of original cortex and many of them are made on flakes. The fine almond-shaped specimen in group III (Pl.XX; Fig.1:1) fully exemplifies the technical skill of the makers of this industry. The same skill is also reflected in the e
cleavers which include several types such as those made on prepared flakes and by the side-blow technique. Finally the presence of Levalloisian type flakes in the assemblage also bears out the advanced character of the industry.
Large triangular handaxe; (a) Dorsal and (b) Ventral views.
Thin almond shape handaxe; (a) dorsal and (b) ventral views.
1. Cleaver on a prepared core flake; (a) dorsal and (b) ventral views.
2. Bifacial pebble chopper; (a) dorsal and (b) profile views.
1. Large, thick flake. 2. Lavellois flake.
1. Flake scraper with a borer-like tip.
2. Small pear shape handaxe.
3. Side scraper on a faceted platform flake.
1. Bifacially alternately flaked pebble chopper or core. 2. Cleaver made by sid
blow technique. 3. Cleaver made on a faceted platform Levallois flake. 4. Small
triangular flake.
1. Roughly almond shape handaxe on a side flake. 2. Pointed handaxe on a side flake. 3. Disc. 4. Roughly discoidal core.
1. Thin, almond shape handaxe with lenticular cross section.
2. V shape cleaver on a side flake.
3. Levallois flake.
4. Unifacial pebble scraper with a flake under surface.
1. Large, thick flake. 2. Tortoise core. 3. Large triangular flake.
River Berach

The collection from the Berach is comparatively small. It consists of thirty five tools including one from an anonymous sub-tributary of the Berach. From the Berach tools were collected from three sites, namely Chitorgarh, Dabok and Sand. One implement was found from Kheri on an anonymous stream which joins the Katara Nadi, an affluent of the Berach. Of the thirty five implements seven were obtained in situ, from the gravel deposits and the remaining from loose gravel in the river bed. The in situ specimens comprise four pebble tools, two cleavers and one thick flake.


The only material employed for making the tools in the Berach industry is quartzite. It is of bluish-grey to pinkish colours and is medium to fine-grained. A few pieces are slightly coarse-grained and micaceous. The source of the material is probably the Aravalli rocks in the east and the Vindhyans in the south.

Nearly all the tools have undergone some rolling and many especially those from the site of Sand are heavily rolled like many of the tools from the Banas. The tools collected in situ are less rolled than those collected from the river bed. All the specimens have acquired a dull brown patina.

TECHNIQUE

There is no evidence of heavy stone hammer technique in the Berach assemblage. Most of the flaking has been done by light stone hammer. Only in two or three specimens the use of the cylinder hammer technique can be seen. There is no evidence of the prepared core technique.
Tool Types

(a) Pebble scrapers and choppers. (Pls. \textit{XXIX}; Figs. 3, 4, 6)

Unifacial

(i) There is only one specimen. In workmanship it is similar to type (i) of the unifacial pebble tools of Banas.

CHG 19 (7.3 x 5.4 x 6.4) Pl. \textit{XXIX} Fig. 4

A thick pebble scraper of grey quartzite; slightly rolled. It has a flat lower face and a triangular three-faced upper face. Steeply flaked on one side from the base upwards.

(ii) Similar to type (ii) of the unifacial pebble tools of the Banas.

CHG 25 (9.1 x 6.7 x 3.6) Pl. \textit{XXIX} Fig. 3

A thin scraper of bluish quartzite; slightly rolled and patinated grey. Found in situ. The entire upper surface which is flat is flaked by detaching shallow flakes.

Bifacial

The implements from the Berach in this category are different from the bifacial tools from the Banas and the Gambhiri. They have two working edges along two sides which are made by flaking from opposite faces. Strictly speaking these may not be regarded bifacial tools because the working edge is not made by flaking from two faces. They are bifacial in the sense that they are worked on two faces.

CHG 18 (15.8 x 11.4 x 5.9) Pl. \textit{XXIX} Fig. 5

An oval pebble chopper/scaper of quartzite; slightly rolled and patinated grey. Steeply flaked along the two sides from opposite faces.

(b) \textbf{Handaxes} (Pls. \textit{XXIX}; Figs. 2, 2.5, 7)

(i) Pebble handaxes: There are only two specimens. One of these is unifacial
and the other bifacial.

**Unifacial**

CHG 4 (12.2 x 8.1 x 4.2) Pl.XXX Fig. 5

A thick-butted pebble handaxe of bluish quartzite; very little rolled.

