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BY

CHARLES M. KELLER

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To Dr. Bertram McGarrity,
who introduced me to an interest in form

PREFACE

No archaeological project can be conducted without the cooperation and assistance of many people, and this is particularly true of a project in a foreign country. For their help and interest I am indebted to Mr. Nico Kriel of Derdeheuval, South Africa; Mr. R. R. Inskeep, School of African Studies, University of Cape Town; Dr. A. O. Fuller, University of Cape Town; Dr. Thomas Barry and the staff of the South African Museum, Cape Town; Mr. B. D. Malan, Secretary of the Commission for the Preservation of Natural and Historical Monuments, Relics, and Antiques; Dr. A. R. Hall, Bolus Herbarium, University of Cape Town; Mr. Michael Wells, Botanical Research Institute, Albany Museum, Grahamstown; Mr. and Mrs. Jalmar Rudner, South African Museum, Cape Town.

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Dr. Glynn Isaac kindly put at my disposal his data on the collection from the 1919 excavation.

Financial support for the project was provided by the National Science Foundation and the Committee on Research, University of California, Berkeley.

The type of excavation that was done, and the level of excellence at which it was performed, was possible only through the efforts of my crew. Their unflagging enthusiasm and energy over seven months is sincerely appreciated. I am indebted to Peter Saunders, Cedric Poggenpoel, and Andrew van Turha. For his help in describing the artifacts in Cape Town I would like to thank Peter Saunders.

Finally, for her aid in cataloging, illustrating artifacts, editing, typing, and general encouragement, I thank my wife, Bonnie B. Keller.

Charles M. Keller
May 22, 1972

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MONTAGU CAVE IN PREHISTORY: A DESCRIPTIVE ANALYSIS

BY

CHARLES M. KELLER

INTRODUCTION

In recent years interest and research into the Acheulean of Africa have progressed to the point that our knowledge about this Industrial Complex is as complete and precise as is that about any body of material on the continent. Extensive work has been done in East and East Central Africa at sites such as Isimila, Olorgesailie, Olduvai Gorge, and Kalambo Falls, and in southern Africa important Acheulean sites at Doornlaagte, Amanzi, and the Cave of Hearths have been investigated. Although much more is known of the later and final stages of the African Acheulean than of the early and middle stages, some clear patterns have emerged. Most notable of the results deriving from this research is the demonstration of considerable variation within the Acheulean Industrial Complex. Where the artifacts are present in a primary archaeological context quite striking differences have been found in the inventory of the tool types present as well as in the ratio of tools to debitage. These differences are not explainable in terms of separation in time or space, and the basic resemblance of the occurrences is ample evidence to support the interpretation that the various occurrences represent parts of a single whole. The situation was summarized by Howell and Clark (1963), and, following Kleindienst (1961), they suggested that the differences within the Acheulean reflect the performance of different activities at different sites.

Variation at another level of analysis has been reported by Isaac (1969) from Olorgesailie. There he feels that differences in the plan-forms of bifaces may be due to differences in stylistic preferences between social groups. And, finally, an increase in chronological control of the contexts that produce Acheulean aggregates has shown that morphological differences exist within the span of time represented by sites such as Olduvai Bed IV or Isimila.

It is clear then that only one facet of the variation that exists within the Acheulean Industrial Complex is represented by the order of variation described by Kleindienst in 1961, but it will be our focus in the following discussion of the Acheulean artifacts from Montagu Cave because it is this sort of variation that appears when the Montagu and East African aggregates are compared.

Much of the material from the East African sites has been described in terms of a system of categories defined by Kleindienst (1962) after her extensive analysis of East and Central and some South African Acheulean material, and this has facilitated comparisons between the sites in East Africa. However, it is only about 600 miles from Olorgesailie to Kalambo Falls, and, given the extremely wide area over which Acheulean material has been found, it is important to determine whether the kinds of phenomena reflected in the East African Late Acheulean were present in other parts of Africa, and also whether there were significant spatial differences within the Late Acheulean. Unfortunately, the areas outside of East Africa from which the Acheulean is known in primary archaeological context are few, and in the one region where appropriate sites are known, South Africa, the published descriptions of the occurrences are phrased in a way that precludes close comparisons with the East African material.

This report is an account of the excavation and the description and analysis of the artifacts from Montagu Cave situated in South Africa (20^{o} 10' E., 33^{o} 50' S.), some 2,000 miles south of the area in East Africa where the other well-known Acheulean sites are located (fig. 1). The primary objective of the work carried out at Montagu Cave was to recover a full lithic assemblage from a sealed archaeological context and to analyze this material using the type categories and terminology employed by Kleindienst (1962) and Howell and Clark (1963).

Montagu Cave was suggested by Dr. J. Desmond Clark as a suitable site for this investigation because it had been partially excavated in 1919, and that excavation had shown that the cave contained Acheulean artifacts, as well as some later material (Goodwin, 1929).

Work was begun at the cave on August 10, 1964, and continued until March 1, 1965. The crew consisted of myself and three Cape Coloured teenage boys, Peter Saunders, Cedric Poggenpoel, and Andrew van Turha. My wife supervised the cataloguing of the excavated material and the succession of small boys who washed artifacts after school. After the excavation was completed, the artifacts, approximately 275,000 of them, were transported to the South African Museum in Cape Town where they were described by Peter Saunders and myself, and where my wife illustrated the artifacts shown in plates I to LIII. We left Cape Town on August 16, 1965, and returned to Berkeley, where the analysis was done between September 1965 and August 1966.

An important aspect of the project was to describe as fully as possible a South African Acheulean assemblage. Since the majority of the Acheulean artifacts in Africa, including those in South Africa, have come from geological rather than archaeological contexts, Montagu Cave is very important for providing the material for such a description.

Sites of this period are much less common than those of later periods. It was known from the previous excavation at Montagu that there was more than one Acheulean stratum in the cave, and this would provide an opportunity to investigate chronological variation in the Acheulean at a single site in South Africa.

Although the project had been designed to focus on the Acheulean material at Montagu, as the excavation progressed it became apparent that there was a considerable amount of post-Acheulean material present. In fact, nearly half of the artifacts recovered in the excavation were post-Acheulean. These latter assemblages are described in the following pages, but because of the inadequate state of knowledge about similar assemblages the comparisons made between Montagu and other sites are less elaborate than those for the Acheulean.

Another objective of the project was to investigate the horizontal spread of artifacts on occupation surfaces or horizons, if such could be found in the cave. Occupation horizons have been found, for the most part, on open sites, and it was hoped that if this kind of information could be recovered from a cave site it would contribute to our knowledge of the way prehistoric men used their habitation places. Acheulean material has not been found in many South African cave sites, with the possible exception of the Wonderwerk cave in the northern Cape Province and Olieboompoort and Wonderboom in the Transvaal. The best-known site, the Cave of Hearths, has a brecciated deposit. It is obvious that the problems of excavating a heavily cemented deposit make it very difficult to recover information about the arrangement of artifacts on an old surface, and for this reason Montagu Cave, with its relatively unconsolidated deposit, was ideal.

Occupation surfaces are of great interest to archaeologists, not only because of the information they can provide about horizontal distribution of artifacts, but also because they represent units of contemporaneity that are extremely useful for investigating variations within a single site. If, for instance, a site was occupied over a period of time by groups performing different tasks, such as butchering, stone tool manufacture, and hide preparation, the artifacts associated with these activities would be left on the surface occupied by each group. If these surfaces were contained in a single stratum and that stratum excavated as a single unit, the different assemblages associated with each activity would be mixed. The characteristic assemblages could be kept separate only if the surfaces were excavated separately. At Montagu, in the strata in which we were able to isolate individual occupation surfaces, there was no evidence of this kind of variation within a stratum, but this could not have been demonstrated unless we had taken the time to isolate and excavate these surfaces. This is an interesting point, because at Isimila and Olorgesailie in East Africa, there was evidence of considerable assemblage variation within a fairly small area. As will become clear, Montagu was primarily a factory site and was visited for this purpose over a long period of time.

The Acheulean material has been described in terms of Kleindienst's (1962) typology in order to facilitate comparisons with other Acheulean assemblages. In addition to listing the numbers of examples present of a particular type, the descriptions that follow include other relevant information about the artifacts in question. This was done in order to point out the amount of subtypical or intratypical variation that was present. A given type of artifact can be characterized in terms of a combination of attributes, but it is unlikely that all representatives of the type will be identical, and it was these minor variations that we were interested in. It has been stated frequently that human behavior is patterned, but that the patterns that are followed are not rigid and allow some variation within culturally prescribed limits. With regard to the Acheulean, Clark (1960:315) has made the distinction of "formal" and "informal" tools. These designations refer to fairly standardized forms such as hand axes, on the one hand, and to more amorphous forms such as scrapers, on the other. A distinction of this sort suggests that there are variations in the mental patterns of the tool-makers and that a formal tool is the manifestation of a more complex and highly integrated pattern whereas an informal tool represents a simpler pattern. In the descriptions that follow, a measure of this variation can be seen in the kinds of attributes present and in the frequencies with which they occur. The weakness of the typological method when applied to ethnographic or archaeological data is that it emphasizes the large patterns of behavior but obscures the smaller variations that are likely to be present.

The objectives of ethnography are to observe behavior and from these observations to infer the rules of behavior a people follow. The same kind of procedure can be followed in archaeology. From the descriptions of the artifacts recovered from a site, one should be able to outline the rules that were followed with regard to the production of tools. There are obvious difficulties in this approach, since the archaeologist can never be certain of the individual formal characteristics the makers of the tools felt were important, but even so, some important information of this sort can be gained. For instance, Kleindienst (1961:40) refers to "flake scrapers" as a general tool category; yet of the scrapers that would seem to fall into this category, in Montagu Layer 3 only 33.8 percent of the scrapers are made on flakes and in Layer 5, only 21.4 percent; the remainder are made on other primary forms. There are many possible interpretations of facts such as these, but the important point is that simply referring to a given number of "scrapers" gives no information such as the primary form on which they are made or where on the object the working edge is placed. As our knowledge increases, it is just this kind of information that will aid in making finer chronological, spatial, and activity distinctions between assemblages and thus contribute to a much fuller understanding of the behavior of the human groups involved.

Yet another objective of this study was to investigate the alleged association of fire with the Acheulean at Montagu. Goodwin (1929) is not clear about whether there was evidence of the use of fire, but Montagu has been cited by Oakley (1957:386) as one of the places in Africa where fire is associated with Acheulean material. The presence or absence of fire at Montagu is relevant to the oft-repeated idea that man could not occupy caves until he had fire. No further mention will be made of this facet of the project because no evidence of fire was found in either of the Acheulean layers at Montagu. There was no charcoal, nor were they any fireplaces like those found in the post-Acheulean layers. Subsequent chemical analysis may provide additional information, but at this point there is nothing to show that fire was used at Montagu Cave by the makers of Acheulean tools.

THE ENVIRONMENTAL SETTING

Africa resembles a large shield, consisting of a broad flat central plateau fringed by coastal lowlands. The edge of the plateau is usually a scarp and the lowlands may be narrow or more than two hundred miles wide as in Mocambique. These two features, the plateau and the lowlands, have an important effect on the drainage, climatic, floral, and faunal patterns of the continent.

The Republic of South Africa has been divided by Cole (1961) into four major physiographic regions, which are named from both their surface and subsurface features. The two areas that lie on the central plateau are called the Karroo and Pre-Karroo provinces because they are formed on bedrock of Karroo and Pre-Karroo age respectively. The other two regions lie south of and below the escarpment; one area is subdivided into the Eastern and Western Marginal provinces, and these are connected by the fourth, the Cape Folded province, with which we will be most concerned. The Montagu Cave, situated near the town of Montagu, lies in the western end of a long narrow valley called the Little Karroo, which makes up part of the Cape Folded province.

Stretching from east to west across the southern part of the continent, this province is made up of parallel ridges and valleys. To the north lies the dry Karroo, and to the south lies the coastal foreland and the Indian Ocean. The northern boundary of the Little Karroo is the Swartberg range, part of the escarpment, and the southern boundary, the Langeberg range; the distance between them is about forty miles. These ranges, as well as the other ranges of the region, are made of folded Table Mountain Sandstone, and the valleys are eroded into Bokkeveld shales. In general, the topography of the area is very regular, with the mountains separated by smooth open valleys. The effect is a series of long corridors running from the Cape Flats on the west to the vicinity of Port Alfred, 500 miles to the east. The mountains of the Cape Folded province are joined in the west by the southern end of a series of ranges that extend to the northwest, and the combination makes the topography of the immediate area very complex. In the east the valleys are open to the coast.

Most of South Africa receives its rainfall during the summer months (December-February), but the Cape Folded province is an exception, receiving most of its rain during the winter (June-August). In winter most of the country is dominated by a high-pressure system, but the southern coastal area is affected by stormy westerly winds, which at this time swing to the north and bring rain to the region (Fitzgerald, 1961:33). The situation is summarized by Schumann:

> When the winter anticyclone is established over the plateau there is an outflow of air over the coastal belt; along the west coast this is associated with berg winds and very high temperatures, which in turn cause the development of a low. . . . This low unites with the circumpolar low to form an inverted "V" shaped depression which moves eastwards along the south coast . . . bringing the unsettled weather, strong north-westerly winds and rainfall associated with depression, to each part of the coast in turn. (Cole, 1951:43)

The weather, moving from the southwest, drops most of its moisture on the coastal belt and on the seaward side of the mountains. Consequently, the Little Karroo is much drier than the coastal foreland only a few miles to the south on the other side of the mountains. Caledon, on the coastal strip, has a mean annual rainfall of 540 mm. whereas that of Montagu is 282 mm. (Jackson, 1961:plate 8). The mean daily temperature in Montagu ranges from 5.0° C. in July to 17.5° C. in January (Jackson, 1961:plates 29-34).

There are three characteristic floras of the southern part of South Africa, and their origins and relations have been discussed by Levyns (1964). The oldest flora, which requires the most rain, is the Temperate Forest Flora found in the Knysna and Humansdorp areas, where the mean annual rainfall is 450 to 650 mm., and also in other areas, where it is confined to ravines and other sheltered places. Large trunks of *Podocarpus falcatus* that were found buried in the sand of the Cape Flats have been dated by carbon 14 to from 30,000 to 40,000 years ago; this, coupled with the present discontinuous distribution of forest, indicates that the temperate forest was once much more widespread than it is at present. Levyns feels that dry periods were unfavorable for forest and that the Cape Flora replaced it.

The Cape Flora is made up of shrubs and larger types such as *Proteaceas* and *Leucadendron*. It is suited to moderately high winter rainfall and dry summers and is found in the area of the Cape Peninsula and along the coastal forelands south of the mountains.

North of the mountains, where the rainfall drops below 250 mm. per year and is seasonally erratic, the youngest of the three floras, the Succulent Karroo Flora, finds optimum conditions. The 250 mm. per year boundary appears critical for the Cape and the Succulent Karroo Flora, and rainfall in excess of this figure allows the former to exist whereas less rain produces the latter. As a result, the Cape Flora is often found on the more moist summits of hills, surrounded by the Succulent Flora on the drier, lower slopes. This discontinuous distribution is interpreted as indicating that the Succulent Flora occupies areas once the territory of the Cape Flora.

The vegetation of the Montagu area is the type described by Keay as "Cape Macchia," which is "composed of evergreen shrubs with hard leathery leaves, generally small and often heath-like. Many of the shrubs contain oil or resin and have a brownish or greyish appearance. Trees are rare and grassland occurs only spasmodically. It is a 'Mediterranean' sclerophyllous type of vegetation" (Keay, 1959:8). Cole (1961) says that typical sclerophyllous bush occurs only where the mean annual rainfall is 20-30 inches (508-762 mm.). A typical area includes an upper story of bushes five to eight feet tall, mainly Proteaceae, with occasional stands of silver trees (Leucadendron argenteum). Below this, there is a dense layer of the small shrubs described by Keay and a ground flora of small woody plants, herbs, and geophytes (Cole, 1961: 69). "In the drier areas the vegetation is more open and less distinctly layered. Small bushes with hard flat leaves dominate and there are generally few plants with ericoid leaves. . . ." (Cole, 1961:69). This statement describes well the vegetation around Montagu, although the larger shrubs and trees are found only near water there. It seems doubtful that the sclerophyllous bush represents a climax vegetation, because burning has "undoubtedly retarded the normal succession and it may well have contributed to the abundance of bulbous plants which would be least affected" (Cole, 1961:69). At the present time, with the aid of irrigation, the farmers of the Montagu area raise wine grapes, apricots, peaches, and pears.

The history of climatic and floral changes in the extreme southern part of Africa is not well known. Butzer's recent summary of climatic evidence illustrates the complexity of the problem (Butzer, 1971). The magnitude of these changes is still in question, but it is clear that they were sufficient to bring about shifts in the patterns of the floral mosaic found in most areas, and there is no reason to suppose that the situation was different in the area with which we are concerned. It is therefore very likely that at times somewhat drier than the present Succulent Flora would have been present around Montagu and that in wetter times patches of forest would have occurred along the water courses and in protected areas of the mountains.

Drainage patterns are often important to archaeologists because they suggest paths of movement for men and animals, and sources of raw material for stone-tool makers. Most of the rivers of the Cape Folded province rise on the escarpment, run through the mountains, and reach the sea directly. There are no large drainage systems in this area to compare with the Orange-Vaal system of the plateau. Rivers such as the Gouritz, Geelbeks, and Buffels are typical because they have their headwaters on the escarpment, run through passes in the northern ranges and into the Little Karroo, where they are joined by tributaries from that region, and then breach the southern mountains and flow across the coastal foreland to the sea.

In considering the possible routes that prehistoric people may have followed in their movements, it is tempting to overemphasize the importance of the migration routes of historic groups. Settlers started from Cape Town, moved to the north and to the east along the flat coastal strips, and then entered the more mountainous regions by passes through which the rivers flowed. The Little Karroo was entered by means of Robinson's Pass, which penetrates the Outeniquas Mountains north of Mossel Bay (see fig. 1). King (1942, 308) states that most of the passes through the mountains are incised meanders and consequently are often narrow and steep-sided. Many passes of this kind, which would not be suitable for European settlers in ox-drawn wagons, would have been perfectly feasible routes for a group of hunter-gatherers moving on foot. We cannot, therefore, rely too heavily on historical evidence for comparison, since what appears to Europeans to be an area of difficult access may be relatively open for less encumbered groups.

Movement into and out of the Little Karroo would have been easiest from the south, where the barrier is only one range of mountains, or from the east, where the mountain ranges stop near the coast. From the west, that is at the Cape Flats north of Cape Town, it is necessary to cross the DuToits Berge or one of the neighboring ridges, cross the valley of the Breede River, and then cross the western end of the Langeberge to enter the Little Karroo. The Montagu area is drained by the Groot Appelkooskloof River, which flows west through Cogmans Kloof and becomes a tributary of the Breede River. Cogmans Kloof is used by the present-day road to enter the Little Karroo, and this is the most likely route from the west. To the north there are a series of mountain ranges, and the rivers rising on the escarpment flow through a maze of passes, which again would have been possible paths for prehistoric man to have followed.

Drainage patterns are also of interest in considering the raw materials used by the inhabitants of Montagu Cave for their stone tools. The tools found in the lower two artifact-bearing layers of the cave are made exclusively of Table Mountain Sandstone, which is the rock that forms the mountains and therefore the rock in which the cave is formed. However, pieces that came directly from the cliff or cave walls were rarely used; instead, rounded cobbles were collected from the stream that runs in front of the cave. In the upper two layers of the cave deposit chert and quartz were used in addition to Table Mountain Sandstone. The quartz is available locally, but the source of the chert is unknown. The most plausible explanation seems to be that the chert occurred as erratics and was collected from rivers that came from the north.

Because most of the rainfall comes in the winter, soil formation in the Montagu area is slight. The moisture is present when the temperature is too low for chemical action, but not low enough for frost action to be important, and little organic matter is contributed by the sclerophyllous bush. The soils vary in depth from a few inches to about thirty inches and "usually consist of crumbly gravelly loams containing occasional ferruginous concretions, overlying compact and impervious gravelly or sandy clays" (King, 1942:89). In the area immediately in front of the gorge or small ravine, known as a kloof, in which the cave is located, there seemed to be little or no soil, and the farm road to the kloof actually runs on the steeply dipping beds of the Bokkeveld shales.

Hot mineral springs form a tourist attraction a few miles from the town of Montagu. Although prehistoric man may not have appreciated the therapeutic effects of the waters, this constant source of water would probably have drawn game and man to the region.

Montagu cave is located in the west side of a kloof on the north side of the Langeberge, which separates the Little Karroo from the coastal foreland to the south. A small permanent stream runs in the bottom of the kloof and empties out into the valley. The present-day occupant of the farm uses the stream for drinking water and irrigation. Prehistoric inhabitants probably used it both for water and as a source of raw material.

There are more trees along the stream and on the west side of the kloof than are common outside on the floor of the main valley. Direct sunlight enters the cave, which faces east-northeast, until about 10 A.M. in the winter and until about 11 A.M. in the summer. The wind in the area can be quite strong, but the currents in the kloof are complex, and as a result the wind changes frequently and gusts come from many directions.

The cave consists of two chambers, a large open outer chamber, in which the excavation was carried out, and a long narrow tunnel-like chamber, which opens out at the junction of the roof and back wall of the outer chamber. This rear chamber extends several hundred feet back into the mountain. During the guano-mining operations carried out there in the late nineteenth century, an iron ladder was fixed to the back wall of the cave, making it possible to climb from the floor of the outer chamber into the inner chamber. It probably would be possible to negotiate this climb without the ladder, but it is not likely that this was done regularly by the prehistoric inhabitants. Archaeological material occurs only in the outer chamber.

The outer chamber is approximately 55 feet deep by 35 feet wide, and the roof is about 40 feet above the present floor level. Owing to the steep cliff face above the cave, the drip line extends some 17 feet into the cave, and rain blows to within about 25 feet of the back wall. Probably as a result, the area of most intensive occupation seems to have been near the rear of the outer chamber (see fig. 2).

At the mouth of the cave the beds of Table Mountain Sandstone, which despite its name is really a quartzite, are tilted about 71° from the horizontal. The long axis of the cave follows approximately the strike of the beds. Water drips slowly but regularly from the bedding planes in the roof of the cave, and there are stained areas around the places from which the water drips, indicating that this has gone on for some time. According to Arthur Fuller, lecturer in Geology at the University of Cape Town, Table Mountain Sandstone is extremely variable with regard to hardness and mineral composition, and there are many felspathic areas that are much softer than the surrounding rock (pers. comm.).

The cave was apparently formed by water seeping down along the bedding planes and dissolving a more soluble portion of the Table Mountain Sandstone. This solution, and the resultant undercutting and fall of pieces of the roof, formed the cave. There are portions in the upper chamber that appear water worn, and there are small funnellike holes, always centered on a bedding plane, which run horizontally into the rock. Very fresh-looking fallen rocks are present at the rear of the upper chamber; the cave seems to be increasing in length.

The cave today, as well as in the past, is a pleasant place. In the late nineteenth and early twentieth centuries it was a popular picnicking spot. There is a constant water supply nearby and around the stream there are a variety of plants and large shrubs and trees that might be used as food and as a source of fuel. In addition, game is attracted by the water. Dassie, baboon, and grysbok were seen in the kloof, and the quantity and variety of animals would presumably have been greater in the past. From the front of the cave there is a clear view of the floor of the valley, which would make it possible to observe the movements of large bodies of game. The cave is cool in the summer as well as in the winter, and it affords shelter from the wind and rain. It is easy to see why the site was occupied repeatedly over a long period of time.

STRATIGRAPHY AND METHOD OF EXCAVATION

Montagu Cave, known locally as the Guano Cave, was first reported by a European in the 1880s. Mr. C. Ravenscroft, the discoverer, reported the existence of the cave to the owner of the land, Mr. A. Kriel, who in turn discovered that there were deposits of bat guano in the dark, inner portion of the cave. This guano was removed in the 1890s and used as fertilizer on Mr. Kriel's farm.

In 1919 Mr. E. J. Jansen visited the site and discovered on the surface "an implement of true paleolithic form" (Goodwin, 1929:3). This discovery was reported in the Cape Times of May 31, 1919. Mr. Jansen dug several small pits but did no extensive excavation. In October of 1919 Drs. S. H. Haughton and K. H. Barnard, paleontologists, and Mr. Tucker, all of the South African Museum, Cape Town, visited the site, and in thirty-eight days during October and November they removed approximately three-quarters of the deposit in the cave. An account of their work, and a description of the stratigraphy and artifacts, was published by A. J. H. Goodwin ten years later (Goodwin, 1929). Four artifact-bearing layers were reported, the uppermost containing "Later Stone Age" artifacts and the three lower ones containing artifacts from the "Earlier Stone Age."

The stratigraphy of the cave, as it appeared to Haughton and Barnard, was summarized by Goodwin (1929). The uppermost layer was described as "debris," which was thought to have been thrown down from the upper cave during guano-mining operations. Layer "A" was described as the "modern surface deposit," which was composed of brown earth about a foot thick in the center and three-fourths of an inch of swallow guano along the sides. Below this was an artifact-bearing layer "B," which "is formed on a basal black band; over this lies a white band, and above this is ordinary brown earth, with black fire-zones and occasional thin white bands" (Goodwin, 1929:60). Layer "C" consisted of brown earth capped with swallow guano and contained no artifacts. Layer "D," which contained tools, was made up of "irregular black, grey, white, and brown bands." Layer "E" was sterile red sand. Below "E" lay the artifact-bearing layer "F" which was composed of "black, grey, and brown bands quite irregularly mixed with white bands." Another sterile sand, layer "G," underlay layer "F." The lowest occupation layer was "H," which was composed of a series of black, grey, and white bands, and below this lay the decomposing bedrock of the bottom of the cave (see fig. 3).

Goodwin's map (1929) shows the location of the pits and trenches dug by Jansen, Haughton, and Barnard. This map indicated that they left a fairly large area on the south side of the cave undisturbed except for one trench, which was stopped by large boulders. However, the notebook kept by Haughton and Barnard, which is in the files of the South African Museum in Cape Town, contains two maps, one of which shows the trenches that they intended to dig, and another, at the end of the notebook, which shows the trenches actually dug. It is this first map that Goodwin has reproduced, but the second and more accurate map shows that the trench into the undisturbed area, trench 3 of Goodwin's map, was never dug. Consequently, an area, 20 feet by 25 feet, of undisturbed deposit remained, and it was this area that was excavated in 1964-1965.

At the site the areas that had been previously excavated were easily recognizable since they were much lower and relatively free from rock. The unexcavated portion had a datum depth of about .2 feet and was covered with angular rubble, whereas the excavated portion had a datum depth of about 5.0 feet and was free of rubble. Along the edge of the undisturbed area lay a series of large boulders, which the notes of the previous excavators said could not be moved without the use of explosives. These were clearly fallen rocks and had not been moved by the previous archaeological or guano-mining activities. Consequently, it was a straightforward matter to identify the undisturbed area, to see that the published map was in error, and to select the area for excavation.

The initial phase of the excavation involved two objectives: first, to move the rubble and boulders off the top of the undisturbed area, and second, to cut some preliminary sections that could serve as guides for the excavation. A grid system was laid out, and work was begun in squares 20 and 25 D and 40 E (see fig. 17), while part of the crew began moving the rubble out to the dump area in front of the cave. The rubble consisted almost entirely of angular pieces of rock although an occasional prehistoric artifact was found, and some corks and bits of green bottle glass were present, indicating that the rubble belonged to a recent period. Below the loose rubble, a loose brown sand was encountered, and the work was halted.

This left only the large fallen rocks to be dealt with. These were moved, by means of a block and tackle and a crowbar, into the center of the area, away from the edge and the sections that were being cut, and there were broken up with sledgehammers and wedges and carried out to the front of the cave.

A pit, 45 D, was excavated near what Goodwin called "the grotto," toward the back of the cave. The original report indicated that this was near the edge of the previous excavation, and it was hoped that undisturbed fill might be found, but this was not the case. The pit was later filled with rocks broken up during the course of our excavation.

After these steps were completed the main excavation was begun.

The sections had been cut primarily to provide a vertical guide from which to work. One of the most striking features about the sections was that the strata dipped much more than the section drawings published by Goodwin had indicated, and it became rapidly clear that the use of arbitrary horizontal levels as excavation units would be unsuitable. One such six-inch level excavated in square 25 D contained microliths from one side of the square and hand-axes from the other, and as a result we decided to remove the deposit using the obvious strata as the units of excavation. However, this raised certain methodological and terminological problems.

Generally speaking, an archaeologist deals with two kinds of deposits. The first is often referred to as being "sterile," meaning that it contains no artifacts; such deposits usually have been formed by noncultural agencies such as wind or water. Descriptions of the second, or "artifact-bearing," type of deposit are often confusing. Some of these deposits contain artifacts but man has had no influence on the formation of the deposits; river gravel containing stone tools is an example. Other deposits, such as middens, contain artifacts and are artifacts themselves, since they owe their existence to human activity. The confusion arises in discussions of the latter kind of deposit. If the deposit is homogeneous in color, compactness, grain size, or whatever other criteria the excavator feels are important, then the deposit may be excavated as a single unit. Alternatively it may be divided into subunits by the excavator; these subunits are usually of uniform thickness, such as six inches or ten centimeters, and are called "arbitrary units" since they are imposed on the deposit by the excavator. If, however, the deposit is not homogeneous but is made up of sharply defined subunits varying in color, and the like, the archaeologist may choose to excavate the deposit by these subunits, which are often called "natural" units since they are inherent in the deposit. In fact, as we have pointed out above, these units are not "natural" but "cultural," since they themselves are artifacts owing their composition in the main to cultural activities.

This situation is particularly common in cave deposits, and the confusion was thrown into focus at Montagu Cave, where the use of "arbitrary" units was not appropriate, and consequently we determined to excavate by so-called "natural" units. However, within these "natural" units we encountered concentrations of artifacts that appeared to represent material deposited during a single occupation and so were called occupation horizons or surfaces. The occupation horizons were termed "cultural" units until it became apparent that the layer containing them was equally as cultural in its formation as the horizons themselves. Therefore we will speak of visual units and layers, indicating only that they were readily recognizable strata and carrying no connotation regarding processes of deposition. Within the visual units in which occupation horizons were present the occupation horizons were excavated as entities, and the method of doing this is discussed below. In fact, the only "natural" unit in the deposit was the sterile layer, Layer 4. The visual units or layers were the basic units in which the excavation was done and the vertical locations of the artifacts recorded.

The artifact concentrations, referred to subsequently as "surfaces" or "horizons," are not floors like those found at open sites such as Olorgesailie, Isimila, or Kalambo Falls. The Montagu surfaces were often more than one artifact thick but, although the thickness varied, a surface was never more than about three inches thick.

An exception to the removal of the deposit by visual units or layers was made in the case of the squares excavated to provide a guide section. These squares, 20 and 25 D, were excavated by six-inch levels, and the material recovered has not been included in the analysis. Parts of Layer 1 and Layer 2 were also excavated by arbitrary levels, as discussed below.

The upper layer, Layer 1, consisted of a light brown sand, which lay in a depression in the surface of the layer below it. A small niche in the south wall of the cave about one foot above Layer 1 contained sand like that which constituted Layer 1, and one of the fireplaces in Layer 1 had been partly dug away. These facts indicate that the top of this layer had been removed some time before the deposition of the rubble by the guano-miners and previous excavators. There was no visible stratification within the layer, and no horizontal concentrations of artifacts were found. Where the layer was more than six inches thick, it was removed in arbitrary levels of six inches each. The greatest thickness occurred at the section in square D, where it was nearly twelve inches.

Several fireplaces were found in Layer 1, which were isolated and treated as features (following Heizer, 1958:58) and the artifacts from them kept separate, although in the analysis all the material from Layer 1 was treated as a unit. There was some charcoal scattered through the deposit, but most was concentrated in the fireplaces.

Layer 2 both underlay Layer 1 and extended laterally beyond it, since Layer 1 was confined to the low area in Layer 2. Layer 2 consisted generally of a mottled dark gray sand. There were small (from a few inches to one and one-half feet in diameter), irregular patches of lighter colors, but these were not large enough to follow as strata. Some alternating dark and light bands were present near the top of Layer 2 in the 35 E and F section, but they lensed out from twelve to fourteen inches from the section, and the remainder of the layer was uniform. The layer was about nine inches thick at the west end of the 25 D section and about five feet thick at 20 G because the bottom of the layer sloped sharply toward the south and east, that is, to one wall and the mouth of the cave. Charcoal was scattered throughout the layer.

An attempt was made to follow several of the rather poorly defined light stains in Layer 2, in the belief that they might represent some kind of feature, but apparently this was not the case. These color variations were present throughout the layer and produced its faintly mottled appearance. Finally, square 30 E was removed, and in the small section that resulted a horizontal concentration of artifacts was seen. This concentration was uncovered and followed, and surface I thus identified. The procedure that we followed from that time on involved looking for a concentration of artifacts in one of the sections and then uncovering this concentration. The artifacts were left in place, and by moving from one to the other following the dip of the artifacts it was possible for us to uncover the whole surface. On occasion we would encounter a bare spot, and since there was no visible stratigraphy to follow, this created certain problems, the solution of which usually lay in working around the bare spot and determining from the arrangement of the artifacts in the surrounding area whether the spot was in fact bare or if we simply had failed to dig deeply enough. This was necessarily very slow work, done with grapefruit knives and paint brushes, but the rewards of following an artifact horizon and coming upon a fireplace or concentration of tools added to the interest of a rather tedious technique of excavation. All of the deposit removed was sieved through one-eighth screens.

After the surface had been uncovered, the distribution of the artifacts was plotted and the type of artifact indicated on the plot. This was done in very general terms, that is, "flake or flake fragment," "chip or chunk," "natural stone," or "trimmed piece." The difficulty was that there was no way to wash the pieces as they were taken up, so in some cases a tool thought to be a core when dirty was clearly a scraper when washed. Therefore more specific type designations were not made during the plotting and are not indicated on the plots presented here. The concentrations of trimmed tools are, however, visible.

Datum depth readings were taken on the surfaces, and the material that occurred between the surfaces was labeled as having come from, for example, "between surfaces II and III." There was always some artifactual material between the surfaces, but the surfaces stood out as distinct concentrations of artifacts, and the assumption is made that the artifacts on a surface were deposited over a short period of time and were contemporary (see figs. 17-23).

An inspection of the charts and plots will show quite clearly that the number of artifacts found on the surfaces increased as we went down into Layer 2. A similar situation was present in the lowest Acheulean layer, Layer 5. An explanation of a similar phenomenon can be found in Wells (1965:81). In analyzing the botanical remains from Scott's Cave, a "Later Stone Age" site in the Eastern Cape province, Wells found that the sample from the upper level contained a smaller percentage of hard parts, such as grass stems, than the lower level. Wells interprets this as owing to differential decomposition, the hard parts being more resistant than the soft. The lower sample was only about one-fourth the size of the upper sample, but Wells feels that they originally contained about the same amount of vegetation. The result is, then, that the lower and older sample was considerably reduced in bulk and the hard parts concentrated as decomposition and compaction took place. It is clear that considerable compaction has taken place in the lower layers of the Montagu Cave deposit as grass bedding and other perishable materials decomposed. However, this mechanism seems inadequate to explain the concentration of artifacts on surfaces or horizons.

Work on the surfaces had indicated clearly that there was much less material toward the front of the cave than toward the back and that stones from the roof and sides of the cave were more common near the front. The time involved in excavating this front area was not commensurate with the amount of information gained, and so none of the squares in the 15 line were excavated below surface VII.

There were no identifiable concentrations of tools below surface VII in Layer 2, and the deposit below surface VII was removed as a unit. But the layer thickened considerably to the southeast, and we felt that it would be wise to have some sort of vertical control over the material being recovered. To achieve this, two adjacent squares, 20 and 25 G at the thickest part of the deposit, were excavated by six-inch levels.

At the bottom of Layer 2 there was a thin, artifact-rich band, which was the same color as the layer above it. Artifacts and pieces of charcoal were the main constituents of this band, and it looked very much like some sort of deflation feature. Much of the band was made up of charcoal, but it does not seem likely that this would have remained if the deflating agency had been wind, nor was there any indication of water action. The artifacts from the band were analyzed separately and were similar in all respects to those from the rest of the layer. There is no evidence from the artifacts to indicate that this band represents an extensive period of time that would fill the apparent hiatus betwene Layers 2 and 3.

Layer 3, which directly underlay Layer 2, was composed of fine sandy clay and was much more compact than Layer 2. As with Layer 2, the sections were somewhat misleading, since there appeared to be some very fine banding in this layer, but the bands lensed out within a few inches of the section faces. However, there were six of these thicker units (12, 13, 15, 17, 17a, and 17b) that ranged in color from reddish brown to white. No concentrations of artifacts were found within the bands, so no surfaces were uncovered, nor were any plots of artifact distributions made. The extent of the bands varied, as can be seen in figure 4. Band 12 was extensive, covering most of the excavated area, and was about nine inches thick. Below lay bands 13 and 15, which covered a smaller area and were about three and four inches thick, respectively. Band 13 was confined to the center of the excavation and does not appear in the section. Band 17 covered a large area, whereas bands 17a and 17b were much smaller and lay above 17 with 17a being the highest. In the sections, 17 had appeared to be composed of a series of alternating dark and light bands, and it had been our plan to follow these. However, they lensed out, and everything between 17b and the sterile sand that lay below it was treated as 17. No charcoal was found.

Layer 3 was underlain by a sterile red sand, Layer 4. Microscopic examination of the sand has shown that it consists of white quartz sand coated with red silt- and clay-sized material. Comparison of grains of this sand with samples taken from the wall of the cave indicates that the two are identical and that the sterile sand is derived from the disintegration of the bedrock. The origin of the finer grained red material, an iron oxide, and its mode of deposition is unknown. There is a small amount of silt- and clay-sized material in the bedrock so the finer-grained material might also be derived from the bedrock. Although the presence of red beds, and climatic inferences from their presence, has received considerable attention in the literature of African prehistory, the mere presence of the red silt and clay seems an inadequate basis for asserting a climatic change at Montagu (Krynine, 1949 and 1950; Sherman, 1952; Van Houten, 1948). The sterile sand is completely unsorted, and the extreme angularity of the grains rules out deposition by wind or water.

A bedding plane in the bedrock runs through the roof of the cave roughly parallel to the D line of squares. It was along this line that most of the large fallen rocks found on the top of the deposit occurred, and rocks were found in this area all through the excavation, with the exception of Layer 3 and the sterile red sand. Layer 3 was relatively thin, and one might argue that it represents only a fairly short period of time. However, the sterile sand ranged in thickness from two and one-half to three and one-half feet and must represent a considerable time, and no rock falls were present in it either. Apparently grain-by-grain disintegration of the bedrock took place for a long time, and periodically large rocks fell from the roof, particularly along the bedding planes.

Below the sterile sand was Layer 5, which was composed of alternating light and dark bands; its composition was similar to Layer 3. The four subdivisions of Layer 5 were called 20, 21, 22, and 23, and each contained an occupation horizon, numbered VIII, IX, X, and XI respectively.

Preliminary comparisons of samples of the dark and light bands done by Dr. Arthur Fuller of the University of Cape Town indicated that one difference between the two is that the dark layers contain more organic matter. The darker bands always contained more artifacts than the lighter ones, and the average thickness of the darker bands was greater than that of the light, which frequently lensed out. The darker bands, then, would seem to have been formed during times of more intensive occupation.

In the excavation of Layer 5, bands were followed and, where concentrations of tools were found within the band, the concentrations were treated as horizons and uncovered and plotted as with the horizons in Layer 2. By following bands, and the tools within the bands, we found that this layer had been considerably compacted. Compaction features were apparent in the sections, but not to the extent that they were later revealed by the horizons in Layer 5; parts of horizon X, for example, showed evidence of having been pushed down about two feet around underlying rocks. Layer 5 was undoubtedly considerably thicker than when it was originally deposited, and as the softer material decomposed the weight of the overlying deposit compressed the lowest layer. Four horizons were found in this layer. No charcoal was present.

In the examination of the sediment samples from Layer 5 for pollen and other petrographic features, small pieces of carbonized insect carapaces were noted. Samples were submitted to Mr. Fred Guess, an entomologist at the South African Museum, who identified them as fragments of the shells of Col :optra beetles. There are a number of birds, loca:ly called swifts, that live in the roof of the cave; they have feeding habits similar to swallows and catch insects on the wing. The source of the beetles' carapaces was an interesting question, and initially it seemed likely that they were incorporated into the deposit by the birds, either by the birds' dropping bits of the shell or in the birds' feces. However, an examination of the modern bird feces in the cave revealed no insect remains. Mr. Guess felt that it was unlikely that insects of the very small size found in the deposit would have been caught by the birds, and an ornithologist, Dr. J. M. Winterbottom, concurred; very delicate parts of insects, such as legs and wings, were present, and these probably would not have survived if the insects had been eaten by the birds. Mr. Guess suggested that the insects may have been present in grass that was brought into the cave, and then as the grass and insects decomposed only the hard parts of the insects remained. Insect remains were not present in the light-colored bands, a fact that would support this interpretation, since insect remains are associated only with evidence of intensive occupation.

Dr. Robert Jones, Department of Agronomy, University of Illinois, examined samples from this layer. He found quantities of plant opal, a silica formation present in epidermis of grasses. This is additional evidence that grass was carried into the cave from outside.

Below Layer 5 lay a second sterile sand layer, Layer 6, seven inches thick and similar to the one between Layers 3 and 5. Below this sand was a thin, fine-grained layer, Layer 7, similar in appearance to Layers 3 and 5, but only about two inches thick. It contained weathered fragments of bedrock but no artifacts. Below this was the decomposing bedrock of the cave.

The stratigraphy described above coincides closely with that outlined by Barnard and Haughton as reported by Goodwin (see fig. 3). The only significant difference is the lack of a sterile layer, Goodwin's layer "C," between our Layers 2 and 3, and the previous excavator's apparent failure to differentiate between our Layers 1 and 2. It is, of course, entirely possible that Layer 1, which was partially removed on the south side of the cave, had been removed entirely in the central and north parts.

One aspect of the deposit in the cave that has not yet been discussed is the presence of holes and disturbed areas. Caves and rock shelters commonly have their deposits disturbed near the walls, and Montagu is no exception. This was shown most clearly in the 35 E-F-G section where all the layers are disturbed next to the wall. This disturbed area was from about one and one-half to two feet wide and ran immediately next to the wall. It was composed of brown sand that was less compact than the undisturbed deposit and contained a mixture of artifact types. In addition, there were six holes, approximately from one to one and one-half feet in diameter, which ran through the deposit in different directions. Four of these were filled with artifacts and other material from Layer 2, mixed with material from lower layers, and two were empty. One hole in 35 F went nearly vertically through Layers 3, 4, and into 5, and then twisted toward the back of the cave. This hole was filled with a mixture of material from Layers 2, 3, and 4. Another hole ran across squares 35 and 30 E into 25 D in Layer 5 and contained only material from that layer. Yet another hole in Layer 4 ran parallel to the one in Layer 5 and was filled with a mixture of material from Layers 2 and 3. A fourth hole followed a similar path within Layer 4, but unlike the others it was empty. All four of these holes sloped from the back of the cave toward the mouth and ended near a group of fall rocks in square 25 D. Under these rocks there was a hole that went down into the bedrock. In addition, there was a hole in 25 E running almost straight down to these same rocks in 25 D and filled with artifacts and material from Layers 3, 4, and 5.

As the surfaces in Layer 5 were uncovered, it became clear that an area in 25 E, adjacent to the rocks in 25 D, was disturbed. The section at this point showed what looked like a miniature fault. The bands were broken and slipped downward, apparently as the result of removal of material immediately below. The weight of the overlying deposit then forced this part of the layer into the void below. The last hole was encountered on surface XI, in square 30 G, and ran straight down, disappearing among some large rocks. The origin of these holes is unknown. All those that were empty looked as if water had played an important part in their enlargement, but it is not clear whether or not water action was responsible for their origin. One suggestion has been that they were the result of animal burrows and subsequently were enlarged by water. Although there are no burrowing animals living in the area at this time, some may have been present in the past under different environmental conditions. Water drips from the ceiling and could have dissolved the holes through the deposit and gone out through the bedding planes in the bedrock at the bottom of the cave.

These holes provide some suggestions regarding the formation of the deposit. One explanation suggested for the alternating black and white bands of Layer 5 was that they were caused by a small pond standing in the cave. This explanation seems very unlikely, however, since it is hard to imagine that water would stand in the cave with two large holes running down into the bedrock. If there had been sufficient water in the cave to form a pool, it either would have run out or would have washed the holes full.

To summarize, then, the cave is formed in a metamorphosed sandstone that breaks into large blocks as well as disintegrating grain-by-grain. The coarse sand produced by this grain-by-grain disintegration makes up Layers 4 and 6, which contain no archaeological material. Layers 1, 2, 3, and 5 contain archaeological material and are made up of a mixture of the coarse sand derived from the bedrock and larger amounts of fine-grained material. However, the mechanism or mechanisms specifically involved in the deposition of Layers 1, 2, 3, and 5 are not known. Certainly two factors are involved, the first the decomposition of the bedrock, the second the addition of organic and perhaps some inorganic material by the human and other occupants of the cave. Evidence from more recent South African sites, such as Scott's Cave or Melkhoutboom, indicates that quantities of grass, brush, and twigs are carried into caves by the people living in them. This material introduces large amounts of organic matter that would not otherwise be present. Analysis of samples from Layers 3 and 5 have demonstrated the presence of sand grains, which are not found in the sample from the bedrock nor in Layer 4. The sand grains that make up Layer 4 are coated with an iron oxide. From the size of the grains it seems possible that this material was blown into the cave, but its specific source is unknown. It may be derived from the shales that occur as the bedrock of the valley the cave overlooks. The literature on the accumulation of cave deposits in general is very meager, and that dealing with the formation of archaeological cave deposits smaller yet, so many of these questions remain unanswered.

Analysis of solidified guano found adhering to the wall of the upper cave proves that guano has not been a significant factor in the formation of the sediments of the lower cave. There is no similarity between the chemical constitution of the guano and that of the sediments.

A second problem that must be considered is the relation of the upper and lower caves to each other and to the formation of the deposit in the lower cave. Some parts of the walls of the upper cave appear smooth and rounded, but it is not clear whether this is from weathering or from water action. The question of the mechanism of water action is raised here because the suggestion has been made that at some point in the past a small stream could have been present in the upper cave that ran down into the lower cave and out its mouth. I am certain that this was not the case during the time represented by the deposits in the lower cave. Although no survey has been made that is sufficiently accurate to permit a precise estimation of the volume of material that has been removed in the formation of the upper cave, it is clear that much more material has been removed than is represented by the sediments in the lower cave. Since most caves are essentially funnel shaped, individual sand grains, by the action of the wind, could, without actually being blown out, work their way down along the slope of the cave floor to the mouth, and then out of the cave. Alternatively, a stream, either perennial or periodic, may have been responsible. Whatever the explanation, the phenomenon has not functioned in the recent past since it would have inhibited the accumulation of the deposits with which we are concerned in the lower cave. In addition, there has been an appreciable accumulation of wall-derived sand in the upper cave.

The analysis of the archaeological material that follows will indicate that there is a considerable difference between the artifacts from Layer 3 and those from Layer 2, and evidence from other sites suggests that these two assemblages may be separated in time by as much as 40,000 years. Yet there is no stratigraphic feature between Layers 2 and 3 in the Montagu Cave to account for a time gap of that length. There is no reason to assume that the disintegration of the bedrock went on at a constant rate, and it may have stopped altogether at some periods. The sand grains are too large to have been blown out of the cave, and there is no evidence of water action that could have removed the particles. Either deposition of the sand did stop, or the two archaeological assemblages are not separated by so great a time as had been commonly held and the evidence from other sites reflects a situation different from the one at Montagu.