Upper face fully flaked; edges sharp.

**Bifacial**

KHR 1 (14.2 x 8.0 x 4.0) Pl.XXX Fig. 3

A point-butted handaxe of bluish quartzite; completely unrolled but slightly patinated. Flaked inversely on the two faces by detaching small and relatively deep flakes. Butt portion as well as much of the central portion on both faces retains pebble cortex.

(ii) **Fully flaked handaxes.**

A special feature of these handaxes is their small size. Except one specimen all measure less than ten and a half centimeters in their longer dimension; two of them measure less than seven and a half centimeters. These latter are miniature versions of handaxes similar to TNK 4 (Pl.XIV Fig.3) from the Banas. Flaking is of the stone hammer variety and excepting two or three specimens all are asymmetrical and poorly developed. Though there are some ovates in the collection, they are thick and irregular. Several pieces may be made on flakes. They may be divided into following types.

(1) **Narrow and Elongated**

CHG 16 (17.5 x 8.1 x 5.3) Pl.XXX Fig. 2

A long, narrow handaxe of light yellow quartzite; slightly rolled.

Fully flaked by stone hammer technique. Butt rounded and lateral margins slightly wavy; section biconvex. Flake scars are relatively large but generally shallow. Because of its long narrow tip it would have been
very effective as a spearhead. Similar to an ovate-acuminate from the N horizon at S Nsongezi on the Kagera in Uganda.1

(ii) Almond-shaped

SND 7 ( 7.4 x 5.6 x 2.7 ) Pl.XXX'I Fig. 5

An almond-shaped tiny handaxe of grey quartzite; much rolled and patinated light brown. Fully flaked by stone hammer technique except for a small patch of pebble cortex on the dorsal face in the centre. Similar to a handaxe from Tonk on the Banas, illustrated in Pl.XIV Fig. 3

(iii) Oval

CHG 24 ( 10.4 x 7.8 x 4.2 ) Pl.XXIX Fig. 2

A thick oval handaxe of quartzite; much rolled and slightly patinated. Flake scars are big and deep; on the upper surface there is some step flaking along the sides. Lateral margins slightly wavy and the left one more so. Section biconvex.

(iv) Triangular

SND 6 ( 8.3 x 6.4 x 3.0 ) Pl.XXX'I Fig. 2

A small triangular handaxe of reddish quartzite; much rolled and patinated light brown. Irregularly flaked by detaching large flakes; upper face retains some pebble cortex.

(c) CLEAVERS ( Pls.XIX, XXXI Figs. 11, 1; 11, 1.)

Cleavers also like handaxes are poorly made. Technologically they are much inferior to the specimens from the Gambhiri. They are thick and bifacially flaked like the handaxes. Cross sections is biconvex or plano-

convex except in one case where it approaches a parallelogram. Two specimens which are quite fresh are well made and one of these has extensive step flaking over it both the faces. Following types can be seen in them.

(i) Rounded butt and straight edge

CHG 7 (14.5 x 7.2 x 3.2) Pl. XXX Fig. 1

A long straight-sided cleaver of bluish quartzite; unrolled but patinated light brown. Found in situ. Fully worked on both faces mainly by step flaking by cylinder hammer technique. Part of the left margin is thick and unflaked. Butt portion and cleaver edge straight; section symmetrically biconvex.

(ii) Square butt and straight edge.

SND 1 (14.5 x 9.6 x 2.6) Pl. XXX Fig. 1

A thin, rectangular cleaver of quartzite; heavily rolled and patinated dull grey. Flake scars are large but shallow; margins and butt partly worked by step technique. Section plano-convex.

(iii) Pointed butt and oblique edge.

CHG 10 (11.5 x 7.2 x 3.5) Pl. XXX Fig. 1

A medium-sized cleaver of bluish quartzite; much rolled and patinated light brown. Lower face made by a large side flake scar. Upper face steeply flaked along the margins and butt. Front portion has a big sloping scar. Section parallelogrammatic.

(d) FLAKES (Pl. XXX; Figs. 5; 4)

Excepting one thick coarse flake all are thin and small sized.

Technologically they are similar to flakes of group two from the Gambhiri. Typologically they may be divided into two groups: (i) Triangular flakes;
and (ii) Round flakes.

**Triangular flakes**

CHG 14 (11.2 x 8.5 x 3.0) Pl. XXIX Fig. 5

A triangular flake of bluish quartzite; slightly rolled and patinated dull brown; found in situ. It has a faceted striking platform, a prominent bulb and a flake angle of 90°. Upper face is worked.

**Round Flakes**

CHG 5 (8.2 x 6.6 x 3.3) Pl. XXIX Fig. 4

A thick, round flake of bluish-grey quartzite; slightly rolled and patinated light brown; found in situ. Bulb and striking platform subsequently removed. Upper face worked by shallow flaking except along one corner in one end. It has a cleaver-like cutting edge made by the intersection of the main flake surface with a sloping scar from the upper surface.

(E) **CORE** (Pl. XXX Fig. 4)

CHG 13 (12.0 x 14.0 x 2.2)

A rectangular flake core of greyish quartzite; slightly rolled. From the upper face one large flake leaving a deep negative scar has been detached. The right margin bears scars of two smaller flakes. Lower face is a main flake surface.

The Table on the following page gives the number of different tool types.
TABLE VII  
INVENTORY OF TOOL TYPES

<table>
<thead>
<tr>
<th>SITES</th>
<th>CHG</th>
<th>SND</th>
<th>DEK</th>
<th>KIR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Choppers and scrapers

(i) Made on pebble
(a) Unifacial 3
(b) Bifacial 2

Handaxes

(i) Made on pebble
(a) Unifacial 1
(b) Bifacial 1
(ii) Fully flaked
(a) Narrow elongated 1
(b) Almond-shaped 4 1
(c) Triangular 1 1
(d) Oval 3

Cleavers

(a) Round butt and straight edge 2
(b) Square butt and straight edge 1 1
(c) Round butt and splayed edge 3 1

Flakes

(i) Triangular flakes 2 1
(ii) Round flakes 2 2 1

Core 1
1. Rectangular cleaver. 2. Thick, oval handaxe. 3-4. Unifacial pebble scrapers. 5. Triangular flake.
Besides my own collection, two other small collections from the Bech were studied at Delhi and Baroda. At Delhi there were only three implements. These came from the site of Nagari near Chitorgarh and comprised

1 thin, fresh U shaped cleaver extensively flaked by cylinder hammer technique; margins worked by cylinder hammer technique step flaking. Section symmetrically biconvex; and

1 large, thick-butted rectangular cleaver; upper face retaining some cortex; fresh. Section trapezoidal.

At Baroda there were six tools from Nagari. These were made of bluish or pinkish quartzite and were generally unrolled, some almost in a mint condition. Some of these showed weathering and encrustations of lime and clay. They may be divided as follows:

1 large, thick oval scraper or chopper. Lower face a side flake scar; margins inversely flaked by step flaking.

1 smaller scraper/chopper on a side flake of bluish quartzite.

1 U shaped cleaver on an end flake; fully flaked; margins worked by step flaking. Section biconvex.

1 V shaped cleaver on an end flake; upper face steeply flaked along the margins; section trapezoidal.

1 elongated cleaver with tongue-shaped working edge at both ends.

1 pear-shaped handaxe with biconvex section.

At Baroda sixteen more tools were studied from the site of Parsoli on a tributary nalla of the Berach near Bichore. These may be divided into following types.

1 unifacial pebble scraper.

2 pointed core scrapers, one unifacial and one bifacial.
1 irregular handaxe with a long narrow tip ascribable to group I handaxes of the Gambhiri.

1 point-based elongated leaf-shaped handaxe on flake; section triangular.

4 almond-shaped handaxes; two of them have a flake under surface and plano-convex section; the other two have biconvex section. All may be ascribed to group II of the Gambhiri.

3 U shaped cleavers. Two of them very thin. One is extremely thin and regular and has a lenticular section; it is worked on both faces. The other two have a flake under surface.

1 V shaped cleaver with plano-convex section.

2 very small, thin flakes, one of them fully worked on the upper surface.

1 thick end flake.