Charcoal samples have produced dates of 23,200 ± 180 B.P. (GRN. 4726) for the top and 45,900 ± 210 B.P. (GRN 4728) and > 38,000 (GXO 947) for the bottom of Layer 2. The > 38,000 date reflects the limits of the counting ability of the laboratory. The laboratory report suggests that this confirms the 45,900 date. A sample, GRN. 5123, from between horizon 5 and 6 has produced a date of 19,100 ± 110, and another sample, GRN. 5124, from between 6 and 7, a date of 50,800. It is impossible to explain either the inconsistency of these dates or the extreme age of some of them. The obvious reason for a sample to produce a date older than expected is that the sample has been contaminated with old charcoal. This is not possible in this situation, since the lower layers do not contain any charcoal. A sample from the Howieson's Poort shelter, near Grahamstown, which contains material similar to that from Layer 2, has given a date of 18,740 ± 320. This suggests that the 19,100 and 23,200 dates may be about right. An alternative explanation is that the samples that have produced the younger dates are the contaminated ones and that the older dates are a more accurate reflection of the age of this material.

The date for the bottom is surprisingly old but, if correct, could indicate that there is no great time gap between Layers 2 and 3 since a date of from 50,000 to 60,000 years for the Acheulean of Layer 3 is not impossible. However, there is a date of 7,100 ± 45 B.P. (GRN 4725) for Layer 1, which would mean that the difference in age between Layer 1 and the upper part of Layer 2 is about 16,000 years. In the absence of evidence of any deposition during that time, one cannot assume that the disintegration of the bedrock went on at a constant rate, since there was no deposition during the 16,000 years that elapsed between the deposition of Layers 1 and 2.

Archaeologists frequently state that the most important data they recover are not the artifacts themselves, but information about the relationship of the artifacts to each other in the deposit. I have tried to suggest that an understanding of the deposit in which these relationships obtain is equally important, since the deposit may itself be an artifact. Linguists and ethnologists are aware that the context in which behavior occurs is important for a full understanding of that behavior, and the context in which archaeological artifacts are found may be equally important to their interpretation. Later, the material from Layers 3 and 5 will be shown to be the result of tool-making or workshop activities. Workshop sites are often not considered to be "habitation" sites, but in Montagu Cave knowledge of the deposit in which the material occurs demonstrates that, in fact, the site was occupied repeatedly, apparently for the purpose of exploiting the source of raw material in the stream below.

An additional reason for this extensive discussion is that the literature on the sedimentology of cave deposits in general, and archaeological cave deposits in particular, is very small, and it is hoped that this discussion will point out some of the problems involved and perhaps stimulate further research in this area (see Appendix II).

DESCRIPTION AND DISCUSSION OF ASSEMBLAGES

INTRODUCTION

Archaeological descriptions involve a substantial amount of subjectivity, and if they are to be useful it is important that they be as explicit as possible.

In the description and analysis of the Montagu collections we used the Acheulean terminology published by Kleindienst (1962) to facilitate comparisons with the East African material. For the post-Acheulean material a terminology was developed with the cooperation of Miss Barbara Anthony. Definitions of the post-Acheulean tool categories are included in the body of the descriptions, and the substance of Kleindienst's terminology is included in Appendix I. Definitions of more general terms are presented below.

Miss Anthony was consulted on the assumption that it would be useful to have basically similar terminologies used for describing material from Montagu Cave and Peer's Cave. At the time this description was done (1965) no other Middle Stone Age sites in southern South Africa had been excavated for some years, and eventual comparison with the Peer's Cave material seemed appropriate.

A second objective of these descriptions, beyond the purely comparative, is to illustrate variability within the descriptive categories. Clark (1950) has made the distinction between "formal" and "informal" tools with reference to the Acheulean. This distinction involves the notion that tools that have been produced by considerable modification of the primary form—for instance a hand-axe, which requires a large number of operations in manufacture—exhibit less variation and are more standardized than those that require fewer operations, for instance a scraper. It is not a simple matter to compare categories like "hand-axe" and "scraper" since the attributes that define the two are usually mutually exclusive. However, in the following descriptions univariate frequencies are included in an effort to indicate the kinds of variation present within the categories. It must be emphasized that the attributes for which frequencies are included are not necessarily the most important ones for determining membership in any classificatory group. Other attributes may have been as important, or even more important for classificatory purposes. Many of the attributes listed are not criterial (Bruner, et al., 1956, 31) or essential (Clarke, 1968:137), but are of interest to archaeologists for purposes other than classification. Thus characteristics such as raw material or type of striking platform are included, even though they had no bearing on classification. Since most of the criterial attributes do not vary but form a categorical framework within which other attributes vary, it is often possible to see evidence of the choice of techniques and raw material to produce certain tool forms, whereas other techniques and raw material were preferred for other forms.

Another possibility that bears on the "formal-informal" distinction is that the "informal" tools represent a residual category; that is, when all possible pieces have been assigned to some category the remaining pieces constitute the "informal" tools. To clarify this question I will summarize the way the various attributes were used to categorize the artifacts.

When classifying Acheulean material, I first separated artifacts into trimmed and untrimmed categories. The untrimmed pieces included flakes, flake fragments, chips, and chunks. Any piece that showed secondary modification of its primary form was included with the trimmed pieces. Pieces showing only hammerstone modification were placed in a special category. These categories were not the traditional "waste" and "tool" units, since some pieces, for example cores, were treated as tools and only later included with the untrimmed pieces for the purpose of figuring percentages. Trimmed pieces were then segregated into various types.

There were minor fluctuations in procedure depending on the particular lot of artifacts. No codified check list was used, although a mental one was. Pieces with a large number of flake scars were usually picked out first and described as belonging to one or another category (hand-axe, cleaver, pick) on the basis of plan and cross section. Obviously the relative weighting of a given attribute is impossible to assess when a procedure of this kind is used, since a number of attributes are perceived at the same time. One picks out the hand-axes (or whatever) and describes them and goes on to something else. However, it is important to note that some basic attributes are very important in influencing categorization. Amount of modification is an initial one. No matter what the plan-form, if secondary modification is absent, then the piece is placed in what ultimately becomes the waste category. Plan-form is of secondary importance with cross section third; that is, presence or absence of a cleaver bit or pointed end is then modified by cross section (as to both relative thickness and degree of symmetry) to categorize a piece as a hand-axe, pick, cleaver, or pushplane.

After these more readily recognized pieces for which plan and section are important are described, whatever is left must be categorized. Some pieces fell outside the limits of Kleindienst's terminology for hand-axe, and so forth and these were placed in special categories, such as "hand-axe chopper," which are dealt with below. The special categories contain pieces that have different expressions of the same attributes we have been discussing.

For other categories other attributes are more important. The plans and cross sections of choppers are different from those of hand-axes and cleavers, but the distinction between cores and choppers is made on the basis of type of flake scars rather than on any of the previously mentioned attributes. Pieces with identical plans and sections but different kinds of flake scars would be placed in separate categories. That is, if two specimens were identical in all attributes but one had large complete scars and the other had small step scars and a crushed edge, the former would be classed as a core, the latter as a chopper. When cores, pieces with large complete scars, showed battering, crushing, and small step scars along part or all of their margin, they were described as cores with chopper use.

The residuum now consists of pieces with less modification than those already classified. The remaining pieces in the Montagu Acheulean collection consisted of fragments of tools, large pieces with a few large flake scars, and pieces with minor modification of their margins. The large pieces appeared to represent an early stage in the manufacturing process and so were put into a separate category. The pieces with marginal modification were placed in the "scraper" category. Those items with characteristic asymmetrical sections and steep edges were placed in Kleindienst's "core scraper" category. Everything else was lumped as a scraper.

In classifying the post-Acheulean material, the procedure was essentially the same, within the limits imposed by the nature of the modification. For instance, plan was a much less important attribute and the nature of margin modification was more important than for the Acheulean material. In general, however, those pieces with more modification (of whatever kind) were categorized first, and those that were modified less were categorized last.

For scrapers then, especially in the Acheulean, the "informal" tools do represent a residual category. This is not to say that this category is defined in purely negative terms. There are attributes that define the category, but they are fewer and for cultural reasons they are more difficult to describe than are other attributes. The characteristics used to define the more formal tools are those that are important in categorization of western European hand tools: amount of modification (or number of attributes), plan-form, and cross section.

In the following description the frequency of various attributes is set out in tabular form. Some attributes for some types have been used for correlation analysis and these are discussed individually. In general, however, one can readily perceive the pattern of combinations present. For most attributes there is one expression that accounts for a majority of the pieces. A combination of the major expressions of each attribute produces a composite of the category, and wholesale correlations seem unwarranted. For instance, among the hollow scrapers from Layer 2 the most common raw material (chert, 90 percent) occurs most commonly in association with the most frequent primary form (end-struck flakes, 41.6 percent), which occurs most commonly with the most frequent plan (irregular, 71.9 percent) and the most frequent location of trimming (one side, 73.2 percent).

The classification procedure has been described in order to clarify the way Kleindienst's terminology was used and also to give some indication of the classificatory use of the attributes listed. Some were of considerable importance whereas others, such as raw material, were not used at all. Therefore it is not possible to test these categories by carrying out a correlation study of the attributes listed since many of the necessary characteristics are not included. Many of the attributes that are not listed are criterial, in that they determine assignment to a category, but are "inessential" (in Clarke's terms) since they are present on each piece in the category.

DEFINITIONS

Tool—Those pieces that appear to have been altered in a purposeful way, excluding cores. The alteration may have been intended to modify the shape of the primary form or to produce a particular kind of edge, or both. Tools are indicated by the term "shaped" in the figures.

Waste—Unaltered chips, chunks, flakes, flake fragments, and cores. All waste except cores is referred to as flake waste. Certainly some pieces classed as waste could have been used as tools, but if no alteration is visible, these pieces have been classed as waste.

Utilized—Pieces that have been altered only by use.

Primary form—The kind of object on which a tool or core is made. For instance, the primary form on which a hand-axe is made might be a flake, a chip, or a chunk. For some it is impossible to tell what the primary form was; for others it is clear that the primary form was a flake, but the flake has been altered to the point where it is impossible to say whether it is end-struck or side-struck. The placement of the trimming is described in terms of the primary form, so where possible the trimming is said to be on the dorsal or ventral face. But if such a designation is impossible, the piece is simply described as "unifacial" or by some other appropriate term. The same is true of the placement of the edge. A chip could be described as "trimmed on one side," but a side-struck flake could be described as "trimmed on the distal side" or "proximal side," and so on.

Flake—A piece that retains the complete bulb of percussion and tapers to thin edges at its margins.

Split flake fragment—A piece that retains all or part of the bulb of percussion, but which has broken parallel to the direction in which the flake was struck. Ideally the split face and platform would intersect at a 90° angle.

Snapped flake fragment—A flake fragment in which the split face is parallel to the platform; that is, it runs at 90° to the direction in which the flake was struck.

Chip—An artifact that obviously has been detached from some larger piece but lacks a bulb of percussion or part thereof is called a chip. The bottom or distal part of a step-flake fragment would be classified as a chip.

Chunk—An artifact from which other pieces have been detached. The surface of a chunk is usually made up of partial flake scars or break faces. The scars, however, are not regular or numerous enough to justify calling the piece a core.

Plain platform—A smooth platform on a flake or core. On a flake the plain platform could be cortex, a break face, or part of a large flake scar.

Negative-scar platform—The platform of a core where a single negative scar has been used as a striking platform.

Simple-facetted platform—A platform consisting of two or in the case of cores three flake scars. The term is comparable to "pseudo-facetted," used by some writers.

Facetted platform—A platform with three or more flake scars. A facetted platform on a core is one that would have produced flakes with facetted platforms.

"Bulb only" platform—The kind of platform found on some flakes (in Layers 1 and 2) that have practically no platform, but only a very thin face above the bulb.

Thin platform—The kind of platform found on some cores; two faces intersect at a sharp angle and force has been applied to one face to remove flakes from the other face.

End-struck—Flakes that are longer than they are wide. Length is measured along a line perpendicular to the striking platform; width is measured at the widest point on a flake along a line parallel to the striking platform.

Side-struck—Flakes that are wider than they are long, or that are equal in these two dimensions—that is, flakes as wide as they are long are counted as side-struck flakes.

Dorsal face—The face of a flake opposite the face with the bulb of percussion. On other artifacts—such as a chunk—with a plano-convex cross section, the convex face is the dorsal face.

Ventral face—The face having the bulb of percussion. The term is equivalent to the "main flake surface" of some other writers.

End—The narrow part of the margin of a flake. On an end-struck flake the end is opposite the platform and on a side-struck flake it is adjacent to the platform.

Side—The broad part of the margin of a flake. (See "end" above.)

Proximal end or side—The platform end of an end-struck flake or the platform side of a side-struck flake.

Distal end or side—The end or side opposite the striking platform of a flake.

Edge—The working edge of a tool or the part of the margin that has been trimmed; an "edge" may be found on either the sides or ends.

Shallow—Describes an edge with an angle that falls between 0^{o} - 25^{o}.

Blunt—Describes an edge with an angle that falls between 26^{o} - 55^{o}.

Steep—Describes an edge with an angle of more than 55^{o}.

Guillotine left and right—Kleindienst (1962) uses the term "guillotine" to refer to cleaver bits that are not perpendicular to the long axis of the tool. Where it is possible to determine the ventral and dorsal faces of a cleaver, the tool is oriented with the ventral face down and the bit away from the recorder, and then the bit is described as to whether it slopes to left or right. Where it is impossible to identify the dorsal or ventral face, the bit is simply described as "guillotine."

In the following pages the artifacts from the four artifact-bearing layers are described. Range, means, and standard deviations are given for the lengths, widths, and thicknesses of the tools, cores, and utilized pieces, and other characteristics are described as well. Ranges, means, standard deviations, and modes are also given for width/length and thickness/width. These ratios are often useful in expressing something of the shapes of the tools in question. The modal frequency for these ratios is also included, since it may reflect more precisely than the mean a pattern that the makers of the tools were attempting to produce. Where several values are represented an equal number of times the values are listed. Where there was no modal value it has been omitted. Broken specimens were not used in determining the w/l and t/w values. The name of each type designation is followed by two numbers: the first is the number of examples of that type, and the second is the percentage the type represents of the larger general category, such as tools or cores, to which it belongs. For example, in Layer 1 there are 9 crescents that comprise 4.5 percent of the tools, and there are 18 single-platform cores that comprise 77.4 percent of the cores. Similarly, the percentages given for utilized pieces are in terms only of the utilized pieces.

In the descriptions the most precise terms have been used wherever possible. For instance, in some categories reference is made to trimming located on the "distal end" and in the same category trimming is described as located simply on "one end." This has been done because it is sometimes impossible to distinguish distal from proximal ends. If the primary form is a flake, one can make the distal/proximal distinction in terms of the platform, but on other primary forms where no platform exists this distinction is not possible, and the more general term "one end" is applied to those trimmed on the "proximal" or the "distal" end. The same is true of the face that was trimmed; if possible the term "dorsal" or "ventral" was used, but if it was not possible to make this distinction then the more general "unifacial" was used.

Nongeometric terms have been used to describe the plan-form of some tools. Among the scrapers from Layer 1, for example, terms such as "pebble" or "crystal" are used. These terms reflect the primary form on which the tool was made; thus a piece made on a split quartz crystal is described as having a "crystal"-shaped plan-form. The same is true of "pebble" when it is used to describe plan-form.

A brief discussion of the assemblage from each layer follows the description, but comparisons will be discussed in the comparative section.

LAYER 1 DESCRIPTION

Tools
(201)

Crescents (9, 4.5 percent; plates I:12-13; II:12-13)

All these are made of quartz and are trimmed on the dorsal face. All are made on flakes, but the platforms have been removed by the backing.

Dimensions	Range	Mean	Standard deviation	Mode
Length	10-20 mm.	14.4 mm.	3.1 mm.	—
Width	5-9 mm.	6.4 mm.	1.3 mm.	—
Thickness	1-4 mm.	2.5 mm.	1.0 mm.	—
W/L	33-90	47.0	15.9	40
T/W	20-67	40.0	15.1	33

Backed blades (2, .9%)

These are flakes that are trimmed, apparently in order to blunt one side. These specimens are quadrilateral in shape and are made on end-struck quartz flakes with plain platforms. They are trimmed on one side on the dorsal face to straight edges.

Dimensions	Range	Mean	Standard deviation	Mode
Length	14-15 mm.	14.5 mm.	0.7 mm.	—
Width	4-5 mm.	4.5 mm.	0.7 mm.	—
Thickness	2-3 mm.	2.5 mm.	0.7 mm.	—
W/L	29-33	31.0	2.3	
T/W	50-60	55.0	5.0	

Obliquely truncated blades (3, 1.5%; plate II:10-11)

These are pieces that are trimmed obliquely on one end and sometimes in other places as well. The trimming is steep and resembles backing. One is made of quartz and two of chert. All are trimmed on the dorsal face and distal end; one is trimmed on two sides as well. Two have "bulb only" platforms and one has a plain platform.

Dimensions	Range	Mean	Standard deviation	Mode
Length	22-36 mm.	27.0 mm.	7.8 mm.	—
Width	6-10 mm.	8.0 mm.	2.0 mm.	—
Thickness	2-4 mm.	3.0 mm.	1.0 mm.	—
W/L	22-45	31.0	10.1	
T/W	30-50	38.0	8.7	

Thumbnail scrapers (31, 15.4%; plates I:5-6, 8; II:1-2, 4, 7-8)

These tools are trimmed only on one edge and are usually roughly trapezoidal in plan with a convex working edge

Dimensions	Range	Mean	Standard deviation	Mode
Length	6-36 mm.	14.0 mm.	5.1 mm.	—
Width	7-27 mm.	13.1 mm.	3.5 mm.	—
Thickness	1-9 mm.	4.4 mm.	1.8 mm.	—
W/L	58-167	99.0	24.8	100
T/W	10-61	34.0	11.9	27

Material	No.	Percent
Quartz	14	45.2
Chert	17	54.8
Primary form		
Chips	7	22.6
Chunks	2	6.5
End-struck flakes	8	25.8
Side-struck flakes	13	41.9
Split flake	1	3.2
Edge plan		
Convex	30	96.7
Straight	1	3.2

Trimmed face	No.	Percent
Dorsal	27	87.1
Unifacial	4	12.9
Striking platform (21)		
Bulb-only	4	19.1
Plain	11	52.4
Simple-facetted	2	9.5
Removed	4	19.1

Hollow scrapers (4, 2%)

These tools are characterized by concave, semicircular scraping edges.

Dimension	Range	Mean	Standard deviation	Mode
Length	17-38 mm.	27.0 mm.	9.3 mm.	—
Width	6-23 mm.	14.8 mm.	8.0 mm.	—
Thickness	3-7 mm.	5.2 mm.	1.7 mm.	—
W/L	19-135	68.0	47.8	
T/W	25-60	41.0	14.2	

Material	No.	Percent
Chert	4	100
Primary form		
Chips	2	50
Chunk	1	25
Snapped flake	1	25

Trimmed face	No.	Percent
Dorsal	1	25
Opposite sides and faces	2	50
Unknown	1	25

Scrapers (108, 53.7%; plates I:7,9; II:3, 5, 14, 16)

All tools in this large and variable category have steep unifacial edges. Three of the 108 scrapers are fragmentary

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-123 mm.	28.4 mm.	23.5 mm.	—
Width	5-98 mm.	22.6 mm.	17.0 mm	—
Thickness	2-66 mm.	9.7 mm.	11.1 mm.	—
W/L	23-264	87.0	38.2	60
T/W	11-100	43.0	19.0	40

Material	No.	Percent
Table Mountain Sandstone	15	13.9
Quartz	32	29.6
Chert	61	56.4
Primary form		
Chips	19	17.6
Crystal fragments	16	14.8
End-struck flakes	14	12.9
Side-struck flakes	16	14.8
Split flakes	6	5.6
Snapped flakes	1	0.9
Chunks	36	33.3
Plan		
Round	3	2.8
Pebbles	4	3.7
Slabs	2	1.9
Crystal-shaped	6	5.6
Short quadrilateral	4	3.7
Sub-quadrilateral	2	1.9
Ovoid	1	0.9
Semicircular	1	0.9
Long quadrilateral	1	0.9
Irregular	84	77.7

Location of trimming	No.	Percent
Two sides	4	3.7
Two ends	3	2.8
End and side	4	3.7
Distal end	10	9.3
One end	19	17.6
All the way around	1	0.9
On distal end and side	1	0.9
One side and both ends	1	0.9
One side	52	48.2
Trimmed face		
Bifacial	1	0.9
Unifacial	38	35.1
Ventral	3	2.8
Dorsal	66	61.0
Platform (31 pieces)		
"Bulb only"	2	6.5
Plain	25	80.7
Facetted	3	9.7
Simple-facetted	1	3.2

Outils écaillés (23, 11.4%; plate I:10)

These tools have been described by van Riet Lowe (1946) and Clark (1958a and 1958b). Tools with characteristic bifacial outil edge and the characteristic battering are included in this category. Those with the outil type working edge but lacking the battering are included in the chisel category (see below).

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-30 mm.	18.9 mm.	5.6 mm.	—
Width	5-21 mm.	11.7 mm.	3.9 mm.	—
Thickness	3-16 mm.	7.6 mm.	3.7 mm.	—
W/L	38-175	65	27.5	50,63,67,77
T/W	24-100	63	2.0	60,100

Material	No.	Percent
Quartz	22	95.7
Chert	1	4.3
Primary form		
Chip	1	4.3
Chunks	4	17.4
Crystals	3	13.1
Crystal fragments	13	56.5
End-struck flake	1	4.3
Side-struck flake	1	4.3

Location of trimming	No.	Percent
Worked on two ends	6	26.1
Worked on one end	16	69.5
Piece made on the end-struck, flake trimmed on distal end	1	4.3

Chisels (2, 0.9%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	20-21 mm.	20.5 mm.	0.7 mm.	—
Width	16-17 mm.	16.5 mm.	0.7 mm.	—
Thickness	4-14 mm.	9.0 mm.	0.7 mm.	—
W/L	76-85	80	4.4	
T/W	24-88	55	31.9	

Material	No.	Percent
Quartz crystal	2	100

Location of trimming	No.	Percent
One end	1	50
Two ends	1	50

Burins (3, 1.5%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	19-25 mm.	22.3 mm.	3.0 mm.	—
Width	7-12 mm.	9.0 mm.	2.6 mm.	—
Thickness	2-7 mm.	4.0 mm.	2.6 mm.	—
W/L	28-63	42	15.2	—
T/W	25-100	50	35.3	—

Material	No.	Percent
Quartz	3	100

Primary form	No.	Percent
Chip	1	33.3
Crystal	1	33.3
Crystal fragment	1	33.3

Discoid (1, 0.5%)

This is a round, flat chert tool, the primary form of which is unidentifiable. It is trimmed bifacially and is not a core.

Dimensions

Length 26 mm.; Width 21 mm.; Thickness 11 mm.

Pointed tool (1, 0.5%)

This is an irregularly shaped chunk of quartz with a unifacial point trimmed on one end.

Dimensions

Length 15 mm.; Width 6 mm.; Thickness 2 mm.

Trimmed flakes (6, 3%; plate I:3)

Most of the tools included in this category, as well as those called "trimmed chips" and "trimmed chunks," have shallow or blunt edges whereas most scrapers have steep edges. The distinction of cutting edges and scraping edges made in the Acheulean material is based on two features: one, the shallowness or sharpness of the edge; and two, the way in which the edge is worked, that is, a cutting edge, in the Acheulean, is usually bifacial, whereas a scraping edge is usually unifacial. Unfortunately, such variation does not exist in this later material since virtually every edge is unifacial. The trimmed flakes, however, seem to possess a characteristic combination of attributes in the placement of trimming, the object on which they are made, and the angle of the edge, and as a result, they are placed together in a single category. The other similar tools, that is, "trimmed chips" and "trimmed chunks," possess similar edges but the primary form is different. It is tempting to think of these tools as cutting tools, but no real evidence exists for this presumption.