My own collection from the Berach is small and therefore not fully representative. But taken together with Mr. Rao’s collection from Nagari and Parsoli it gives a fairly good idea of the Berach industry. The industry may be regarded broadly similar to that of the Gambhiri though some elements of the latter are missing in it. These are (i) Levalloisian flakes, (ii) cleavers made by the side blow technique and having a parallelogram section, and (iii) mixed bifacial choppers made by alternate flaking. However the handaxes and most of the cleavers may be well compared to those of the Gambhiri. The Berach assemblage includes very fine handaxes and cleavers made predominantly by the cylinder hammer technique. There are no crude asymmetrical handaxes nor large thick flakes such as those of the Gambhiri. Flakes are thin and well-worked and can be compared to the small and thin flakes of group II from the Gambhiri.
It is certain that if a larger collection was available for study the resemblance between the industries of the two rivers will be much greater. There are two reasons for this: (i) Very few artifacts have so far been found from the Berach west of Chitorgarh; nearly all the material comes from near Chitorgarh or downstream from where the Gambhir joins the Berach. Since the two rivers flow so close to each other at Chitorgarh, their paleolithic industries could have hardly developed in isolation; they are in fact bound to be influenced by each other. (ii) The artifacts found from east of Chitorgarh must inevitably include some derived material from the Gambhir. This fact would also tend to minimize the differences that may originally exist between the two industries. Here it might be mentioned that the implements from Nagari and Parsoli show more advanced features than those from Chitorgarh.
RIVER CHAMBAL

From the Chambal tools from two sites, namely Bhainsrorgarh and Sonita, were studied at Baroda. The Bhainsrorgarh material came from excavation and that from Sonita partly from excavation and partly from surface.

There are only twenty tools from Bhainsrorgarh. They are all made of quartzite. They are heavily rolled, more than the tools from the Banas, in many cases so much so that it is difficult to say that they are tools at all. Many of them bear encrustations of lime on them. They are on the whole crude and undeveloped. Excepting two handaxes all the tools are thick and mostly made by the stone hammer technique. The heavy rolling further accentuates their crudeness. The tools may be divided into following types.

(a) Pebble choppers and scrapers.
   (i) 1. Inversely flaked chopper/scaper.
   (ii) 2. Unifacial chopper/scrapers.
   (iii) 1. Bifacial end-scaper/chopper.

(b) Flake scrapers and choppers.
   (i) 1. X chopper/scaper along side and end.
   (ii) 1. End-scaper.

(c) Handaxes

   (i) 2. Almond-shaped handaxes; one fully worked and made on end flake with much step flaking along the sides; the other is unworked on the lower face which is a flake surface; right side on the upper face retains cortex; it is comparatively crude.

   (ii) 1. Round-butted elongated handaxe; weathered; butt and the central portion on both faces retain cortex; otherwise thin and well-made.
(iii) 1. Triangular handaxe; tip broken.
(iv) 1. Thick, elongated oval type; worked by step flaking.

d) Cleavers.
(i) 1. Thick V shaped cleaver with a triangular section.
(ii) 1. Thin cleaver with biconvex section.

e) Flakes.
(i) 2. Large, elongated, thick end flakes, measuring more than twenty centimeters in length; upper face is pebble cortex; one heavily rolled.
(ii) 2. Smaller, fresh flakes of reddish quartzite with a very wide angle and in one a very prominent bulb of percussion; upper face worked.
(iii) 1. Thick blade flake; upper face partly cortexed.
(iv) 1. Small, thin elongated oval flake; upper face cortexed.
(v) 2. Thick pebble flakes, one round and one elongated; highly rolled.

The collection from Sonita consisted of forty four specimens. They display very advanced technological features, especially the extensive use of cylinder hammer technique, thin size and symmetrical shape. The principal element of this assemblage are the cleavers which include highly symmetrical, thin forms. Though there are no specimens similar to the Levalloisian and double side-blow cleavers of Gambhiri, those made on simple flakes and finely worked are in no way inferior to the former. The collection may be divided into following types.

a) Pebble scrapers and choppers.

(i) 6 Unifacial specimens; of these five are choppers and one a scraper.

Three of these are very steeply flaked and are fresh; the remaining three are less steeply flaked and rolled.
(ii) 5 Bifacial specimens; one chopper and five chopper/scrapers.

Excepting one round specimen which itself is thick and crude, there is no specimen worked by alternate flaking.

(b) Flake scrapers and choppers.

(i) 1 chopper on a large, broad and wide angled flake; upper face fully worked; margins worked by step flaking.

(ii) 1 Small side-scraper with a thick back.

(iii) 1 Side and end chopper/scaper on a thick end flake; upper face cortexed.

(c) Core scrapers.

(i) 1 Unifacial small scraper.

(ii) 1 Unifacial chopper/scaper.

(iii) 2 Bifacial chopper/scrapers.