Dimensions	Range	Mean	Standard deviation	Mode
Length	15-98 mm.	48.3 mm.	30.3 mm.	—
Width	15-27 mm.	33.5 mm.	16.0 mm.	—
Thickness	3-21 mm.	9.8 mm.	6.3 mm.	—
W/L	38-112	78	27.5	
T/W	21-37	28	6.8	

Material	No.	Percent
Table Mountain Sandstone	3	50
Chert	3	50
Primary form		
End-struck flakes	2	33.3
Side-struck flakes	1	16.7
Snapped flakes	3	50.0
Location of trimming		
One side	3	50.0
Two sides	2	33.3
Two ends	1	16.7

Trimmed face	No.	Percent
Dorsal	5	83.4
Parti-bifacial	1	16.7
Platform		
Plain	2	33.3
Facetted	2	33.3
"Bulb only"	2	33.3

Trimmed chips (3, 1.5%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	20-59 mm.	39.3 mm.	19.5 mm.	—
Width	11-24 mm.	15.3 mm.	7.5 mm.	—
Thickness	4-7 mm.	5.3 mm.	1.5 mm	—
W/L	28-55	41	10.9	
T/W	29-45	37	6.6	

Material	No.	Percent
Chert	3	100
Location of trimming		
Two sides	1	33.3
One side	2	66.6

Trimmed face	No.	Percent
Dorsal	2	66.6
Bifacial	1	33.3

Point (1, 0.5%; plate I:4)

This point is made on an end-struck, chert flake with a plain platform. It is trimmed only on the dorsal face (and is probably intrusive).

Dimensions

Length 58mm.; Width 46 mm.; Thickness 14 mm.

Choppers (2, 0.9%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	76-100 mm.	88.0 mm.	16.9 mm.	—
Width	56-72 mm.	64.0 mm.	11.3 mm.	—
Thickness	28-55 mm.	41.5 mm.	19.0 mm.	—
W/L	72-74	73	0.8	
T/W	50-76	63	13.1	

Material	No.	Percent
Table Mountain Sandstone	1	50
Shale	1	50
Primary form		
Chunk	2	100

Location of trimming	No.	Percent
One end	1	50
One side	1	50

Core scrapers (2, 0.9%)

Tools included in this category are usually high-backed and made on chunky objects. The characteristic type of edge is like that on the Acheulean core scraper, that is, steep and often undercutting the side of the object on which it is made.

Dimensions	Range	Mean	Standard deviation	Mode
Length	95-107 mm.	101.0 mm.	8.4 mm.	—
Width	56-84 mm.	70.0 mm.	19.7 mm.	—
Thickness	56-65 mm.	60.5 mm.	6.4 mm.	—
W/L	59-79	68	9.7	
T/W	67-116	41	24.7	

Material	No.	Percent
Table Mountain Sandstone	2	100
Primary form		
Chunk	2	100

Location of trimming	No.	Percent
One end	1	50
Complete circumference	1	50

Cores

(23)

Single-Platform Cores (18, 77.4%; plates I:14-15; II:9)

These cores are trimmed with more or less parallel flakes from a single platform.

Dimensions	Range	Mean	Standard deviation	Mode
Length	10-36 mm.	22.6 mm.	7.7 mm.	—
Width	8-28 mm.	15.1 mm.	5.5 mm.	—
Thickness	4-17 mm.	9.9 mm.	3.8 mm.	—
W/L	38-167	73	33.7	50, 69
T/W	39-120	68	21.9	73

Material	No.	Percent
Quartz	14	77.9
Chert	4	22.1
Primary form		
Chunks	5	27.8
Crystal fragments	9	50.0
Crystals	4	22.2

Platforms	No.	Percent
Plain	6	33.3
Simple-facetted	1	5.6
Facetted	4	22.2
Negative scars	4	22.2
Crystal faces	3	16.7

Location of trimming on chert cores (4)	No.	Percent
Trimmed one side	3	75.0
Trimmed one end	1	25.0

Location of trimming on quartz cores (14)	No.	Percent
Trimmed one end	13	93.8
Trimmed one side	1	6.2

Double-Platform Cores (4, 17.4%)

Cores in this category are trimmed with more or less parallel flakes from two platforms.

Dimensions	Range	Mean	Standard deviation	Mode
Length	18-25 mm.	20.8 mm.	3.0 mm.	—
Width	12-26 mm.	18.7 mm.	5.7 mm.	—
Thickness	3-15 mm.	9.5 mm.	4.9 mm.	—
W/L	67-104	80	13.7	
T/W	25-83	50	21.6	

Material	No.	Percent
Quartz chunks	2	50.0
Chert chunks	2	50.0
Location of trimming		
Both ends worked of same face	2	50.0
Both ends worked on opposite faces	1	25.0
Trimmed from one end and one side but on opposite faces	1	25.0

Platform	No.	Percent
Thin	2	50.0
Plain	1	25.0
Trimmed from natural faces	1	25.0

Disc Core (1, 4.4%)

Cores placed in this category are usually round, trimmed radially, and thin. This core is sub-quadrilateral in shape, made of Table Mountain Sandstone, and the primary form is unidentifiable. It has been trimmed bifacially with a flat cross section.

Dimensions

Length 58 mm.; Width 48 mm.; Thickness 20 mm.

Utilized Pieces

(67)

Grindstones (4, 6%)

These are slabs of Table Mountain Sandstone that appear to have been utilized for grinding. One is stained red.

Dimensions	Range	Mean	Standard deviation	Mode
Length	144-214 mm.	173.5 mm.	34.7 mm.	—
Width	130-194 mm.	152.2 mm.	29.7 mm.	—
Thickness	45-75 mm.	61.7mm.	14.2 mm.	—
W/L	68-106	89	13.4	
T/W	29-57	41	10.0	

Utilization	No.	Percent
Unifacial	3	75.0
Bifacial	1	25.0

Hammerstone (1, 1.5%)

This is an irregular chunk of Table Mountain Sandstone that has been used as a hammerstone.

Dimensions

Length 97 mm.; Width 91 mm.; Thickness 70 mm.

Flakes (29, 43.3%)

There are twenty (69%) quartz flakes and nine (31%) chert flakes that have been utilized.

Flake Fragments (2, 3%)

One of these is made of quartz and one of chert.

Chips (15, 22.4%)

Nine (60%) of the utilized chips are made of quartz and six (40%) of chert.

Chunks (8, 11.9%)

Five (62.5%) of these are made of quartz and three (37.5%) of chert.

Cores (1, 1.5%)

This consists of a single platform core made of chert that has been utilized on one end.

Pigment (7, 10.4%)

These are pieces of abraded hematite.

LAYER 1 DISCUSSION

The material from Layer 1 is the kind that has often been called "microlithic," but an examination of the size ranges on the preceding pages will make it quite clear that whatever "microlithic" means it would probably not cover such a range. An examination of the lengths of flakes made from the three different materials (see fig. 5) indicates that larger pieces are of Table Mountain Sandstone and that smaller ones are of the finer grained materials. The same is true of the tools, the crescents and backed blades being made of quartz and chert and the larger tools, choppers or large scrapers for instance, are made of Table Mountain Sandstone.

By far the most commonly occurring type of tool is the scraper, which accounts for 72.0 percent of all the tools. The correlation tables show that for all three raw materials a piece of angular waste was most commonly chosen for modification to produce a scraper. Modification was usually on the side of whatever piece was chosen. (The quartz angular waste pieces are an exception; no reason for this is apparent. The same is true for Layer 2 scrapers.) The number of scrapers found made from pieces of angular waste parallels the amount of angular waste found in the assemblage as a whole (fig. 10). We can assume therefore that scrapers were usually made by choosing one of the most commonly occurring artifact forms and trimming all or part of its longest available section of margin, "side" in my terminology, to a steep unifacial edge. Scrapers are followed in frequency by outils écaillés, 11.4%, and crescents, 4.5 percent. These three types alone account for 87.9 percent of all the tools. The point and the trimmed flakes are included with the Layer 1 material for the sake of completeness, but these tools are characteristic of the Layer 2 assemblage and may well have been picked up by the later people and then incorporated in Layer 1.

In the core category, single-platform cores predominate, and these plus double-platform cores account for 94.8 percent of the cores present. Figure 6 shows the incidence of various platform types found on the flakes. The number of "bulb only" platforms, coupled with the predominate types of cores, strongly suggests that parallel-sided flakes were being produced by the punch technique. But it must be emphasized that, although punched, parallel-sided flakes are characteristic and common in this assemblage, they are by no means the predominant type numerically. To describe this assemblage as a completely "microlithic" or "blade" industry would convey an erroneous impression.

Seven features were discovered in Layer 1, and the material that these features contained is outlined in table 2. With the exception of feature 3, all were fireplaces or hearths. All these were more or less oval and the long axis ranged from about 50 to about 97 centimeters, and in depth from 2.5 to 25 centimeters. It is impossible to say if these fireplaces were actually hollowed out before use, but it seems unlikely. They were discernible by a concentration of charcoal surrounded by a light-colored ring of what appeared to be ash. In excavation, the charcoal and then the light-colored material were removed until the unaltered deposit was reached. A similar excavation of the fire that we had used for making our lunch during a period of several weeks produced a pit some 20 inches deep. We had not initially dug a fire pit, and the light-colored material below the fire appeared to be the result of combustion of the organic matter in the fill and not ash in the sense of residue left by the combustion of wood.

This has interesting implications for the interpretation of the artifacts found in these fireplaces. If the fireplaces were not excavated prior to building the fire and the "ash" is, in fact, only the result of combustion of the deposit already present, then the artifacts found in the fireplace are not associated with the fireplace any more than those outside but immediately adjacent to it. None of the artifacts in the fireplaces were actually found among the charcoal but were located below the wood in the "ash." Also none of these artifacts showed any signs of having been subjected to intense heat. There is no clear evidence, then, that the artifacts found in the fireplaces were either thrown into the fire or fell out of material placed in or on the fire.

The single feature that was not a fireplace, feature 3, was a small grinding or pounding pit. It consisted of an oval pit, 86 by 56 centimeters and about 13 centimeters deep at the deepest point. Near the center of the pit was an irregular slab of Table Mountain Sandstone, 214 mm. by 194 mm. by 72 mm., which was both smoothed and battered on one face. The slab was set so that it sloped forward to the deepest part of the pit. On the bottom of the pit toward its shallow end there was a considerable amount of carbonized vegetable matter, which ceased abruptly at a point about three-quarters of the way toward the deep end. At this point there was a shoulder where the bottom of the pit dropped 1.5 to 2 centimeters. The absence of carbonized material and the shoulder suggest that a container was placed at the lower end of the stone.

TABLE 1

Correlations of Raw Materials with Selected Attributes of Layer 1 Scrapers

Primary Form	Location of Trimming											
	End		Side		Two sides		End and side		Other		Total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
	Material: Table Mountain Sandstone											
Angular waste	0	0.0	7	50.0	2	14.3	1	7.1	1	7.1	11	78.5
Flakes	2	14.3	1	7.1	0	0.0	0	0.0	0	0.0	3	21.4
Flake fragments	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	2	14.3	8	57.1	2	14.3	1	7. 1	1	7.1	14	99.9
	Material: Quartz											
Angular waste	11	35.5	10	32.3	2	6.5	0	0.0	0	0.0	23	74.3
Flakes	1	3.2	6	19.4	0	0.0	0	0.0	0	0.0	7	22.6
Flake fragment	1	3.2	0	0.0	0	0.0	0	0.0	0	0.0	1	3.2
Total	13	41.9	16	51.6	2	6.5	0	0.0	0	0.0	31	100.1
	Material: Chert											
Angular waste	6	10.0	23	38.3	1	1.7	1	1.7	3	5.0	34	56.7
Flakes	5	8.3	10	16.7	1	1.7	1	1.7	2	3.0	19	31.7
Flake fragments	3	5.0	3	5.0	0	0.0	0	0.0	1	1.7	7	11.7
Total	14	23.3	36	60.0	2	3.4	2	3.4	6	10.0	60	100.1

TABLE 2

Distribution of Tools, Cores, and Grindstones from Features in Layer 1

	Feature 1	Feature 1A	Feature 2	Feature 3	Feature 4	Feature 5	Feature 6
Crescents	1	-	-	-	-	1	-
Obliquely truncated blade	-	-	-	-	-	1	-
Thumbnail scrapers	1	-	12	1	-	4	-
Scrapers	1	1	12	-	3	6	1
Outils écaillés	3	-	2	1	1	2	-
Burin	-	-	1	-	-	-	-
Pointed tool	-	-	-	-	-	1	-
Trimmed flakes	-	-	-	-	-	2	-
Point	-	-	-	1	-	-	-
Chopper	-	-	-	-	-	1	-
Single-platform cores	1	-	1	1	-	1	-
Grindstones	-	-	3	1	-	-	-
Totals	7	1	31	5	4	19	1

The vegetable matter was identified by M. J. Wells of the Botanical Research Institute, Grahamstown. The results of his analysis are summarized in Appendix III. Most of the material was from the tubers of plants of *Homeria* and *Morea*, members of the Iris family, many of which are eaten by people in the area today. Feature 3, then, seems to have been used for the preparation, by grinding and/or pounding, of plant foods collected by the inhabitants of the cave. It seems probable that some kind of receptacle—perhaps a piece of skin or basket—was placed in the deep end of the pit toward which the grinding/pounding stone sloped, to receive the pounded pulp as it fell from the stone.

The locations of the features are indicated in figure 7 and suggest that the area of most intensive occupation was toward the rear of the cave. The present drip line, shown in figure 2, tends to support this, indicating that the usable portion of the cave, at least so far as keeping dry was concerned, was a relatively small part of the total area. This interpretation assumes that the ancient drip and rain-strike lines were approximately what they are today.

LAYER 2 DESCRIPTION

The definitions used for Layer 1 apply here where the types are the same.

Tools
(992)

Crescents (37, 3.7%; plates XI:11-12; XIII:12, XV:11; XVI:4)

Dimensions	Range	Mean	Standard deviation	Mode
Length	15-42 mm.	29.9 mm.	7.0 mm.	—
Width	3-19 mm.	12.5 mm.	3.3 mm.	—
Thickness	1-8 mm.	3.3 mm.	1.2 mm.	—
W/L	17-65	44	10.7	32
T/W	13-57	27	8.6	21

Material	No.	Percent
Quartz	6	16.2
Chert	31	83.8
Trimmed face		
Unifacial	37	100.0

Edge plan	No.	Percent
Crescent	26	70.4
Trapezoidal	8	21.6
Irregular	3	8.1

Backed Blades (12, 1.2%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	17-36 mm.	26.3 mm.	6.6 mm.	—
Width	6-19 mm.	12.8 mm.	4.1 mm.	—
Thickness	2-4 mm.	3.1 mm.	0.6 mm.	—
W/L	35-62	51	8.5	
T/W	16-50	27	10.0	

Material	No.	Percent
Quartz	3	25.0
Chert	9	75.0
Primary form		
Unidentifiable	2	16.7
Chips	3	25.0
End-struck flakes	6	50.0
Snapped flakes	1	8.3
Condition		
Broken	3	25.0
Whole	9	75.0
Platform (6 pieces)		
"Bulb only"	3	50.0
Plain	1	16.7
Removed	2	33.3

Location of trimming	No.	Percent
End and side	2	16.7
One side	10	83.2
Trimmed face		
Dorsal	9	75.0
Ventral	2	16.7
Undeterminable	1	8.3
Edge form		
Straight	9	75.0
Convex	3	25.0
Plan		
Long quadrilateral	5	41.6
Short quadrilateral	1	8.3
Crescent	1	8.3
Irregular	5	41.6

Backed Flakes (17, 1.7%; plate XVI:8, 14)

Backed flakes are similar to backed blades except that they are not quadrilateral in shape and hence are not "blades" in the usually accepted sense. A few other pieces' are included in this category that are not flakes, but to assign them to a separate category would serve no purpose.

Dimensions	Range	Mean	Standard deviation	Mode
Length	22-65 mm.	33.7 mm.	10.6 mm.	—
Width	10-24 mm.	17.3 mm.	4.1 mm.	—
Thickness	2-8 mm.	4.3 mm.	1.7 mm.	—
W/L	32-86	53	13.2	42, 43, 47
T/W	16-38	25	5.7	27

Material	No.	Percent	Location of trimming	No.	Percent
Quartz	2	11.7	Both sides	1	5.8
Chert	15	88.3	One side	16	94.1
Primary form			Trimmed face		
End-struck flakes	13	76.5	Ventral	1	5.8
Chips	3	17.6	Dorsal	15	88.3
Split flake	1	5.8	Undeterminable	1	5.8
Plan			Platform (13 pieces)		
Long quadrilateral	1	5.8	"Bulb only"	2	15.4
Triangular	3	17.6	Plain	8	61.5
Irregular	13	76.5	Facetted	2	15.4
			Simple facetted	1	7.6

Obliquely Truncated Blades (42, 4.2%; plates V:8; X:8; XV:14; XVI:5, 13)

Dimensions	Range	Mean	Standard deviation	Mode
Length	16-47 mm.	26.8 mm.	6.3 mm.	—
Width	6-18 mm.	12.6 mm.	2.9 mm.	—
Thickness	2-6 mm.	3.0 mm.	0.9 mm.	—
W/L	25-67	44		41
T/W	13-67	27	11.6	27

Material	No.	Percent	Location of trimming	No.	Percent
Quartz	3	7.1	Distal end and one side	4	9.5
Chert	39	92.9	One end	8	19.1
			Distal end	19	45.2
Primary form			Proximal end	2	4.7
Chip	1	2.3	Distal end and two sides	1	2.3
Unidentifiable	6	14.3	Proximal end and two sides	6	14.3
Snapped flakes	11	26.2			
End-struck flakes	24	57.1	One end and one side	2	4.7
Plan			Platform (24 pieces)		
Long quadrilateral	13	30.9	Plain	11	45.8
Crescent-shaped	3	7.1	"Bulb only"	7	29.2
Sub-quadrilateral	3	7.1	Facetted	1	4.2
Short quadrilateral	2	4.7	Simple-facetted	1	4.2
Irregular	21	50.0	Removed	4	16.6
Trimmed face			Condition		
Dorsal	38	90.5	Fragmentary	12	71.4
Ventral	1	2.3	Whole	30	28.6
Undeterminable	3	7.1			

Thumbnail scrapers (4, 0.4%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	14-44 mm.	21.5 mm.	15.0 mm.	—
Width	16-19 mm.	16.7 mm.	1.5 mm.	—
Thickness	3-5 mm.	3.7 mm.	0.9 mm.	—
W/L	36-136	100	37.8	
T/W	19-31	22.4	5.1	

Material	No.	Percent	Location of trimming	No.	Percent
Chert	4	100	Distal side-flake	2	50
			Chip, one side	1	25
Primary form			Chunk, two ends	1	25
Chip	1	25	Plan		
Side-struck flakes	2	50	Irregular	3	75
Chunk	1	25	Crescent-shaped	1	25

Hollow Scrapers (71, 7.1%; plate XV:6)

Dimensions	Range	Mean	Standard deviation	Mode
Length	16-61 mm.	32.4 mm.	9.7 mm.	—
Width	8-53 mm.	17.3 mm.	7.5 mm.	—
Thickness	2-18 mm.	4.8 mm.	3.1 mm.	—
W/L	25-212 mm.	56	27.6	50
T/W	11-93 mm.	28	13.0	18

Material	No.	Percent
Table Mountain Sandstone	5	7.0
Quartz	2	2.8
Chert	64	90.0
Primary form		
Chips	15	21.1
End-struck flakes	30	42.2
Side-struck flakes	2	2.8
Snapped flakes	24	33.8
Plan		
Sub-quadrilateral	5	7.0
Long quadrilateral	12	16.9
Short quadrilateral	3	4.2
Irregular	51	71.9
Platform (34 pieces)		
"Bulb only"	7	20.6
Plain	24	70.6
Simple-facetted	2	5.8
Facetted	1	2.9

Location of trimming	No.	Percent
Distal end and two sides	1	1.4
Proximal side	1	1.4
Split face of a split flake	1	1.4
Two sides	12	16.9
Two sides and one end	1	1.4
Distal end and side	1	1.4
One end	1	1.4
Distal side	1	1.4
One side	52	73.2
Trimmed face		
Ventral	3	4.2
Dorsal	66	92.9
Undeterminable	2	2.8

Multiple Hollow Scrapers (21, 2.1%; plate XV:4-5, 15)

These are similar to hollow scrapers but they have more than two of the characteristic semicircular concave scraping edges.

Dimensions	Range	Mean	Standard deviation	Mode
Length	26-67 mm.	37.2 mm.	10.6 mm.	—
Width	11-37 mm.	16.0 mm.	5.9 mm.	—
Thickness	2-14 mm.	4.8 mm.	2.5 mm.	—
W/L	22-89	44	14.6	39
T/W	16-93	30	15.9	31, 33

Material	No.	Percent
Chert	21	100
Primary form		
Chips	3	14.3
End-struck flakes	10	47.6
Snapped flakes	8	38.1
Plan		
Irregular	16	76.2
Long quadrilateral	3	14.3
Short quadrilateral	1	4.7
Triangular	1	4.7

Location of trimming	No.	Percent
Two sides	10	47.6
One side	11	52.4
Trimmed face		
Unifacial	18	85.7
Ventral	1	4.7
Adjacently one side on opposite face	2	9.5
Platform (11 pieces)		
Plain	8	72.7
"Bulb only"	1	9.1
Facetted	2	18.2

Strangulated Scrapers (16, 1.6%; plates XV:12, XVI:7)

These tools owe their name to the fact that they exhibit at least two irregular concave edges which are opposite to each other and produce the characteristic constricted plan.

Dimensions	Range	Mean	Standard deviation	Mode
Length	25-54 mm.	39.8 mm.	7.3 mm.	—
Width	11-38 mm.	19.3 mm.	7.0 mm.	—
Thickness	2-9 mm.	4.0 mm.	1.7 mm.	—
W/L	28-94	50	18.8	41
T/W	8-36	22	7.4	14, 19

Material	No.	Percent
Chert	16	100.0
Primary form		
Chips	4	25.0
End-struck flakes	10	62.5
Snapped flakes	2	12.5
Plan		
Irregular	12	75.0
Long quadrilateral	3	18.7
Short quadrilateral	1	6.2

Location of trimming	No.	Percent
Two sides	15	93.7
Two ends	1	6.2
Trimmed face		
Dorsal	15	93.7
Undeterminable	1	6.2
Platform (11 pieces)		
"Bulb only"	4	36.4
Plain	5	45.5
Facetted	2	18.2

Scrapers (189, 18.9%) plates IV:2; V:11; VI:2-3; IX;4; XI:10; XII:1; XIV:6)

Dimensions	Range	Mean	Standard deviation	Mode
Length	14-108 mm.	37.5 mm.	19.5 mm.	—
Width	5-128 mm.	28.5 mm.	18.8 mm.	—
Thickness	2-59 mm.	12.7 mm.	10.1 mm.	—
W/L	32-191	76	25.6	64
T/W	11-133	46	21.3	39, 50

Material	No.	Percent
Table Mountain Sandstone	60	31.8
Quartz	25	13.1
Shale	2	1.1
Chert	102	54.0
Primary form		
Unidentifiable	14	7.4
Chips	30	15.9
End-struck flakes	27	14.3
Side-struck flakes	10	5.2
Crystal fragments	11	5.8
Crystal	1	0.5
Split flakes	6	3.2
Snapped flakes	15	7.9
Flake fragments broken in two directions	2	1.1
Chunks	73	38.6
Plan		
Ovoid	4	2.1
Round	6	3.2
Sub-quadrilateral	4	2.1
Sub-triangular	3	1.5
Triangular	5	2.6
Short quadrilateral	6	3.2
Crystal-shaped	7	3.7
Long-quadrilateral	6	3.2
Quadrilateral	1	0.5
Pointed	1	0.5
Pebble-shaped	1	0.5
Irregular	144	76.2
Semicircular	1	0.5

Location of trimming	No.	Percent
End and side	14	7.4
All around	4	2.1
Two sides	27	14.3
One end	25	13.2
Distal end	10	5.2
Distal end and two sides	3	1.5
Distal end and one side	3	1.5
Both ends and both sides	1	0.5
Distal side and one end	1	0.5
Both ends and distal side	1	0.5
Two ends and one side	1	0.5
Distal side	5	2.6
Two sides and one end	1	0.5
One side	93	49.2
Trimmed face		
Unifacial	90	47.6
Ventral	6	3.2
Opposite sides and opposite faces	1	0.5
Dorsal	90	47.6
Bifacial	2	1.1
Platform (40 pieces)		
"Bulb only"	3	7.5
Plain	23	57.5
Simple-facetted	3	7.5
Facetted	8	20.0
Removed	3	7.5

Outils Ecaillés (10, 1.0%)

There are two pieces that are double-edged and these are combined with burins.