(d) Handaxes

(i) 5 Almond-shaped; one very large, measuring about twenty centimeters. Worked by detaching a small number of large flakes and retaining much cortex along the butt end. The remaining four are of medium size; three of these are on end flakes with lower face only partly worked; one is made on a pebble with much cortex on the lower face but still worked by cylinder hammer technique.

(ii) 1 Small irregular handaxe.

(iii) 1 Elongated triangular.

(e) Cleavers

(i) 8 U shaped. In three the lower face which is an end flake surface remains unworked; the rest are all fully worked. They are very fresh, one or two specimens in a mint condition. Butt generally thin and sharp.
Section plano-convex or biconvex but in one or two specimens approaching a parallelogram. One specimen with fine step flaking on its lower face is remarkable for its beauty.

(ii) 1 Round-butted highly oblique-edged cleaver. The obliqueness is so pronounced that it has a pointed tip at the end of one margin instead of a straight edge. Lower face is the surface of a large side flake. It is worked by cylinder hammer technique and has much step flaking over it.

(iii) 7 Roughly V shaped. Of these four have an oblique edge. One specimen is an almost exact replica of a cleaver from the Malaprabha, in the Deccan College Museum. Two have thin butts; in the remaining they are thick but in all they are fully worked. All specimens exhibit step flaking of a very high order. Sections are plano-convex to trapezoidal.

(f) Flakes

3 specimens of medium to small size with upper face cortexed.
RIVER SARGARMI

In the Western Rajputana only one site has been found so far which can be ascribed to the Lower Palaeolithic. The site is Govindgarh on the Sagarmati in district Ajmer. Here two implements were found from the loose gravel in the river bed just near the village. One of these is a small, elongated ovate. It is very much rolled and worked by detaching large primary flakes. The other implement is a cleaver which is described below.

GDO 2 (11.7 x 7.9 x 2.8) Pl. XXXI Fig. 3

A long, thin cleaver of quartzite; slightly rolled and sparsely and thinly encrusted with lime. It is made probably on an end flake but all trace of the bulb and the striking platform has been obliterated by subsequent working on the lower face. Lower face is fully worked by cylinder hammer technique; upper face is worked on all sides except in the centre where there is a large patch of cortex. Margins are slightly thick and working edge oblique. Section trapezoidal.
Thus in the Lower Palaeolithic culture of Rajputana two industries may be distinguished. These are:

(i) A primitive Banas industry; and
(ii) An advanced Gambhiri industry.

The former comprises simple pebble tools, crude pebble handaxes and some Acheulian handaxes, simple cleavers, thick flakes and large thick cores. Most of the tools are incompletely worked leaving large areas of the original cortical surface; flaking is bold and primitive; secondary flaking is rare and so is the use of the cylinder hammer technique. The implements are crude, thick and irregular and on the whole emphasis is on core rather than flake tools.

The Gambhiri industry comprises alternately flaked bifacial pebble tools having a W shaped edge, symmetrical and thin handaxes and very fine cleavers having parallelogrammatic cross section. Tools are more fully flaked, thinner and more symmetrical. There is extensive secondary flaking and greater use of the cylinder hammer technique. Some of the flake scrapers technologically even recall the scrapers of the Middle Palaeolithic. Besides there is unmistakable evidence of the use of the Levalloisian technique. Finally the number of flake tools is much larger than that of core tools.

The Berach and Chambal industries should also be grouped with the Gambhiri industry. Though the former lack some of the features of the Gambhiri, such as alternately flaked choppers, Levalloisian flakes and cleavers made by the side blow technique, they share many other features with the latter. The handaxes and cleavers from the Berach and the Chambal specially from the site of Sonita on the latter river are in no way inferior
to those of the Gambhiri. They are symmetrical, thin and worked principally by the cylinder hammer technique. flakes are also thin and small and there are very few crude, irregular handaxes and large, thick flakes like those of the Banas.

Banasa

Regarding the differences between the Gambhiri industry and the Gambhiri-Berach-Chambal industry it might be pointed out that stratigraphically the two belong to the same climatic phase and are hence very probably contemporary. And secondly since the sites on the Banas are not far removed from those on the Gambhiri, Berach and the Chambal, it is unlikely that the people inhabiting the banks of the Banas could have remained uninfluenced by the higher technological skill of those living on the banks of the latter rivers. Perhaps this influence is reflected in the few advanced features of the Banas industry such as a few Acheulian handaxes, and some flake scrapers. A plausible explanation for the general primitiveness of the Banas industry has been pointed out on page 116.