Dimensions	Range	Mean	Standard deviation	Mode
Length	10-51 mm.	24.4 mm.	10.9 mm.	—
Width	8-35 mm.	16.0 mm.	7.9 mm.	—
Thickness	3-16 mm.	8.3 mm.	4.6 mm.	—
W/L	41-85	66	13.0	69
T/W	33-80	51	15.4	—

Material	No.	Percent	Location of trimming	No.	Percent
Table Mountain Sandstone	1	10.0	Two sides	1	10.0
Chert	2	20.0	Two ends	1	10.0
Quartz	7	70.0	One end	8	80.0
Primary form					
Chips	2	70.0			
Crystal fragments	6	60.0			
Chunks	2	20.0			

Chisels (7, 0.7%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	13-36 mm.	26.6 mm.	8.9 mm.	—
Width	9-25 mm.	16.4 mm.	5.6 mm.	—
Thickness	3-11 mm.	7.6 mm.	3.1 mm.	—
W/L	44-86	64	14.7	
T/W	12-79	50	20.1	

Material	No.	Percent	Location of trimming	No.	Percent
Table Mountain Sandstone	1	14.3	One end	6	85.7
Quartz	3	42.8	Two ends	1	14.3
Chert	3	42.8			
Primary form					
Chunks	2	28.6			
Chips	2	28.6			
Crystal fragments	3	42.8			

Burins (10, 1.0%; plates XI:7, 9; XV:10, 13)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-50 mm.	27.9 mm.	13.9 mm.	—
Width	6-32 mm.	14.8 mm.	8.2 mm.	—
Thickness	2-14 mm.	7.7 mm.	4.5 mm.	—
W/L	29-95	55	17.5	
T/W	33-75	51	13.7	

Material	No.	Percent	Location of trimming	No.	Percent
Table Mountain Sandstone	1	10.0	One end	6	60.0
Quartz	3	30.0	Distal end	1	10.0
Chert	6	60.0	One side	3	30.0
Primary form					
Chips	4	40.0			
Chunks	4	40.0			
Crystal fragment	1	10.0			
End-struck flake	1	10.0			

Discoid (1, 0.1%)

This is an artifact that is trimmed unifacially. The trimming is smaller than that on the disc cores and for that reason it is classed as a tool rather than a core. It is made of chert and trimmed on one side unifacially.

Dimensions

Length 19 mm.; Width 12 mm.; Thickness 5 mm.

Nosed Tool (1, 0.1%)

This is a chunk of chert trimmed on one end.

Dimensions

Length 31mm.; Width 16 mm.; Thickness 6 mm.

Pointed Tools (3, 0.3%)

These are small, amorphous pointed tools.

Dimensions	Range	Mean	Standard deviation	Mode
Length	18-69 mm.	37.0 mm.	12.9 mm.	—
Width	11-41 mm.	21.0 mm.	17.3 mm.	—
Thickness	6-22 mm.	12.0 mm.	8.3 mm.	—
W/L	46-61	55	6.8	
T/W	54-91	66	17.3	

Material	No.	Percent
Table Mountain Sandstone	1	33.3
Quartz	2	66.6
Primary form		
Chunk	1	33.3
Crystals	2	66.6

Trimmed Flakes (300, 30%; plates III:1, 5-6, 10; IV:1, 4; V:3; VI:4, 9; VII:2, 6-7; VIII:6; X:6-7, 15; XI:15; XII:4-5, 8, 17; XIII:8, 11; XIV:4; XVI:1, 9)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-147 mm.	44.5 mm.	26.5 mm.	—
Width	3-116 mm.	26.1 mm.	16.6 mm.	—
Thickness	1-52 mm.	8.1 mm.	3.9 mm.	—
W/L	17-147	58	22.2	46
T/W	10-550	34	37.8	38

Material	No.	Percent
Table Mountain Sandstone	98	32.6
Quartz	14	4.7
Chert	188	62.7
Primary form		
Side-struck flakes	9	3.0
Split flakes	13	4.3
Snapped flakes	95	31.6
Flake fragments	6	2.0
End-struck flakes	177	59.0
Plan		
Sub-quadrilateral	1	0.3
Long quadrilateral	64	21.3
Short quadrilateral	39	13.0
Triangular	24	8.0
Ovoid	1	0.3
Pointed	2	0.6
Irregular	169	56.4

Location of trimming	No.	Percent
Distal end and one side	8	2.7
Distal end and two sides	5	1.6
Proximal end and two sides	2	0.6
Distal side	3	1.0
One end	4	1.3
One end and one side	7	2.3
Distal end	10	3.3
Two sides	86	27.6
Split face	2	0.6
Two ends	1	0.3
One side	172	57.6
Trimmed face		
Ventral	25	8.3
Bifacial	8	2.7
Unifacial	5	1.6
Adjacently on the same side but on opposite faces	4	1.3
Parti-bifacial	1	0.3
Dorsal	257	85.7

Platform (197 pieces)	No.	Percent
Plain	109	55.4
Simple-facetted	26	13.2
Facetted	41	20.8
"Bulb only"	18	9.1
Removed	3	1.5

Trimmed Chips (139, 14.0%; plates VIII:7; X:10, 17)

Dimensions	Range	Mean	Standard deviation	Mode
Length	12-160 mm.	34.5 mm.	20.8 mm.	—
Width	6-83 mm.	22.6 mm.	12.6 mm.	—
Thickness	2-29 mm.	6.8 mm.	4.8 mm.	—
W/L	22-14	69	22.8	—
T/W	11-100	30	14	19

Material	No.	Percent
Table Mountain Sandstone	34	24.4
Quartz	8	5.7
Chert	97	69.9
Trimmed face		
Ventral	7	5.0
Bifacial	14	10.1
Unifacial	31	22.3
Parti-facial	2	1.4
Dorsal	85	61.1

Location of trimming	No.	Percent
Two sides	27	19.4
One end	5	3.6
All around	1	0.7
End and one side	10	7.2
Two ends	1	0.7
One side	95	68.3

Trimmed Chunks (45, 4.5%; plate VII:8)

Dimensions	Range	Mean	Standard deviation	Mode
Length	10-174 mm.	54.4 mm.	36.8 mm.	—
Width	8-130 mm.	38.9 mm.	27.3 mm.	—
Thickness	2-92 mm.	20.0 mm.	18.5 mm.	—
W/L	40-133	73	18.1	73
T/W	5-121	49	21.9	42

Material	No.	Percent
Table Mountain Sandstone	24	53.4
Quartz	6	13.3
Chert	15	33.4
Trimmed face		
Unifacial	19	42.2
Ventral	5	11.1
Dorsal	12	26.7
Bifacial	9	20.0

Location of trimming	No.	Percent
One end	5	11.1
Two sides	9	20.0
One end and one side	4	8.9
One side	27	60.0

Points (45, 4.5%; plates VII:10; X:12, 16; XI:2, 13; XII:15, 18; XV:7-9)

The tools in this category are characterized by a tip that, in plan at least, is sharp. Pieces that are pointed in plan but not trimmed to the tip are included in the scraper category. Untrimmed triangular flakes are not included here but will be found in the waste categories. All "points" appear to have been intentionally trimmed to a sharp point.

Dimensions	Range	Mean	Standard deviation	Mode
Length	19-109 mm.	44.8 mm.	20.4 mm.	—
Width	12-56 mm.	28.8 mm.	10.4 mm.	—
Thickness	3-18 mm.	9.0 mm.	3.4 mm.	—
W/L	42-103	68	16.5	58
T/W	19-46	32	6.8	29

Material	No.	Percent
Table Mountain Sandstone	13	28.8
Quartz	2	4.3
Chert	30	66.6
Amount of trimming by face		
Bi-facial	7	15.5
Parti-bifacial	3	6.6
Unifacial	35	77.9
Trimmed face		
Dorsal	44	97.0
Ventral	1	3.0

Primary form	No.	Percent
Unidentifiable	12	26.7
Chips	6	13.3
End-struck flakes	26	57.7
Side-struck flakes	1	2.2
Platform (25 pieces)		
Facetted	10	40.0
Plain	11	44.0
Simple-facetted	3	12.0
Reduced	1	4.0
Condition		
Fragmentary	9	20.0
Whole	36	80.0

Point Tips (3, 0.3%)

All are made of Table Mountain Sandstone. One is bifacial and two unifacial.

Core Scrapers (5, 0.5%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	31-104 mm.	72.4 mm.	35.1 mm.	—
Width	26-92 mm.	60.6 mm.	29.9 mm.	—
Thickness	13-71 mm.	46.6 mm.	24.7 mm.	—
W/L	78-88	83	3.5	
T/W	50-91	75	15.5	

Material	No.	Percent
Table Mountain Sandstone	4	80.0
Chert	1	20.0
Location of trimming		
One side	2	40.0
One end	1	20.0
Two sides	1	20.0
All the way around	1	20.0

Primary form	No.	Percent
Chunks	3	60.0
Pebbles	2	40.0
Trimmed face		
Dorsal	4	80.0
Opposite sides on opposite faces	1	20.0

Choppers (5, 0.5%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	13-89 mm.	66.0 mm.	30.6 mm.	—
Width	15-65 mm.	49.6 mm.	19.8 mm.	—
Thickness	5-56 mm.	49.0 mm.	17.4 mm.	—
W/L	63-115	83	18.8	
T/W	33-100	73	27.7	

Material	No.	Percent
Table Mountain Sandstone	4	80.0
Quartz	1	20.0
Location of trimming		
One side	4	80.0
Two sides	1	20.0

Primary form	No.	Percent
Chunks	4	80.0
Crystal fragment	1	20.0

Unidentified (9, 0.9%)

These are amorphous trimmed pieces.

Dimensions	Range	Mean	Standard deviation	Mode
Length	15-64 mm.	31.7 mm.	14.9 mm.	—
Width	11-31 mm.	19.2 mm.	7.2 mm.	—
Thickness	3-17 mm.	7.2 mm.	4.6 mm.	—
W/L				
T/W				

Material	No.	Percent
Table Mountain Sandstone	2	22.2
Chert	7	77.7
Trimmed face		
Unifacial	6	66.6
Bifacial	3	33.3
Plan		
Irregularly shaped	8	88.8
Quadrilateral	1	11.1

Primary form	No.	Percent
Unidentifiable	7	77.7
Chip	1	11.1
Chunk	1	11.1
Location of trimming		
One side	6	66.6
Two sides	1	11.1
One end	1	11.1
One end and side	1	11.1

Cores
(614)

Single-Platform Cores (237, 38.8%; plates V:5-6; VII:4, 13; IX:2; X:3, 9, 18; XI:5, 7; XIII:10, 18; XIV:1; XVI:6)

Dimensions	Range	Mean	Standard deviation	Mode
Length	12-151 mm.	32.8 mm.	17.9 mm.	—
Width	6-80 mm.	26.6 mm.	14.7 mm.	—
Thickness	2-61 mm.	14.4 mm.	10.2 mm.	—
W/L	33-193	82	18.1	100
T/W	7-124	61	21.3	64

Material	No.	Percent
Table Mountain Sandstone	42	17.7
Quartz	60	25.3
Chert	135	57.0
Trimmed face		
Dorsal	14	5.9
Ventral	2	0.8
Bifacial	3	1.2
Multiple	1	0.4
Unifacial	217	91.6
Platform		
Cortex	83	35.1
Facetted	49	20.7
Plain	18	7.6
Negative scar	57	24.1
Simple-facetted	10	4.2
Thin	12	5.0
Crystal faces	7	2.9
Reduced	1	0.4

Primary form	No.	Percent
Unidentifiable	76	32.0
Chips	7	2.9
Chunks	109	46.0
End-struck flakes	5	2.2
Side-struck flakes	3	1.2
Flake fragment which is broken in two directions	1	0.4
Snapped flakes	4	1.8
Split flake	1	0.4
Crystal fragments	29	12.2
Crystals	2	0.8
Location of trimming		
One end	124	52.3
One side	66	27.8
All around	3	1.2
One end and side	9	3.8
Distal end	8	3.6
From a split face and on one end	1	0.4
Undeterminable	26	10.9

Multiple-Platform Cores (82, 13.3%; plates VIII:12; XI:8, 16; XIII:17; XVI:10)

Dimensions	Range	Mean	Standard deviation	Mode
Length	14-140 mm.	32.5 mm.	17.7 mm.	—
Width	2-103 mm.	26.6 mm.	14.7 mm.	—
Thickness	4-60 mm.	13.9 mm.	8.6 mm.	—
W/L	4-116	83	15.9	86, 96, 100
T/W	19-100	61	73.1	50

Material	No.	Percent
Table Mountain Sandstone	17	20.7
Quartz	13	15.8
Chert	52	63.4
Worked faces		
Bifacial	37	45.1
Unifacial	45	54.9
Platform		
Facetted	29	20.2
Crystal face	2	1.4
Simple-facetted	6	4.2
Negative scar	43	30.0
Plain	14	9.8
Cortex	44	31.0
Thin	4	2.8

Primary form	No.	Percent
Chunks	35	42.6
Crystal fragments	4	4.8
Crystal	1	1.2
End-struck flakes	1	1.2
Snapped flakes	1	1.2
Unidentifiable	40	48.7
Location of trimming		
Two sides	10	12.1
One end and one side	23	28.0
One side and both ends	1	1.2
Two ends and one side	3	3.7
Both sides and both ends	1	1.2
Both ends	44	53.7

Disk Cores (158, 25.8%; plates V:4; VII:5, 9; VIII:2, 5; IX:1; X:4-5; XII:14; XVI:2-3, 11)

Dimensions	Range	Mean	Standard deviation	Mode
Length	18-112 mm.	43.3 mm.	19.5 mm.	–
Width	5-94 mm.	37.8 mm.	17.0 mm.	–
Thickness	2-75 mm.	19.5 mm.	12.1 mm.	–
W/L	55-119	89	11.1	90
T/W	11-90	50	15.5	50

Material	No.	Percent
Table Mountain Sandstone	77	48.6
Quartz	20	12.6
Chert	61	38.8
Plan		
Triangular	2	1.2
Irregular	17	10.7
Semi-circular	7	4.4
Sub-quadrilateral	10	6.3
Quadrilateral	3	1.9
Sub-triangular	1	0.6
Elongated	1	0.6
Ovoid	26	16.4
Circular	91	57.6

Primary form	No.	Percent
Chip	1	0.6
Chunks	2	1.2
Crystal fragments	1	0.6
Side-struck flakes	1	0.6
Split flake	1	0.6
Snapped flakes	4	2.5
Unidentifiable	148	93.6
Trimmed face		
Unifacial	51	32.3
Parti-bifacial	17	10.7
Bifacial	90	57.0

Biconical Cores (5, 0.8%)

These are similar in shape to the Acheulean biconical cores but are smaller in size.

Dimensions	Range	Mean	Standard deviation	Mode
Length	19-64 mm.	51.4 mm.	21.2 mm.	–
Width	29-69 mm.	43.4 mm.	18.1 mm.	–
Thickness	21-54 mm.	33.6 mm.	15.0 mm.	–
W/L	74-100	85	8.9	
T/W	65-90	77	8.3	

Material	No.	Percent
Table Mountain Sandstone	3	60.0
Quartz	1	20.0
Chert	1	20.0

Primary form	No.	Percent
Chunk	1	20.0
Unidentifiable	4	80.0
Plan		
Round	3	60.0
Ovoid	2	40.0

Radial Cores (12, 1.9%; plates XIII:20; XIV:2)

These cores are trimmed radially like disc cores but have less regular cross sections than the latter.

Dimensions	Range	Mean	Standard deviation	Mode
Length	23-74 mm.	47.4 mm.	17.1 mm.	—
Width	22-74 mm.	41.0 mm.	16.0 mm.	—
Thickness	6-34 mm.	18.5 mm.	9.0 mm.	—
W/L	68-1000--	87	11	
T/W	20-77	45	16	43

Material	No.	Percent
Table Mountain Sandstone	7	58.3
Chert	5	41.7
Primary form		
Chunks	4	33.3
Unidentifiable	8	66.6

Trimmed face	No.	Percent
Unifacially	9	75.0
Bifacially	2	16.7
Parti-facially	1	8.3

Irregular Cores (77, 12.5%; plates VI:1; XI:14; XII:3; XIII:16, 19; XV:1-2)

The cores in this category are similar to disc cores in plan and cross section, but they lack the regular trimming found on disc cores and on single-platform cores. The trimming is generally radial but appears random. Individual flakes produced from such cores could have been either irregular or parallel-sided. Although no characteristic patterns of edge damage are present, it is possible that these are tools rather than cores.

Dimensions	Range	Mean	Standard deviation	Mode
Length	2-139 mm.	38.1 mm.	19.2 mm.	—
Width	13-82 mm.	32.1 mm.	14.7 mm.	—
Thickness	3-48 mm.	16.8 mm.	10.2 mm.	—
W/L	53-123	84	13.5	94
T/W	15-93	51	16.2	40

Material	No.	Percent
Table Mountain Sandstone	21	27.2
Quartz	7	9.1
Chert	49	63.6
Cross section		
Lenticular	16	20.8
Asymmetrical	11	14.3
Bevelled-base	1	1.3
High-backed	1	1.3
Flake	1	1.3
Pebble	1	1.3
Crystal	2	2.6
Irregular	44	57.1

Primary form	No.	Percent
Chunks	30	38.9
Crystals	3	3.8
End-struck flakes	1	1.3
Unidentifiable	43	55.9
Worked face		
Multiple faces	7	9.1
Bifacial	33	42.9
Parti-bifacial	1	1.3
Unifacial	36	46.7

Struck Cores (19, 3.1%; plate VIII:1)

Cores in this category are characterized by a single large flake scar on one face that truncates radial scars on the same face. They are similar to "levallois" cores.

Dimensions	Range	Mean	Standard deviation	Mode
Length	19-64 mm.	35.1 mm.	12.8 mm.	—
Width	17-56 mm.	29.6 mm.	11.4 mm.	—
Thickness	4-23 mm.	12.7 mm.	5.4 mm.	—
W/L	66-106	84	10.3	81
T/W	21-71	44	11.1	46

Material	No.	Percent
Table Mountain Sandstone	3	15.7
Chert	16	84.3

Primary form	No.	Percent
Chunks	2	10.5
Unidentifiable	17	89.5

Trimmed face	No.	Percent	Platform	No.	Percent
Parti-bifacial	2	10.5	Facetted	9	47.4
Unifacial	13	68.5	Thin	6	31.6
Bifacial	4	21.0	Negative scar	1	5.2
			Plain	3	15.7

Formless Cores (24, 3.9%)

These cores are similar to the Acheulean type of the same name; they are trimmed in three or more directions on three or more faces.

Dimensions	Range	Mean	Standard deviation	Mode
Length	18-84 mm.	37.4 mm.	17.9 mm.	—
Width	13-72 mm.	32.7 mm.	17.4 mm.	—
Thickness	2-62 mm.	22.3 mm.	15.4 mm.	—
W/L	52-112	86	14.1	92
T/W	8-104	66	19.5	63

Material	No.	Percent	Plan	No.	Percent
Table Mountain Sandstone	6	25.0	Sub-quadrilateral	1	4.1
Quartz	4	16.6	Irregular	23	95.8
Chert	14	58.4			
Primary form			Cross section		
Chunks	18	75.0	Trihedral	2	8.3
Unidentifiable	6	25.0	Irregular cross section	22	91.7

Utilized Pieces

(338)

Grindstones (2, 0.5%)

Both specimens are made of Table Mountain Sandstone and are of irregular shape. One is unifacial and the other bifacial.

Dimensions	Range	Mean	Standard deviation	Mode
Length	97-171 mm.	134.0 mm.	52.3 mm.	—
Width	94-120 mm.	107.0 mm.	18.4 mm.	—
Thickness	78-91 mm.	84.5 mm.	9.2 mm.	—
W/L	-			
T/W	-			

Hammerstones (7, 2.7%)

All are made of Table Mountain Sandstone. Five are pebbles and two chunks.

Dimensions	Range	Mean	Standard deviation	Mode
Length	13-89 mm.	90.0 mm.	33.4 mm.	—
Width	25-94 mm.	69.7 mm.	23.3 mm.	—
Thickness	15-70 mm.	48.0 mm.	18.6 mm.	—
W/L	68-98	79	9.4	
T/W	5-81	68	9.2	

Pestle (1, 0.3%; plate IX:3)

This is a pebble of Table Mountain Sandstone that has been used on one end as a pestle.

Length 140 mm.; Width 60 mm; Thickness 48 mm.

Dimpled Pounder (1, 0.3%)

This is a Table Mountain Sandstone pebble.

Length 110 mm.; Width 77 mm.; Thickness 64 mm.

Anvil (1, 0.3%)

This is made of a chunk of Table Mountain Sandstone and is battered on one end.

Length 133 mm.; Width 122 mm.; Thickness 50 mm.

Flakes (113, 33.3%)

Material	No.	Percent
Table Mountain Sandstone	14	12.4
Chert	81	71.7
Quartz	18	15.9

Flake Fragments (56, 16.5%)

Material	No.	Percent
Table Mountain Sandstone	5	8.9
Chert	44	78.5
Quartz	7	12.5

Chips (72, 21.3%)

Material	No.	Percent
Table Mountain Sandstone	7	9.7
Chert	50	69.5
Quartz	15	20.8

Chunks (31, 9.1%)

Material	No.	Percent
Table Mountain Sandstone	7	22.6
Chert	13	42.0
Quartz	11	35.4

Pigment (54, 15.9%)

These are abraded pieces of hematite.

LAYER 2 DISCUSSION

The most striking feature of the artifacts from this level is their variety in size, form, and raw material. Large flakes of Table Mountain Sandstone up to 15 cm. long are associated with flakes less than 1 cm. long made of quartz or chert; triangular flakes with convergent dorsal scars and facetted platforms are associated with small, parallel-sided flakes with "bulb only" platforms; and large trimmed flakes, disc cores, and "levallois type" cores are associated with backed blades, crescents, and small single-platform cores. Undoubtedly, if this assemblage had been collected from the surface of an open site, it would have been interpreted as a mixture and separated into a "Middle Stone Age" and a "Later Stone Age" industry, but the association of all those elements in Layer 2 is incontrovertible in a context where mixing is impossible.

It will be recalled from the discussion of the stratigraphy that, although there was no visible stratigraphy within Layer 2, there were seven concentrations of artifacts that were excavated as occupation surfaces. The deposit below surface VII was removed as a single unit with the exception of two adjacent squares in the corner of the excavation where the deposit was thickest; these were excavated in six-inch levels. Also, at the very bottom of Layer 2 there was a thin band that had a higher density of charcoal and artifacts than the rest of the layer. In addition, there were a few squares in which the upper surfaces were dug through before they were discovered. The material, then, has been collected from five kinds of excavation units in this layer: the material from above surface I and from those squares where the upper surfaces were dug through; the surfaces and the material from between them; material from below surface VII; material from the arbitrary levels below surface VII; and the band with high artifact and charcoal density at the bottom of the layer.

The differential concentration of artifacts between the top and bottom of the layer was also mentioned in the description of the stratigraphy. This presents some problems in the determination of what differences might be present in the assemblages contained within Layer 2 because there are more artifacts on the lower surfaces than on the upper ones. An inspection of table 5 will show quite clearly these differences in the numbers of tools present at the top of Layer 2 and at the bottom. The thin band at the bottom contained forty-

TABLE 3

Correlations of Raw Materials with Selected Attributes of Layer 2 Scrapers

Primary Form	End		Side		Two sides		End and side		Other		Total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Material: Table Mountain Sandstone												
Angular waste	5	8.5	18	30.5	5	8.5	3	5.1	1	1.7	32	54.3
Flakes	3	5.1	5	8.5	1	1.7	4	6.8	2	3.4	15	25.4
Flake fragments	4	6.7	4	6.7	1	1.7	0	0.0	0	0.0	9	15.3
Other	0	0.0	0	0.0	1	1.7	1	1.7	1	1.7	3	5.1
Total	12	20.3	27	45.7	8	13.6	8	13.6	4	6.8	59	
Material: Quartz												
Angular waste	8	32.0	12	48.0	1	4.0	0	0.0	1	4.0	22	88.0
Flakes	1	4.0	1	4.0	0	0.0	0	0.0	0	0.0	2	8.0
Flake fragment	0	0.0	0	0.0	0	0.0	1	4.0	0	0.0	1	4.0
Other	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	9	36.0	13	52.0	1	4.0	1	4.0	1	4.0	25	
Material: Chert												
Angular waste	9	8.8	37	36.2	7	6.8	5	4.9	1	0.9	59	57.8
Flakes	2	1.9	12	11.7	2	1.9	2	1.9	2	1.9	20	19.6
Flake fragments	1	0.9	5	4.9	6	5.8	0	0.0	1	0.9	13	12.7
Other	1	0.9	1	0.9	3	2.9	3	2.9	2	1.9	10	9.8
Total	13	12.7	55	53.9	18	17.6	10	9.8	6	5.8	102	
Material: Shale												
Angular waste	0	0.0	1	50.0	0	0.0	0	00.0	0	0.0	1	50.0
Other	1	50.0	0	0.0	0	0.0	0	0.0	0	0.0	1	50.0
Total	1	50.0	1	50.0	0	0.0	0	0.0	0	0.0	2	

Location of Trimming (column heading spanning End through Total)

TABLE 4

Correlations of Raw Material with Selected Attributes of Layer 2 Trimmed Flakes

Platform	Table Mountain Sandstone		Quartz		Chert		Total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Bulb only	3	1.5	3	1.5	11	5.6	17	8.5
Plain	35	17.8	5	2.5	68	34.5	108	54.8
Simple-facetted	11	5.6	0	0.0	16	8.1	27	13.7
Facetted	13	6.6	2	1.0	27	13.7	42	21.3
Removed	1	0.5	0	0.0	2	1.0	3	1.5
Total	63	32.0	10	5.0	124	62.9	197	

TABLE 5

Tools and Cores from Layer 2

	Surface I and above	Surface II and above	Surface III and above	Surface I	Between I and II	Surface II	Between II and III	Surface III	Between III and IV	Surface IV	Between IV and V	Surface V	Between V and VI	Surface VI	Between VI and VII	Surface VII	Unstratified, below Surface VII	Below Surface VII, Level 1	Below Surface VII, Level 2	Below Surface VII, Level 3	Below Surface VII, Level 4	Below Surface VII, Level 5	Below Surface VII, Level 6	Band at bottom of layer
Crescents	-	-	-	-	-	-	-	-	-	-	1	-	-	1	2	1	16	2	2	6	1	1	1	3
Backed blades	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	1	1	1	-	1	1	2
Backed flakes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	1	-	4	1
Obliquely truncated blades	-	-	-	-	-	-	-	1	1	-	-	-	1	-	1	-	29	1	3	2	-	2	-	1
Thumbnail scrapers	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-
Hollow scrapers	-	1	-	-	-	-	-	-	-	-	1	2	4	-	10	-	28	7	1	9	7	1	-	-
Multiple hollow scrapers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	3	3	1	1	1
Strangulated scrapers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	3	-	-	-
Scrapers	3	1	1	-	3	1	2	5	4	17	2	2	11	4	24	10	47	11	11	7	7	3	4	9
<u>Outils écaillés</u>	-	-	-	-	-	-	-	-	-	-	1	-	1	-	2	1	3	-	1	1	-	-	-	-
Chisels	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	2	-	1	-	1
Burins	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	1	2	1	2	-	-	1	-	-
Discoid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Points	-	1	-	-	-	-	-	1	1	-	1	1	-	2	12	3	8	6	3	2	1	1	-	2
Trimmed flakes	5	4	-	-	-	2	1	3	-	7	2	2	7	2	39	7	131	27	23	14	11	3	1	12
Trimmed chips	-	-	-	-	-	-	-	2	-	-	1	3	2	2	7	2	58	24	13	6	3	8	2	6
Trimmed chunks	-	2	-	-	-	1	-	1	-	-	-	1	3	-	7	5	17	3	1	-	1	-	-	3
Pointed tools	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-
Choppers	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	2	-	1
Core scrapers	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	1	1	-	-
Nosed tool	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Point fragments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1
Unidentifiable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	2	1	-	-	-	-	-
Single platform cores	-	-	1	-	2	1	1	4	3	5	3	8	7	3	19	7	87	18	18	19	14	6	4	7
Double platform cores	-	-	-	-	-	-	1	-	1	1	-	1	1	3	3	7	40	7	8	1	3	2	-	3
Disc cores	1	3	-	-	-	1	-	-	-	-	-	4	9	4	30	8	50	15	8	5	11	3	1	5
Formless cores	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	1	14	1	-	1	1	-	1	2
Irregular cores	-	-	-	-	-	-	-	-	-	2	-	-	-	2	8	-	28	10	12	8	4	-	1	2
Biconical cores	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	1	1	-	1	-	-	-	-	-
Struck cores	-	-	-	-	-	-	-	-	-	-	-	1	-	1	2	-	6	1	3	3	2	-	-	-
Radial cores	-	-	-	-	-	-	--	-	-	-	-	1	-	-	3	1	2	1	1	2	-	-	1	-
Totals	11	12	2	2	6	6	5	18	12	33	16	26	46	26	172	55	620	139	114	92	75	37	21	63

three tools, and in order to have a comparable number from the top, it is necessary to combine the tools from above surface I through surface III, a total of forty-seven tools. If we then compare these two units, we find that the two most numerous types of tools in both are the trimmed flakes and scrapers, 31.9 percent and 34 percent at the top, and 28 percent and 21 percent at the bottom. This is also true of Layer 2 as a whole, where trimmed flakes make up 30 percent and scrapers 18.9 percent of the tools.

The only types that are not present in the top part of the layer but are found in the bottom are crescents, backed blades, and backed flakes. This may not be a significant difference, however, since the samples are so small—less than fifty—and since in the total assemblage these types constitute only 3.7 percent, 1.2 percent, and 1.7 percent respectively.

The mean length of end-struck flakes in the total Layer 2 assemblage is 4.06 cm.; in the bottom band it is 3.87 cm.; and in the top units 4.04 cm. Of the 8,533 pieces of flake waste in the bottom band, 65.9 percent are Table Mountain Sandstone, 18.9 percent chert, and 15.2 percent quartz. Of the 3,925 pieces of flake waste on surface II and above, 63.4 percent are Table Mountain Sandstone, 23.9 percent chert, and 12.7 percent quartz. Since the material from the top and the bottom of Layer 2 is so very similar, the assemblage will be discussed as a whole.

Tools with more or less shallow, unifacial edges (that is, trimmed flakes, chips, and chunks) make up 47.9 percent of the tools and are followed by all types of scrapers, which total 30.6 percent. The three next most numerous types are points, obliquely truncated blades, and crescents, which account for 4.5 percent, 4.2 percent, and 3.7 percent of the tools respectively. The variety of flake and platform types present was mentioned above, and figure 12 shows that flakes with particular kinds of platforms were used for making particular kinds of tools.

The correlation table of platform types and raw material for trimmed flakes shows that a flake production technique involving a plain platform was used most frequently, followed by a technique involving a facetted platform. This was true for all raw materials. Among the scrapers the preferences were the same as those from Layer 1. A piece of angular waste, the most commonly occurring artifact form, was trimmed along one side, that is along part of the longest part of the margin. The same relationships among raw materials are present in the Layer 2 material as in Layer 1. More quartz pieces were trimmed on the end than specimens of other raw material.

Surface I (see fig. 17) was very near the top of the Layer 2, and parts of it were removed before we were able to isolate it as a horizon. The excavation procedure was outlined earlier. There is very little that can be said about the distribution of the artifacts on surface I because they are so few. Although feature 3 belonged to Layer 1, it cut through the upper surface of Layer 2, and so is indicated on the appropriate plots.

Much the same is true of surface II (see fig. 18), although there seem to be more artifacts in squares 30 F and G than in the others. There were also three fireplaces on this surface, two in 30 F and G and one in 20 E and F.

On surface III (see fig. 19) the material is evenly distributed with the exception of two concentrations, one against the wall of the cave in square 30 G and another at the edge of 30 F. There also seems to be a less obvious concentration of material in 20 E near the large fall rock.

The area plotted on surface IV (see fig. 20) is greater than the previous three because we were able, in excavating this surface, to move out into the 15 line of squares for the first time. These had been occupied by large fallen rocks, which were not moved until the excavation reached the level of the surface on which they were resting. Again, as with the other surfaces, there are concentrations of artifacts in squares 30 F and G.

An even larger area was plotted on surface V (see fig. 21) than on IV as it was possible to remove more of the fallen rocks toward the front of the cave. There is a concentration of artifacts next to a small fireplace in 30 F and also a dense strip of material more or less along the boundary between the F and the G squares.

On surface VI (see fig. 22) there is a concentration of artifacts in the southwest half of square 30 F and an interesting concentration of natural stones on the other half of the square, but unfortunately it is impossible to interpret these concentrations in terms of functional units. In 20 G and extending into 15 G there is a long narrow area which is devoid of stone, either natural or artifactual; this again is interesting but functionally uninterpretable.

By far the greatest density of material on any of the surfaces was found on surface VII (see fig. 23). In squares 20 F and extending into 20 G and 25 F and G there is an interesting oval ring of material with a heavy concentration along its west side. There is also another small concentration in 25 F.

There are two justifications for excavating surfaces or horizons of artifacts in the way we have done. First, uncovering and plotting the distribution of artifacts makes it possible to speak more precisely about the concentrations that occur than if the artifacts were simply labelled by their grid unit. This latter technique has been used by Cooke in his report on Pomongwe (1963), and he was able to show that more cores occurred near the front of the cave than toward the rear and so was able to interpret something about areas in which different activities were practiced. But if the Pomongwe material had been plotted as it was done at Montagu, a more detailed interpretation might have been possible. Second, even if there is no interest in the distribution of the artifacts on a surface, the excavation of such a surface in this way provides a unit of contemporaneity; that is, it can be assumed that the material was deposited over a short span of time and so represents more accurately the tools and waste being produced by the site's occupants at a given time than would the material from any arbitrary level.

Therefore, even though one is presently unable to interpret the concentrations of artifacts described above in terms of functional units, from the plots of these seven surfaces it is possible to make a general statement about the use of the cave. It seems clear that the area of heaviest occupation, if the density of the artifacts is a true reflection of this, was the rear of the cave. Unfortunately, most of this area was removed by the 1919 excavation, and the portion of the cave that we excavated covered only part of it. In Layer 1 the features were concentrated toward the rear of the cave, and the plots of artifact distribution on the four surfaces in Layer 5 give the same impression. The rear of the cave seems, therefore, to have been the area most intensively occupied throughout the time that the cave was inhabited.

It had been hoped that plotting the distribution of the tools would produce some information about the functional units (the tools that were used together) which make up the assemblage. But this was not the case. The greatest number of tools found on any single living surface in Layer 2 was thirty on surface VII, which covered more than two hundred square feet; clearly this is not a high enough density to be informative, since the tools do not occur close enough together to show any association of types.

The results are somewhat disappointing, then, at least in terms of functional interpretations, but they are very important for understanding the constitution of the assemblage since they show quite clearly the intimate association of the typologically varied material that was found. In the comparative section it will be indicated that an assemblage of this kind has never been adequately described, and, further, that the demonstration of the association of these diverse elements on a series of occupation horizons is of great value.

LAYER 3 DESCRIPTION

Where Kleindienst's typology does not apply, the tool types are defined below. Incomplete specimens were not used in determining the W/L and T/W figures and so those categories consisting entirely of broken pieces, such as "Biface Butts," have no W/L or T/W ratios as part of their description.

All artifacts from Layer 3 are Table Mountain Sandstone.

Tools
(563)

Hand-axes (76, 13.5%; plates XVIII:2,8; XIX:2-4; XX:2-5; XXI:2; XXII:1,8; XXVI:4; XXVII:3-4; XXVIII:1)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-27 cm.	14.7 cm.	3.4 cm.	—
Width	5-17 cm.	8.8 cm.	1.8 cm.	—
Thickness	2-6 cm.	4.0 cm.	0.9 cm.	—
W/L	38-13	60	13.5	53
T/W	29-75	47	9.5	50

Primary form	No.	Percent
Side-struck flakes	9	11.8
Chunks	2	2.6
Chip	1	1.3
Unidentifiable	64	84.2
Trimmed face		
Parti-bifacial	10	13.2
Unifacial	2	2.6
Bifacial	64	84.1
Butt trimming		
Untrimmed	16	21.0
Trimmed unifacially	9	11.9
Partially trimmed	16	21.0
Rolled	1	1.3
Bifacially trimmed	33	43.4
Cortex	1	1.3
Finish		
Rough	18	23.7
Fine	19	25.0
Very fine	6	7.9
Coarse	33	43.4

Plan	No.	Percent
Triangular	2	2.6
Sub-triangular	6	7.9
Ovate	10	13.2
Irregular ovate	3	3.9
Asymmetrical ovate	5	6.6
Long ovate	13	17.2
Asymmetrical long ovate	6	7.9
Irregular long ovate	3	3.9
Ovate-acuminate	4	5.3
Lanceolate	6	7.9
Elongated lanceolate	1	1.3
Irregular lanceolate	2	2.6
Asymmetrical lanceolate	3	3.9
Pointed	2	2.6
Cordiform	2	2.6
Elongate	1	1.3
Limande	7	9.2
Condition		
Broken	4	5.3
Whole	72	94.7

Hand-axe flakes (6, 1.1%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	12-15 cm.	13.3 cm.	1.4 cm.	—
Width	7-10 cm.	8.7 cm.	1.0 cm.	—
Thickness	2-5 cm.	3.7 cm.	1.2 cm.	—
W/L	47-83	66	11.0	69
T/W	22-56	42	10.5	—

Primary form	No.	Percent
Unidentifiable	4	66.6
End-struck flakes	2	33.3
Trimmed face		
Dorsal	5	83.4
Ventral	1	16.6
Butt trimming		
Bifacially	1	16.6
Unifacially	3	50.0
Untrimmed	2	33.3

Plan	No.	Percent
Lanceolate	1	16.6
Cordiform	1	16.6
Irregular ovate	2	33.3
Asymmetrical broad ovate	1	16.6
Ovate	1	16.6
Finish		
Rough	2	33.3
Coarse	1	16.6
Fine	3	50.0

Cleavers (64, 11.4%; plates XVIII:4; XIX:1; XXIII:4; XXIV:1-4; XXVI:2; XXVII:2)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-25 cm.	15.7 cm.	3.2 cm.	—
Width	5-13 cm.	9.2 cm.	1.7 cm.	—
Thickness	2-8 cm.	4.5 cm.	0.9 cm.	—
W/L	45-78	65	9.9	56,62,63
T/W	33-89	53	8.9	50

Primary form	No.	Percent
Unidentifiable	27	42.2
Chip	1	1.5
Chunk	1	1.5
End-struck flakes	4	6.3
Side-struck flakes	31	48.5

Trimmed face	No.	Percent
Unifacial	3	4.7
Opposite side/opposite face	1	1.5
Parti-bifacial	14	21.9
Bifacial	46	71.9

Plan	No.	Percent
Irregular	5	7.8
Convergent	12	18.8
Asymmetrically convergent	1	1.5
Ultra-convergent	4	6.3
Parallel	31	48.5
Asymmetrically parallel	5	7.8
Irregular parallel	2	3.1
Divergent	2	3.1
Asymmetrically ultra-convergent	1	1.5
Irregular convergent	1	1.5
Bit plan		
Straight	14	21.9
Guillotine to the right	20	31.3
Guillotine to the left	11	17.2
Guillotine	19	29.7
Platform (35 pieces)		
Reduced	26	74.2
Removed	8	22.8
Plain	1	2.9

Butt trimming	No.	Percent
Untrimmed	13	20.3
Unifacially	4	6.3
Partially	3	4.7
Partially trimmed ventral face	2	3.1
Partially trimmed dorsal face	1	1.5
Bifacially	41	64.0
Butt plan		
V-butts	13	20.3
Square butts	13	20.3
U-butts	38	59.5
Finish		
Rough	14	21.9
Fine	11	17.2
Very fine	3	4.7
Coarse	36	56.2
Condition		
Whole	61	95.3
Broken	3	4.7

Cleaver Flakes (11, 1.9%; plates XXIII:3; XXIV:5)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-18 cm.	13.6 cm.	2.2 cm.	—
Width	8-17 cm.	10.2 cm.	2.6 cm.	—
Thickness	2-6 cm.	4.3 cm.	0.9 cm.	—
W/L	57-142	78	22.7	64, 67
T/W	25-56	43	9.2	44, 50

Primary form	No.	Percent
Unidentifiable	3	27.3
End-struck flakes	3	27.3
Side-struck flakes	5	45.4
Plan		
Irregular	2	18.2
Parallel	6	54.5
Divergent	1	9.1
Irregular convergent	1	9.1
Short quadrilateral	1	9.1
Trimmed face		
Unifacial	6	54.5
Dorsal	4	36.4
Parti-facial	1	9.1
Butt trimming		
Bifacial	7	63.6
Untrimmed	3	27.3
Partially trimmed on ventral face	1	9.1

Butt plan	No.	Percent
Square butts	7	63.6
U-butts	2	18.2
V-butts	2	18.2
Bit plan		
Straight	8	72.7
Guillotine to the right	2	18.2
Guillotine to the left	1	9.1
Platform		
Plain	9	81.8
Reduced	1	9.1
Removed	1	9.1
Finish		
Fine	3	27.3
Coarse	8	72.7
Condition		
Whole	10	90.9
Fragmentary	1	9.1

Knives (14, 2.5%; plates XXII:7; XXVI:3)

Dimensions	Range	Mean	Standard deviation	Mode
Length	8-19 cm.	14.0 cm.	3.4 cm.	—
Width	4-12 cm.	8.6 cm.	2.4 cm.	—
Thickness	3-5 cm.	4.1 cm.	0.7 cm.	—
W/L	40-75	62	8.2	58
T/W	36-100	50	15.7	—

Primary form	No.	Percent
Unidentifiable	8	57.1
Chip	1	7.2
End-struck flake	4	28.6
Side-struck flake	1	7.2
Trimmed face		
Unifacial	1	7.2
Trimmed ventral	1	7.2
Bifacial	12	85.6

Plan	No.	Percent
Round	1	7.2
Sub-quadrilateral	1	7.2
Elongate	1	7.2
Semicircular	1	7.2
Quadrilateral	1	7.2
End and side	5	35.7
Pointed	4	28.6

Discoid (3, 0.5%; plate XX:1)

Dimensions	Range	Mean	Standard deviation	Mode
Length	8-16 cm.	13.0 cm.	4.4 cm.	—
Width	7-13 cm.	10.0 cm.	3.0 cm.	—
Thickness	3-5 cm.	3.7 cm.	1.1 cm.	—
W/L	63-88	78	11.0	
T/W	30-43	42	5.3	

Plan	No.	Percent
Round	2	66.6
Ovoid	1	33.3
Trimmed face		
Bifacial	3	100.0

Finish	No.	Percent
Fine	3	100

Scrapers (174, 30.9%; plates XXII:2; XXV:1-4, 7-11; XXVI:5; XXVII:1; XXVIII:2)

For comparative purposes in figure 25 the scrapers are divided into large and small categories on the basis of their maximum dimension, but all are combined for descriptive purposes here. Three broken specimens were omitted from the description.

Dimensions	Range	Mean	Standard deviation	Mode
Length	3-28 cm.	9.0 cm.	3.6 cm.	—
Width	2-22 cm.	8.5 cm.	3.3 cm.	—
Thickness	1-14 cm.	3.3 cm.	1.7 cm.	—
W/L	33-225	93	33.2	100
T/W	11-100	44	18.4	50

Primary form	No.	Percent
Unidentifiable	4	2.3
Chips	9	5.2
End-struck flakes	21	12.1
Side-struck flakes	39	22.5
Split flakes	13	7.5
Snapped flakes	4	2.3
Flake fragments broken in two directions	3	1.7
Chunks	80	46.0
Pebble	1	0.6
Plan		
Short quadrilateral	8	4.6
Triangular	2	1.2
Irregular	154	88.5
Ovoid	1	0.6
Round	1	0.6
Semicircular	1	0.6
Sub-quadrilateral	1	0.6
Sub-triangular	1	0.6
A pebble	1	0.6
Elongate	4	2.3

Location of trimming	No.	Percent
Distal side	23	13.3
Distal side and one end	7	4.0
Two sides	14	8.0
Two ends	3	1.7
Two sides and one end	1	0.6
One end	21	12.0
A corner	4	2.3
One end and one side	15	8.5
Distal end	4	2.3
Distal end and one side	5	2.9
Proximal end	1	0.6
Proximal side	1	0.6
Split face	1	0.6
One side	74	42.5
Platforms (59 pieces)		
Simple-facetted	12	20.3
Plain	42	71.2
Reduced	4	6.7
Removed	1	1.7

Core Scrapers (8, 1.4%; plate XXV:9)

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-21 cm.	12.9 cm.	4.7 cm.	—
Width	7-15 cm.	10.8 cm.	2.5 cm.	—
Thickness	4-10 cm.	6.5 cm.	2.1 cm.	—
W/L	67-118	88	17.3	67, 100
T/W	40-80	59	10.9	67

Primary form	No.	Percent
Chunks	7	87.5
Snapped flakes	1	12.5

Location of trimming	No.	Percent
Two sides	2	25.0
One end and one side	2	25.0
One side	2	25.0
The margin (periphery of equidimensional pieces)	2	25.0

Choppers (5, 0.9%; plate XVIII:1)

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-11 cm.	9.6 cm.	1.5 cm.	—
Width	6-8 cm.	7.0 cm.	0.7 cm.	—
Thickness	4-6 cm.	4.8 cm.	0.8 cm.	—
W/L	60-100	74	13.4	70
T/W	50-86	69	14.0	—

Primary form	No.	Percent
Unidentifiable	2	40.0
Chunks	2	40.0
Side-struck flakes	1	20.0

Location of trimming	No.	Percent
One side	2	40.0
Two sides and one end	1	20.0
Two ends	1	20.0
Distal side	1	20.0

Core Choppers (3, 0.5%)

These are cores used on one side as choppers. All are bifacial.

Dimensions	Range	Mean	Standard deviation	Mode
Length	8-11 cm.	9.3 cm.	1.5 cm.	—
Width	7-9 cm.	8.0 cm.	1.0 cm.	—
Thickness	6 cm.	6.0 cm.	0.0 cm.	—
W/L	82-89	86	3.0	
T/W	67-86	75	7.7	

Pointed Tool (1, 0.2%)

This has an irregular shape and is trimmed bifacially. The primary form on which it is made is unidentifiable.

Dimensions: Length 9 cm.; Width 7 cm.; Thickness 4 cm.

Burins (2, 0.3%; plate XXV:2, 5)

Both are made on chunks, trimmed on one end, and are unifacial.

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-10 cm.	7.5 cm.	3.5 cm.	—
Width	5 cm.	5.0 cm.	0.0 cm.	—
Thickness	2-3 cm.	2.5 cm.	0.7 cm.	—
W/L	50-100	75	20.4	
T/W	40-60	50	21.7	

Nosed Tools (5, 0.9%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	8-12 cm.	9.2 cm.	1.8 cm.	—
Width	4-10 cm.	7.0 cm.	2.5 cm.	—
Thickness	3-5 cm.	4.0 cm.	0.7 cm.	—
W/L	50-100	75	15.8	75
T/W	40-125	65	31.2	—

Primary form	No.	Percent
Chunks	3	60.0
End-struck flakes	1	20.0
Side-struck flakes	1	20.0

Location of trimming	No.	Percent
One side	4	80.0
Two sides	1	20.0
Trimmed face		
Dorsal	3	60.0
Unidentifiable	2	40.0

Point (1, 0.2%; plate XXV:6)

This is a flake that has been trimmed bifacially. The bulb and platform have been partially reduced.

Dimensions: Length 5 cm.; Width 5 cm.; Thickness 2 cm.

Triangular Tool (1, 0.2%)

The primary form on which this tool is made is unidentifiable. It has a triangular plan and has been trimmed on two sides on the dorsal face.

Dimensions: Length 7 cm.; Width 6 cm.; Thickness 3 cm.

Minimally Trimmed Flakes (41, 7.3%; plates XXIII:5; XXVIII:3)

These are flakes that have had a few flakes detached but lack sufficient trimming to be placed in any of the more specific categories. Most show some attempt to remove or reduce the bulb and platform. The trimming was done with large flakes, and it appears that the intent was to alter the shape of the object rather than to produce a specific kind of edge.

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-45 cm.	15.0 cm.	9.2 cm.	—
Width	5-23 cm.	12.4 cm.	4.4 cm.	—
Thickness	2-8 cm.	4.2 cm.	1.4 cm.	—
W/L	34-169	95	32.3	100
T/W	17-60	35	9.3	40

Primary form	No.	Percent
Unidentifiable	12	29.2
End-struck flakes	7	17.0
Split flakes	1	2.4
Snapped flakes	2	4.9
Side-struck flakes	19	46.4
Trimmed face		
Bifacial	21	51.2
Parti-bifacial	4	9.8
Dorsal	8	19.5
Ventral	6	14.6
Unifacial	2	4.8

Platform	No.	Percent
"Bulb only"	1	2.4
Plain	8	19.5
Simple-facetted	4	9.8
Removed	16	39.0
Reduced	9	21.9
Unidentifiable	3	7.3

Minimally Trimmed Chips (5, 0.9%)

These are similar to the trimmed flakes but are made on chips. All are trimmed on one side.

Dimensions	Range	Mean	Standard deviation	Mode
Length	3-54 cm.	23.1 cm.	16.4 cm.	—
Width	5-22 cm.	13.8 cm.	5.3 cm.	—
Thickness	2-6 cm.	4.0 cm.	1.4 cm.	—
W/L	30-167	81	38.9	100
T/W	19-40	31	6.8	38

Trimmed face	No.	Percent
Dorsal	3	60.0
Unifacial	1	20.0
Bifacial	1	20.0

Minimally Trimmed Chunks (14, 2.5%; plate XXI:1)

These are similar to the above two categories, but the primary form is a chunk.

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-19 cm.	10.2 cm.	3.1 cm.	—
Width	5-12 cm.	7.4 cm.	1.8 cm.	—
Thickness	2-7 cm.	3.9 cm.	1.4 cm.	—
W/L	53-86	74	8.8	78
T/W	33-100	54	16.7	43, 50

Location of trimming	No.	Percent
One side	4	28.6
One end	2	14.3
One end and one side	1	7.2
Unifacial but location unrecorded	7	50.0

Biface Butts (32, 5.7%)

All are bifacial, and the primary forms on which they are made are unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-17 cm.	10.4 cm.	5.6 cm.	—
Width	6-11 cm.	8.8 cm.	3.9 cm.	—
Thickness	3-6 cm.	4.1 cm.	1.9 cm.	—

Finish	No.	Percent
Coarse	17	53.1
Rough	9	28.1
Fine	6	18.7

Biface Tips (33, 5.8%)

These are the broken tips of bifaces.

Dimensions	Range	Mean	Standard deviation	Mode
Length	2-28 cm.	5.9 cm.	1.2 cm.	—
Width	3-26 cm.	5.8 cm.	4.4 cm.	—
Thickness	1-14 cm.	2.7 cm.	3.8 cm.	—

Trimmed face	No.	Percent
Unifacial	2	6.1
Dorsal	1	3.0
Parti-bifacial	2	6.1
Bifacial	28	84.9

Finish	No.	Percent
Rough	5	15.1
Coarse	7	21.2
Fine	9	27.2
Very fine	11	33.3
Unrecorded	1	3.1

Amorphous Bifaces (6, 1.1%)

These are irregular, bifacially trimmed pieces which have had no particular attention paid to any feature such as a point or working edge. They look like roughouts or unfinished tools.

Dimensions	Range	Mean	Standard deviation	Mode
Length	13-21 cm.	17.5 cm.	2.9 cm.	—
Width	8-11 cm.	9.7 cm.	1.0 cm.	—
Thickness	4-7 cm.	5.2 cm.	1.2 cm.	—
W/L	52-62	56	3.7	53
T/W	44-70	53	8.0	50

Primary form	No.	Percent
Unidentifiable	4	66.6
Chunk	1	16.6
Side-struck flake	1	16.6

Trimmed face	No.	Percent
Bifacial	5	83.4
Unifacial	1	16.6

Chisel-ended Bifaces (12, 2.1%; plates XXIII:1, 2; XXVI:1)

On all the primary form is unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	8-15 cm.	12.2 cm.	2.0 cm.	—
Width	6-10 cm.	7.9 cm.	1.5 cm.	—
Thickness	3-5 cm.	4.1 cm.	0.8 cm.	—
W/L	50-88	66	9.9	64
T/W	43-71	53	8.9	50

Plan	No.	Percent
Ovate	1	8.3
Parallel-sided	3	25.0
Ovoid	1	8.3
Sub-quadrilateral	1	8.3
Pointed	2	16.6
Elongate	3	25.0
Irregular ovate	1	8.3
Trimmed face		
Bifacial	11	91.6
Dorsal	1	8.3

Butt trimming	No.	Percent
Untrimmed butts	5	41.6
Bifacially trimmed butts	6	50.0
Trimmed butt	1	8.3
Finish		
Coarse	9	75.0
Rough	3	25.0

Gouge-ended Bifaces (3, 0.5%; plate XXI:6)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-14 cm.	11.3 cm.	2.5 cm.	—
Width	6-13 cm.	9.0 cm.	3.6 cm.	—
Thickness	3-4 cm.	3.6 cm.	0.6 cm.	—
W/L	67-93	77	11.1	—
T/W	31-50	44	9.0	50

Primary form	No.	Percent
Side-struck flake	1	33.3
Unidentifiable	2	66.6
Finish		
Coarse	3	100.0

Trimmed face	No.	Percent
Bifacial	2	66.6
Unifacial (dorsal face)	1	33.3

Beaked Bifaces (8, 1.4%; plate XXII:3,6)

These tools are similar in many ways to Kleindienst's "picks," but they are far from being identical and so a more descriptive name has been used here. They look as if they might have been the functional equivalents of picks, but they are smaller than most of the East African examples.

On all the primary form is unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	8-13 cm.	10.6 cm.	1.8 cm.	—
Width	6-8 cm.	6.8 cm.	0.7 cm.	—
Thickness	3-5 cm.	4.5 cm.	0.8 cm.	—
W/L	46-88	65	14.1	46, 70
T/W	50-83	67	9.5	71

Plan	No.	Percent
Ovate	2	25.0
Pointed	3	37.5
Sub-triangular	1	12.5
Elongate	1	12.5
Irregular ovate	1	12.5
Finish		
Rough	3	37.5
Coarse	5	62.5

Trimmed face	No.	Percent
Bifacial	7	87.5
Parti-bifacial	1	12.5
Butt trimming		
Trimmed butts	6	75.0
Untrimmed	2	25.0

Twisted-Bit Bifaces (2, 0.4%; plate XXII:4-5)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-10 cm.	9.5 cm.	0.7 cm.	—
Width	6 cm.	6.0 cm.	0.0 cm.	—
Thickness	3-5 cm.	4.0 cm.	1.4 cm.	—
W/L	60-67	63	3.3	
T/W	50-83	67	16.6	

Plan	No.	Percent
Irregular elongate	1	50.0
Ovate	1	50.0

Push Planes (6, 1.1%; plate XXI:7)

On all the primary form is unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	10-18 cm.	12.8 cm.	3.0 cm.	—
Width	7-11 cm.	8.2 cm.	1.6 cm.	—
Thickness	3-6 cm.	4.3 cm.	1.0 cm.	—
W/L	60-70	64	3.5	64
T/W	33-71	54	11.3	57

Plan	No.	Percent
Parallel-sided	2	33.3
Elongate	2	33.3
Asymmetrically parallel	1	16.7
Asymmetrically convergent	1	16.7
Finish		
Coarse	6	100.0

Trimmed face	No.	Percent
Bifacial	4	66.6
Parti-bifacial	2	33.3
Butt trimming		
Bifacial	3	50.0
Untrimmed	2	33.3
Partially trimmed	1	16.7

Bifaces (34, 6%; plate XXVII:6)

These are bifacially trimmed tools that are more or less amorphous; they exhibit a range of features, but cannot be put into any of the biface categories. On all the primary form is unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-30 cm.	11.3 cm.	6.1 cm.	—
Width	5-15 cm.	8.4 cm.	5.3 cm.	—
Thickness	3-7 cm.	3.9 cm.	1.0 cm.	—
W/L	50-100	72	12.2	65, 67, 70, 78
T/W	29-67	49	8.9	50

Plan	No.	Percent
Short quadrilateral	1	2.9
Irregular	12	35.3
Ovate	1	2.9
Long ovate	1	2.9
Parallel	1	2.9
Ovoid	1	2.9
Sub-quadrilateral	2	5.9
Truncated triangular	1	2.9
Pointed	3	8.8
Sub-triangular	2	5.9
Elongate	8	23.5
Trapezoid	1	2.9
Condition		
Broken	15	44.1
Complete	19	55.9

Trimmed face	No.	Percent
Unifacial	1	2.9
Parti-bifacial	1	2.9
Bifacial	32	94.1
Finish (15, broken)		
Rough	4	26.6
Coarse	2	13.3
Fine	3	20.0
Finish (19, complete)		
Rough	6	31.6
Coarse	8	42.0
Fine	2	10.5
Unrecorded	3	15.8

Unidentifiable (1, 0.2%)

The primary form on which this tool is made is unidentifiable. It is irregular in shape and trimmed unifacially on one end to an irregular blunt edge. It appears to be fragmentary.

Dimensions: Length 5 cm.; Width 7 cm.; Thickness 2 cm.

Cores
(110)

Single-Platform Cores (1, 0.9%)

The primary form on which this core is made is unidentifiable. It has a pyramidal cross section and is trimmed from the base of the triangle.

Dimensions: Length 6 cm.; Width 5 cm.; Thickness 3 cm.

Disc Cores (68, 62.7%; plates XVIII:5, 7; XXI:3, 4)

One has been trimmed as a scraper.

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-48 cm.	10.8 cm.	6.0 cm.	—
Width	5-40 cm.	9.1 cm.	4.9 cm.	—
Thickness	2-15 cm.	4.5 cm.	1.9 cm.	—
W/L	65-100	86	9.4	83
T/W	27-75	50	10.3	50

Primary form	No.	Percent
Chunks	6	8.7
End-struck flake	1	1.5
Unidentifiable	62	89.9

Trimmed face	No.	Percent
Unifacial	8	11.6
Dorsal	2	2.9
Parti-bifacial	9	13.1
Bifacial	50	72.5

Plan	No.	Percent
Irregular	8	11.6
Round	26	37.7
Semicircular	3	4.4
Sub-quadrilateral	2	2.9
Sub-triangular	2	2.9
Ovoid	28	40.5

Condition	No.	Percent
Fragmentary	2	2.9
Complete	67	97.1

Formless Cores (9, 8.2%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-17 cm.	10.2 cm.	3.2 cm.	—
Width	6-14 cm.	8.2 cm.	2.6 cm.	—
Thickness	4-12 cm.	6.1 cm.	2.5 cm.	—
W/L	2-120	77	30.6	73, 88
T/W	57-109	74	18.0	57, 67

Primary form	No.	Percent
Chunks	7	77.7
Unidentifiable	2	22.2

Irregular Cores (6, 5.4%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	6-26 cm.	14.7 cm.	7.9 cm.	—
Width	7-22 cm.	11.8 cm.	5.8 cm.	—
Thickness	3-15 cm.	6.7 cm.	4.4 cm.	—
W/L	69-117	85	16.4	69
T/W	38-83	54	15.0	—

Trimmed face	No.	Percent
Bifacial	3	50.0
Parti-bifacial	1	16.7
Unifacial	2	33.3

Biconical Cores (22, 20%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-18 cm.	9.0 cm.	3.4 cm.	—
Width	3-12 cm.	6.9 cm.	1.9 cm.	—
Thickness	3-7 cm.	4.7 cm.	1.0 cm.	—
W/L	33-100	79	15.3	83
T/W	42-100	71	16.0	63, 71, 100

Plan	No.	Percent
Irregular	3	13.6
Round	7	31.8
Ovoid	8	36.4
Semicircular	1	4.6
Sub-quadrilateral	1	4.6
Elongate	2	9.1

Primary form	No.	Percent
Chip	1	4.6
Chunk	1	4.6
Unidentifiable	20	90.9

Trimmed face	No.	Percent
Unifacial	2	9.1
Parti-bifacial	4	18.2
Bifacial	16	72.7

Spindle Core (1, 0.9%)

This has an elongate plan and has been trimmed bifacially. The primary form on which it is made is unidentifiable.

Dimensions: Length 20 cm.; Width 11 cm.; Thickness 7 cm.

Struck Core (1, 0.9%; plate XXI:5)

This has an oval plan; the primary form on which it is made is unidentifiable. It is bifacial with one large flake detached from one face.

Dimensions: Length 5 cm.; Width 5 cm.; Thickness 3 cm.

Split Cobble Core (1, 0.9%)

This is an irregular split cobble.

Dimensions: Length 11 cm.; Width 9 cm.; Thickness 6 cm.

Pebble Core (1, 0.9%)

This is a pebble trimmed on one side bifacially as a core.

Dimensions: Length 17 cm.; Width 15 cm.; Thickness 9 cm.

Utilized Pieces
(73)

Hammerstones (6, 8.2%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-12 cm.	10.1 cm.	1.2 cm.	—
Width	7-9 cm.	8.0 cm.	0.9 cm.	—
Thickness	5-7 cm.	5.7 cm.	0.8 cm.	—
W/L	58-100	80	14.1	
T/W	56-88	72	12.7	

Primary form	No.	Percent	Location of Use	No.	Percent
Flat slabs	2	33.3	Two sides	1	16.6
Pebbles	4	66.6	Ends	5	83.3

Anvils (4, 5.5%)

All are made on pebbles.

Dimensions	Range	Mean	Standard deviation	Mode
Length	14-16 cm.	15.0 cm.	1.2 cm.	—
Width	9-17 cm.	12.5 cm.	3.7 cm.	—
Thickness	6-11 cm.	8.3 cm.	2.0 cm.	—
W/L	64-106	82	16.1	
T/W	47-89	68	16.1	

Flakes (17, 23.2%)

Flake Fragments (13, 17.8%)

Chips (6, 8.2%)

Chunks (25, 34.2%)

Cores (2, 2.7%)

LAYER 3 DISCUSSION

It will become apparent in the following pages that the assemblages from Layers 3 and 5 are considerably different from other recently excavated Acheulean assemblages in Central and East Africa. The differences lie not only in the percentages of the artifacts in the assemblages but also in the presence of some characteristic tool types at Montagu. Therefore, a review of the salient features of the Layer 3 assemblage is appropriate.

An examination of table 7 will clearly indicate that there is no significant variation within the occurrences that make up Layer 3, and consequently the layer will be discussed as a whole. It will be remembered from the discussion of the stratigraphy that this layer was composed of different-colored bands. However, the density of artifact distribution was uniform throughout these bands, and no occupation horizons were present.

In figure 25 a certain amount of lumping has been done to facilitate comparisons. The category labelled "heavy duty" combines core scrapers and choppers. The "other small tool" category includes the unidentified tools, burins, the pointed tool, triangular tool, and nosed tools. Minimally trimmed flakes, chips, and chunks are combined in the "minimally trimmed" category, and biface butts and tips are included in the "fragment" category. The "other biface" category combines the tools called simply "bifaces," as well as the chisel-ended, amorphous, twisted-bit, gouge-ended, and beaked bifaces and push planes. These categories do not duplicate exactly those used by others (Kleindienst: 1961 and 1962; Clark: 1964a; Howell and Clark: 1963), but the attempt has been made to present the Montagu material in a format that will allow comparisons to be made with these other publications yet still describe the assemblage adequately. In any case, the raw figures are present in the descriptions, and they can be organized differently if the reader desires.

Scrapers are the most frequently occurring type of tool, and when they are divided into large and small, the small scrapers are still the most frequent—16.8 percent. The correlation tables for scrapers show that for both the large and small categories the type of scraper most often found was a piece of angular waste trimmed on one side. These correlation tables for large and small scrapers from Layer 3 indicate the same set of relationships as among the scrapers from Layers 1 and 2. Most commonly a piece of angular waste was trimmed along one side to a steep unifacial edge. These tools seem to represent a very simple solution to a problem in that the most common artifact form was modified in the most obvious place. Among the artifacts from Layer 3, more than half were classified as angular waste (fig. 26). Hand-axes and large scrapers occur almost as often as scrapers, 14.5 percent and 14 percent respectively. These are followed closely in frequency by the cleavers, other

TABLE 6

Correlations of Size with Selected Attributes of Layer 3 Scrapers

Primary Form	Location of Trimming											
	One End		One Side		Two Sides		End and Side		Other		Total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
	Small Scrapers											
Angular waste	0	0.0	58	61.1	0	0.0	0	0.0	0	0.0	58	61.1
Flakes	0	0.0	23	24.2	1	1.1	0	0.0	1	1.1	25	26.4
Flake fragments	0	0.0	9	9.5	0	0.0	0	0.0	0	0.0	9	9.5
Other	0	0.0	3	3.1	0	0.0	0	0.0	0	0.0	3	3.1
Total	0	0.0	93	97.9	1	1.1	0	0.0	1	1.1	95	
	Large Scrapers											
Angular waste	0	0.0	33	40.2	0	0.0	0	0.0	0	0.0	33	40.2
Flakes	2	2.4	30	36.6	2	2.4	0	0.0	1	1.2	35	42.6
Flake fragments	0	0.0	11	13.4	1	1.2	0	0.0	0	0.0	12	14.6
Other	0	0.0	2	2.4	0	0.0	0	0.0	0	0.0	2	2.4
Total	2	2.4	76	92.6	3	3.6	0	0.0	1	1.2	82	

TABLE 7

Tools and Cores from Layer 3

	12	13	15	16	17a	17b	17
Hand-axes and hand-axe flakes	8	2	6	11	4	-	51
Cleavers and cleaver flakes	9	2	6	9	2	2	45
Knives	1	-	-	4	1	-	-
Discoids	1	-	-	2	-	-	-
Large scrapers	7	1	11	12	4	2	46
Core scrapers	3	-	2	1	-	1	1
Choppers	3	-	-	2	-	-	-
Core choppers	3	-	-	-	-	-	-
Small scrapers	3	2	15	25	1	2	46
Nosed tools	-	-	2	1	-	-	2
Pointed tool	-	-	-	1	-	-	-
Burins	-	-	-	1	-	-	1
Point	-	-	-	-	-	-	1
Triangular tool	-	-	-	-	-	-	1
Unidentified	1	-	-	-	-	-	-
Minimally trimmed flakes	7	-	3	6	7	-	18
Minimally trimmed chips	2	-	-	1	-	-	2
Minimally trimmed chunks	2	-	3	1	-	-	8
Biface tips	3	-	2	7	1	-	20
Biface butts	3	-	-	7	1	-	21
Bifaces	3	-	-	4	2	1	24
Chisel-ended bifaces	1	-	2	-	-	1	8
Push planes	1	-	1	-	1	-	3
Amorphous bifaces	1	-	2	1	-	-	2
Beaked bifaces	1	-	-	-	-	-	7
Twisted-bit bifaces	-	-	-	-	-	-	2
Gouge-ended bifaces	2	-	-	-	-	-	1
Single-platform core	-	-	-	-	-	-	1
Disc cores	13	2	6	5	2	1	40
Formless cores	1	1	4	2	-	-	3
Irregular cores	-	-	-	1	-	-	9
Biconical cores	5	-	3	4	2	-	8
Struck core	-	-	-	-	-	-	1
Spindle core	-	-	1	-	-	-	-
Split-cobble core	-	-	-	-	-	-	1
Pebble core	-	1	-	-	-	-	-
Totals	84	11	69	108	28	10	381

bifaces, biface fragments, and minimally trimmed pieces. Knives, discoids, heavy-duty tools, and other small tools, each make up less than 3 percent of the total tools (see fig. 25).

As pointed out in the descriptions, the biface butt category contains those objects that are broken bifaces and are too fragmentary to permit their placement in one of the more specific categories, such as hand-axe or cleaver. It is interesting to note that 60.5 percent of the hand-axe tips are of "fine" or "very fine" workmanship, whereas only 36.7 percent of the complete hand axes are "fine" or "very fine."

Undoubtedly the most striking feature of the assemblage from this layer is the tremendous amount of waste. Of the 66,816 artifacts recovered, 99.1 percent are waste, and of this 50.5 percent are chips. Cores account for 0.1 percent of the waste and are subdivided by shape in figure 27. Disc and biconical cores are the prevalent types, with the former occurring more frequently. Forty-eight percent of the flakes are end-struck and fifty-two percent side-struck.

The objection may be raised that the minimally trimmed pieces should not have been included with the tools but placed in a special "modified" category. This was not done, however, because the resulting histogram would make it very difficult to compare the minimally trimmed pieces with the rest of the assemblage because of the large quantity of waste. When placed in a separate category, the minimally trimmed pieces account for only 0.08 percent of the total assemblage, and this completely obscures the fact that there are nearly as many minimally trimmed pieces as hand-axes or cleavers.

There is very little utilized material, the primary form utilized most frequently being a chunk. Hammerstones and anvils combined make up 13.7 percent of the utilized pieces.

LAYER 5 DESCRIPTION

The definitions used for the Layer 3 material apply here, and where new categories are used, they are defined below.

Tools
(1166)

Hand-axes (165, 14.2%; plates XXIX:1; XXXII:2-3; XXXIII:2-4; XXXIV:1; XXXVII:1-2; XXXVIII:3; XXXIX:1, 4; XLIII:1; XLIV:1; XLV:2; XLVI:1; XLVII:1, 6; XLVIII:5; XLIX:4; L:1; LIII:3)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-31 cm.	16.6 cm.	4.4 cm.	—
Width	3-17 cm.	9.3 cm.	2.0 cm.	—
Thickness	2-12 cm.	5.2 cm.	1.5 cm.	—
W/L	23-91	55	8.3	50
T/W	29-133	56	10.5	50

Primary form	No.	Percent
Chunks	1	0.6
End-struck flakes	3	1.8
Side-struck flakes	8	4.9
Unidentifiable	153	92.6
Trimmed face		
Parti-bifacial	31	18.8
Unifacial	2	1.2
Bifacial	132	80.0
Butt trimming		
Untrimmed	31	18.8
Unifacial	14	8.5
Cortex	4	2.4
Partially trimmed	8	4.8
Partially trimmed on dorsal face	3	1.8
Partially trimmed on ventral face	3	1.8
Bifacial	102	61.8
Condition		
Broken	15	9.1
Whole	150	90.9

Plan	No.	Percent
Irregular	1	0.6
Ovate	11	6.6
Long ovate	39	23.8
Irregular long ovate	10	6.1
Asymmetrical long ovate	5	3.0
Irregular ovate	4	2.4
Broad ovate	3	1.8
Asymmetrical ovate	3	1.8
Lanceolate	40	24.2
Asymmetrical lanceolate	11	6.6
Irregular lanceolate	4	2.4
Narrow lanceolate	1	0.6
Block-shaped	1	0.6
Double-pointed	2	1.2
Asymmetrical ovate-acuminate	3	1.8
Ovate-acuminate	8	4.8
Pointed	3	1.8
Sub-triangular	16	9.8
Finish		
Rough	50	30.3
Fine	24	14.5
Very fine	7	4.2
Coarse	84	50.9

Hand-axe Flakes (10, 0.9%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	14-21 cm.	17.0 cm.	2.6 cm.	—
Width	7-12 cm.	10.0 cm.	1.5 cm.	—
Thickness	3-6 cm.	5.1 cm.	1.1 cm.	—
W/L	53-80	66	9.6	
T/W	44-60	52	5.8	

Primary form	No.	Percent
Unidentifiable	2	20.0
End-struck flakes	3	30.0
Side-struck flakes	5	50.0
Trimmed face		
Unifacial	1	10.0
Trimmed on ventral face	6	60.0
Trimmed on dorsal face	3	30.0

Plan	No.	Percent
Ovate	1	10.0
Asymmetrical long ovate	1	10.0
Triangular	1	10.0
Long ovate	2	20.0
Lanceolate	2	20.0
Irregular long ovate	2	20.0
Irregular lanceolate	1	10.0

Butt trimming	No.	Percent	Finish	No.	Percent
Bifacial	3	30.0	Coarse	3	30.0
Untrimmed	4	40.0	Fine	5	50.0
Trimmed on ventral face	2	20.0	Rough	2	20.0
Cortex	1	10.0			

Cleavers (160, 13.7%; plates XXIX:5; XXX:1; XXXII:1, 4; XXXIII:1; XXXVI:1; XXXVIII:2; XXXIX:3, 5; XLII:1; XLIII:3-5; XLV:1, 4-5; XLVIII:1-2; L:2; LI:1)

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-28 cm.	17.5 cm.	4.1 cm.	—
Width	5-16 cm.	10.3 cm.	2.2 cm.	—
Thickness	2-11 cm.	5.1 cm.	1.2 cm.	—
W/L	42-100	60	9.2	50
T/W	27-110	51	10.9	50

Primary form	No.	Percent
Chunks	2	1.2
End-struck flakes	8	5.0
Side-struck flakes	41	25.8
Unidentifiable	109	68.1
Butt trimming		
Untrimmed	40	25.0
Partially trimmed	8	5.0
Partially trimmed on dorsal face	4	2.5
Partially trimmed on ventral face	6	3.8
Trimmed unifacially	11	6.8
Cortex	1	0.6
Bifacially trimmed	90	56.2
Butt shape		
Square butts	35	21.9
V-butts	25	15.6
Irregular butt	1	0.6
Truncated Vs	2	1.2
U-butts	97	60.6
Bit		
Straight	58	36.3
Guillotine to the right	32	20.0
Guillotine to the left	33	20.6
Quillotine	31	19.3
Concave	1	0.6
Convex	5	3.1

Plan	No.	Percent
Irregular	1	0.6
Asymmetrical convergent	10	6.2
Convergent	31	19.3
Ultra-convergent	19	11.9
Irregular convergent	4	2.5
Asymmetrically ultra-convergent	8	5.0
Irregular parallel	6	3.8
Parallel	54	33.8
Asymmetrical parallel	20	12.5
Divergent	6	3.7
Asymmetrically divergent	1	0.6
Trimmed face		
Trimmed on dorsal face	1	0.6
Parti-bifacial	35	21.9
Unifacial	1	0.6
Bifacial	123	76.8
Platforms (64 pieces)		
Reduced	18	28.2
Removed	29	45.4
Plain	17	26.6
Finish		
Rough	38	23.8
Fine	30	18.7
Very fine	1	0.6
Coarse	91	56.8

Cleaver Flakes (24, 2.1%; plates XXXVIII:1; XLVII:3)

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-26 cm.	17.1 cm.	3.7 cm.	—
Width	7-15 cm.	10.7 cm.	1.9 cm.	—
Thickness	3-7 cm.	4.9 cm.	1.1 cm.	—
W/L	47-87	62	9.7	60
T/W	31-75	46	11.2	50

Primary form	No.	Percent
End-struck flakes	5	20.8
Side-struck flakes	19	79.1
Trimmed face		
Ventral	4	16.7
Dorsal	20	83.3
Butt shape		
V-butts	10	41.6
U-butts	9	37.5
Square butts	5	20.8

Plan	No.	Percent
Short quadrilateral	1	4.2
Irregular	1	4.2
Convergent	1	4.2
Parallel-sided	14	58.3
Divergent	2	8.3
Asymmetrically parallel	3	12.5
Ultra-convergent	1	4.2
Asymmetrically divergent	1	4.2
Finish		
Coarse	18	75.0
Rough	3	12.5
Fine	3	12.5

Butt trimming	No.	Percent
Bifacially trimmed	3	12.5
Untrimmed	11	45.7
Trimmed on dorsal face	8	33.3
Cortex	1	4.2
Unifacially trimmed	1	4.2

Bits	No.	Percent
Straight	9	37.5
Guillotine to the right	5	20.8
Guillotine to the left	7	29.1
Guillotine	1	4.2
Splayed	1	4.2
Convex	1	4.2

Knives (26, 2.2%; plates XXXV:3; XLIV:5; XLIX:2)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-23 cm.	14.9 cm.	3.7 cm.	—
Width	5-11 cm.	8.1 cm.	1.7 cm.	—
Thickness	3-6 cm.	4.4 cm.	0.8 cm.	—
W/L	42-83	55	8.3	53
T/W	33-80	56	10.5	50

Primary form	No.	Percent
Chunk	1	3.8
End-struck flakes	1	3.8
Side-struck flakes	1	3.8
Split flakes	3	11.5
Unidentifiable	20	76.9
Trimmed face		
Parti-bifacial	2	7.7
Bifacial	24	92.2

Plan	No.	Percent
Irregular	1	3.8
Long ovate	1	3.8
Lanceolate	1	3.8
Round	1	3.8
Sub-quadrilateral	1	3.8
Pointed	14	53.8
Asymmetrical lanceolate	1	3.8
Elongate	3	11.5
End and side knives	3	11.5

Discoids (2, 0.2%; plate XXXV:1)

Both are round and bifacial, one parti-bifacial. Both are coarse.

Dimensions	Range	Mean	Standard deviation	Mode
Length	11-14 cm.	12.5 cm.	2.1 cm.	—
Width	10-12 cm.	11.0 cm.	1.4 cm.	—
Thickness	5 cm.	5.0 cm.	0.0 cm.	—
W/L	86-91	88	2.5	
T/W	42-50	46	4.1	

Scrapers (215, 18.4%; plates XXIX:3; XXXI:2-4; XXXIV:2; XXXIX:2; XLI:3; XLII:3-4,6; XLV:3,6; XLVII:2; XLVIII:4; XLIX:5; LII:2; LIII:2)

Dimensions	Range	Mean	Standard deviation	Mode
Length	4-25 cm.	10.1 cm.	3.3 cm.	—
Width	2-24 cm.	8.4 cm.	3.3 cm.	—
Thickness	1-13 cm.	3.9 cm.	1.5 cm.	—
W/L	41-220	83	30.1	100
T/W	20-100	50	18.8	50

Primary form	No.	Percent
Unidentifiable	13	6.1
Chips	21	9.8
End-struck flakes	25	11.6
Side-struck flakes	27	12.5
Split flakes	16	7.4
Snapped flakes	4	1.9
Split and snapped flakes	1	0.5
Chunks	108	50.2
Trimmed face		
Dorsal	75	34.9
Ventral	34	15.8
Bifacial	3	1.4
Unifacial	103	47.8

Location of trimming	No.	Percent
Trimmed two sides	28	13.0
Proximal	2	0.9
One end	21	9.8
Two sides and one end	2	0.9
Corner	8	3.7
End and side	10	4.6
Two ends	1	0.5
Distal end	7	3.3
Distal end and two sides	2	0.9
Distal side	18	8.4
Distal side and one end	1	0.5
Proximal side	3	1.4
One side	112	52.1
Condition		
Complete	214	99.5
Broken	1	0.5

Core Scrapers (27, 2.3%; plates XXIX:4; XLIV:3; LIII:4)

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-17 cm.	10.5 cm.	2.9 cm.	—
Width	2-11 cm.	7.6 cm.	2.0 cm.	—
Thickness	4-19 cm.	6.6 cm.	2.8 cm.	—
W/L	17-100	77	21.3	100
T/W	50-300	93	49.2	63, 83, 86, 100

Primary form	No.	Percent
Unidentifiable	1	3.7
Chunks	26	96.3

Location of trimming	No.	Percent
One side	15	55.5
Two sides	3	11.5
One end and one side	4	14.7
One end	4	14.7
Corner	1	3.7

Hand-axe Choppers (4, 0.3%; plates XLI:1, 4; XLVIII:5)

This term has been used by Clark (see comparative section) to describe large, rough, pointed tools usually with little or no trimming at the butt. The tools from Montagu in this category are large, usually have linguate tips and untrimmed butts, lack the keeled points of beaked bifaces, and lack the fine trimming around the tip found on core-axes. All are bifacial and rough.

Dimensions	Range	Mean	Standard deviation	Mode
Length	13-22 cm.	15.7 cm.	4.2 cm.	—
Width	10-15 cm.	12.0 cm.	2.2 cm.	—
Thickness	5-7 cm.	6.0 cm.	1.2 cm.	—

No W/L or T/W figures are available for these tools.

Primary form	No.	Percent
Chunks	2	50.0
Unidentifiable	2	50.0

Plan	No.	Percent
Sub-triangular	2	50.0
Convergent	1	25.0
Pointed	1	25.0

Choppers (51, 4.4%; plates XXX:2; XXXVII:4; LII:4)

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-20 cm.	12.2 cm.	2.8 cm.	—
Width	6-14 cm.	9.2 cm.	1.9 cm.	—
Thickness	4-12 cm.	5.8 cm.	1.5 cm.	—
W/L	55-100	77	10.9	67, 90
T/W	40-92	63	12.3	56

Primary form	No.	Percent
Chunks	24	47.1
Side-struck flake	1	2.0
Unidentifiable	26	51.0

Location of trimming	No.	Percent
Two sides	4	7.9
One end	3	5.9
One end and one side	2	3.9
One side	42	82.4

Pointed Tools (2, 0.2%)

One is made on a chip and the other on a side-struck flake. Both are bifacial. One is less than 10 cm. long.

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-23 cm.	16.0 cm.	9.9 cm.	—
Width	7-10 cm.	8.5 cm.	2.1 cm.	—
Thickness	2-6 cm.	4.0 cm.	2.8 cm.	—

No W/L or T/W figures are available for these tools.

Burin (1, 0.1%; plate XXIX:6)

This is a triangular chunk trimmed on two ends with burin flakes. Dimensions: Length 10 cm.; Width 8 cm.; Thickness 4 cm.

Nosed Tools (3, 0.3%)

All are made on chunks and are unifacial. Two are trimmed on one side and one on a corner. One is less than 10 cm. long.

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-15 cm.	11.3 cm.	5.5 cm.	—
Width	4-10 cm.	7.3 cm.	3.0 cm.	—
Thickness	3-8 cm.	5.3 cm.	2.5 cm.	—

No W/L or T/W figures are available for these tools.

Minimally Trimmed Flakes (94, 8.1%; for illustration see Layer 3)

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-25 cm.	12.2 cm.	4.5 cm.	—
Width	4-24 cm.	11.5 cm.	3.9 cm.	—
Thickness	2-10 cm.	4.3 cm.	1.0 cm.	—
W/L	50-200	102	37.8	100
T/W	15-92	38	10.4	38, 40

Primary form	No.	Percent
Unidentifiable flakes	20	21.3
End-struck flakes	18	19.1
Split flakes	8	8.5
Snapped flakes	5	5.2
Split and snapped flakes	1	1.1
Side-struck flakes	42	44.7

Trimmed face	No.	Percent
Ventral	31	32.9
Dorsal	7	7.5
Parti-bifacial	6	6.4
Bifacial	50	53.2
Platforms		
Removed	63	67.0
Reduced	17	18.1
Plain	14	14.9

Minimally Trimmed Chips (4, 0.3%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	10-14 cm.	12.3 cm.	1.7 cm.	—
Width	7-12 cm.	8.5 cm.	2.4 cm.	—
Thickness	2-4 cm.	3.2 cm.	0.9 cm.	—
W/L	50-92	70	16.8	
T/W	29-50	39	8.3	

Trimmed face	No.	Percent
Ventral face	1	25.0
Unifacial	1	25.0
Bifacial	2	50.0

Minimally Trimmed Chunks (77, 6.6%; plate XL:1)

Dimensions	Range	Mean	Standard deviation	Mode
Length	6-27 cm.	13.1 cm.	4.3 cm.	—
Width	4-18 cm.	9.0 cm.	2.6 cm.	—
Thickness	2-13 cm.	4.9 cm.	1.7 cm.	—
W/L	26-110	71	17.0	100
T/W	30-129	56	16.6	50

Trimmed face	No.	Percent
Dorsal	2	2.6
Ventral	2	2.6
Unifacial	14	18.2
Parti-bifacial	2	2.6
Bifacial	57	74.0

Biface Butts (67, 5.7%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-20 cm.	11.7 cm.	4.9 cm.	—
Width	6-14 cm.	9.4 cm.	3.7 cm.	—
Thickness	3-7 cm.	5.0 cm.	1.7 cm.	—

Finish	No.	Percent	Trimmed face	No.	Percent
Rough	18	26.9	Unifacial	3	4.5
Fine	2	3.0	Parti-bifacial	3	4.5
Coarse	47	70.0	Bifacial	61	91.0

Biface Tips (63, 5.4%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	4-20 cm.	7.5 cm.	2.8 cm.	—
Width	3-10 cm.	5.9 cm.	1.8 cm.	—
Thickness	2-7 cm.	3.2 cm.	1.1 cm.	—

Trimmed face	No.	Percent	Finish	No.	Percent
Dorsal	3	4.8	Rough	19	30.2
Unifacial	2	3.2	Fine	10	15.9
Parti-bifacial	2	3.2	Very fine	2	3.2
Bifacial	56	88.9	Coarse	28	44.4
			Unrecorded	4	6.4

Cleaver Bits (2, 0.2%)

These are fragments of broken cleavers.

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-10 cm.	8.5 cm.	2.1 cm.	—
Width	10 cm.	10.0 cm.	0.0 cm.	—
Thickness	4-5 cm.	4.5 cm.	0.7 cm.	—

Amorphous Bifaces (5, 0.4%)

On all the primary form is unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	18-25 cm.	20.8 cm.	2.7 cm.	—
Width	8-12 cm.	10.6 cm.	1.7 cm.	—
Thickness	5-7 cm.	6.0 cm.	0.7 cm.	—
W/L	44-67	54	8.3	
T/W	47-60	54	7.1	

Trimmed face	No.	Percent
Dorsal face	1	20.0
Bifacial	4	80.0

Chisel-ended Bifaces (21, 1.8%; plates XXXV:2; XLIII:2)

On all the primary form is unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-29 cm.	14.0 cm.	4.5 cm.	—
Width	5-14 cm.	8.8 cm.	2.1 cm.	—
Thickness	3-8 cm.	5.1 cm.	1.4 cm.	—
W/L	44-80	59	10.6	47, 63, 67
T/W	44-86	61	12.8	50, 60

Plan	No.	Percent
Irregular	1	4.8
Ovate	1	4.8
Lanceolate	1	4.8
Convergent	8	38.1
Parallel-sided	3	14.3
Sub-quadrilateral	1	4.8
Elongate	3	14.3
Irregular convergent	1	4.8
Asymmetrical convergent	1	4.8
Irregular parallel	1	4.8

Trimmed face	No.	Percent
Bifacial	18	85.7
Parti-bifacial	3	14.3

Butt trimming	No.	Percent
Bifacial	13	61.9
Untrimmed	5	23.9
Partially, on the dorsal face	1	4.8
Partially, on the ventral face	1	4.8
Partially, on both faces	1	4.8

Finish	No.	Percent
Rough	9	42.8
Coarse	11	52.4
Fine	1	4.8

Gouge-ended Bifaces (9, 0.8%)

On all the primary form is unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	10-15 cm.	11.4 cm.	1.7 cm.	—
Width	6-11 cm.	8.1 cm.	1.3 cm.	—
Thickness	4-6 cm.	5.0 cm.	0.7 cm.	—
W/L	46-110	76	19.0	80
T/W	36-83	61	15.4	63

Plan	No.	Percent
Irregular	1	11.1
Ovate	1	11.1
Lanceolate	1	11.1
Convergent	3	33.3
Parallel-sided	1	11.1
Elongate	2	22.2

Trimmed face	No.	Percent
Bifacial	8	88.8
Parti-bifacial	1	11.1

Finish	No.	Percent
Rough	5	55.5
Coarse	4	44.4

Beaked Bifaces (38, 3.3%; plates XXXVI:3; XLVI:3; LII:1)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-20 cm.	14.4 cm.	3.0 cm.	—
Width	4-14 cm.	9.5 cm.	2.2 cm.	—
Thickness	3-11 cm.	6.0 cm.	1.7 cm.	—
W/L	36-100	71	14.1	56, 80
T/W	38-150	65	22.1	50, 56, 60

Primary form	No.	Percent
Chunks	7	18.4
End-struck flake	1	2.6
Side-struck flake	1	2.6
Unidentifiable	29	76.4
Plan		
Triangular	1	2.6
Ovate	1	2.6
Long ovate	1	2.6
Pointed	21	55.4
Sub-triangular	8	20.5
Elongate	3	7.9
Asymmetrical ovate	1	2.6
Broad ovate	1	2.6
Block-shaped	1	2.6

Trimmed face	No.	Percent
Bifacial	25	65.8
Parti-bifacial	7	18.4
Dorsal face	6	15.7
Butt trimming		
Bifacial	13	34.2
Untrimmed	13	34.2
Partial, on dorsal face	3	7.9
Partial, on ventral face	1	2.6
Unifacial	1	2.6
Cortex	3	7.9
Partial	4	10.5
Finish		
Rough	24	63.2
Coarse	14	36.8

Twisted-Bit Bifaces (6, 0.5%; plate XXX:6)

On all the primary form is unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	10-18 cm.	12.7 cm.	3.8 cm.	—
Width	7-11 cm.	8.7 cm.	1.5 cm.	—
Thickness	3-9 cm.	5.5 cm.	2.2 cm.	—
W/L	47-110	71	24.1	
T/W	50-82	69	11.8	

Plan	No.	Percent
Convergent	1	16.7
Parallel-sided	1	16.7
Sub-triangular	1	16.7
Elongate	1	16.7
Irregular ovate	1	16.7
Broad ovate	1	16.7

Butt trimming	No.	Percent
Trimmed	5	83.3
Untrimmed	1	16.7
Finish		
Rough	2	33.3
Coarse	4	66.6

Double-Pointed Bifaces (3, 0.3%)

On all the primary form is unidentifiable. All are bifacial

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-10 cm.	9.0 cm.	1.7 cm.	—
Width	5-11 cm.	7.0 cm.	3.5 cm.	—
Thickness	3-5 cm.	3.6 cm.	1.6 cm.	—
W/L	50-110	77	24.8	
T/W	27-100	62	29.7	

Plan	No.	Percent
Irregular	1	33.3
Pointed	1	33.3
Elongate	1	33.3

Finish	No.	Percent
Fine	1	33.3
Rough	1	33.3
Coarse	1	33.3

Push Planes (16, 1.4%; plates XXXV:4; XLI:2)

Dimensions	Range	Mean	Standard deviation	Mode
Length	9-19 cm.	14.4 cm.	3.4 cm.	—
Width	5-13 cm.	9.3 cm.	2.3 cm.	—
Thickness	4-10 cm.	6.2 cm.	1.6 cm.	—
W/L	50-80	64	7.6	59
T/W	38-111	70	16.9	60

Primary form	No.	Percent
Unidentifiable	13	81.2
End-struck flake	1	6.3
Side-struck flakes	2	12.5
Trimmed face		
Dorsal	6	37.5
Bifacial	9	56.2
Parti-bifacial	1	6.3
Finish		
Rough	4	25.0
Coarse	11	68.7
Fine	1	6.3

Plan	No.	Percent
Convergent	6	37.5
Parallel-sided	5	31.2
Elongate	2	12.5
Irregular convergent	2	12.5
Asymmetrical ovate	1	6.3
Butt trimming		
Bifacial	8	50.0
Untrimmed	5	31.2
Partial, on the dorsal face	1	6.3
Unifacial	2	12.5

Bifaces (70, 6.0%; plates XXXI:1; XLVII:4; XLIX:1, 3)

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-22 cm.	11.3 cm.	4.2 cm.	—
Width	3-12 cm.	7.7 cm.	2.1 cm.	—
Thickness	2-8 cm.	4.3 cm.	1.5 cm.	—
W/L	45-100	69	13.7	60, 67
T/W	38-88	59	14.6	63, 67

Primary form	No.	Percent
Chunks	2	2.9
Side-struck flakes	2	2.9
Unidentifiable	66	94.2
Plan		
Irregular	10	14.3
Ovate	7	10.0
Long ovate	2	2.9
Lanceolate	2	2.9
Parallel-sided	7	10.0
Semicircular	2	2.9
Pointed	10	14.3
Sub-triangular	5	7.2
Elongate	15	21.4
Asymmetrical long ovate	2	2.9
Irregular ovate	7	10.0
Asymmetrical ovate	1	1.4

Trimmed face	No.	Percent
Parti-bifacial	6	8.6
Unifacial	2	2.9
Bifacial	62	88.6
Condition		
Broken	15	21.4
Whole	55	78.6
Finish (of 15 broken pieces)		
Rough	4	26.6
Coarse	3	20.0
Very fine	1	6.6
Unrecorded	7	46.6
Finish (of 55 complete pieces)		
Coarse	26	47.3
Rough	21	38.2
Fine	2	3.6
Unrecorded	6	10.9

Cores
(291)

Single platform Cores (4, 1.4%)

All are unifacial

Dimensions	Range	Mean	Standard deviation	Mode
Length	6-12 cm.	8.2 cm.	2.6 cm.	—
Width	4-7 cm.	5.5 cm.	1.2 cm.	—
Thickness	2-5 cm.	3.7 cm.	1.5 cm.	—
W/L	33-88	73	22.6	
T/W	50-100	68	20.5	

Primary form	No.	Percent
Chunk	2	50.0
End-struck flake	1	25.0
Unidentifiable	1	25.0

Location of trimming	No.	Percent
One end	1	25.0
One side	3	75.0

Disc Cores (170, 58.4%; plates XXIX:2; XXXI:5; XXXIV:3; XXXVII:3; XLIV:4; XLVII:5; LI:2-3)

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-22 cm.	9.8 cm.	2.6 cm.	—
Width	4-16 cm.	8.2 cm.	2.0 cm.	—
Thickness	2-13 cm.	4.7 cm.	1.4 cm.	—
W/L	24-130	85	12.9	100
T/W	33-175	59	15.0	50

Primary form	No.	Percent
Chunks	5	2.9
End-struck flakes	1	0.6
Side-struck flakes	1	0.6
Unidentifiable	163	95.9
Trimmed face		
Unifacial	24	14.1
Trimmed dorsal	6	3.5
Parti-bifacial	39	22.9
Bifacial	101	59.4

Plan	No.	Percent
Triangular	3	1.8
Irregular	20	11.8
Ovoid	42	24.7
Semicircular	5	2.9
Sub-quadrilateral	15	8.7
Sub-triangular	2	1.1
Elongate	10	5.9
Round	73	42.9

Formless Cores (14, 4.8%; plate XXX:3)

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-16 cm.	10.9 cm.	2.8 cm.	—
Width	5-16 cm.	8.5 cm.	3.1 cm.	—
Thickness	4-11 cm.	6.7 cm.	2.0 cm.	—
W/L	50-108	78.0	15.8	67
T/W	63-117	81.1	15.4	—

Primary form	No.	Percent
Chunks	8	56.1
Unidentifiable	6	43.9

Irregular Cores (12, 4.1%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	7-14 cm.	9.8 cm.	2.2 cm.	—
Width	5-11 cm.	7.4 cm.	1.6 cm.	—
Thickness	2-7 cm.	4.1 cm.	1.3 cm.	—
W/L	54-90	77	11.2	71, 78, 89
T/W	33-100	58.3	26.9	71

Primary form	No.	Percent
Unidentifiable	9	75.0
Chunks	3	25.0

Trimmed face	No.	Percent
Bifacial	7	58.3
Unifacial	3	25.0
Parti-bifacial	2	16.7

Biconical Cores (80, 27.5%; plates XXX:5; XXXV:5; XLII:5; XLVI:2; LII:5)

Dimensions	Range	Mean	Standard deviation	Mode
Length	5-29 cm.	9.9 cm.	3.3 cm.	—
Width	5-18 cm.	7.9 cm.	2.0 cm.	—
Thickness	2-13 cm.	5.7 cm.	1.4 cm.	—
W/L	29-120	82	13.8	100
T/W	25-120	74	14.2	83

Primary form	No.	Percent
Chunk	1	1.3
Unidentifiable	79	98.8

Trimmed face	No.	Percent
Dorsal	1	1.3
Ventral	1	1.3
Unifacial	5	6.3
Parti-bifacial	10	12.5
Bifacial	63	78.8

Plan	No.	Percent
Ovoid	26	32.5
Semicircular	7	8.8
Sub-quadrilateral	1	1.3
Irregular	1	1.3
Elongate	10	12.5
Round	35	43.8

Plano-Convex Cores (9, 3.2%; plates XL:2; XLII:2; LIII:1)

The distinctive traits of these cores are their plano-convex cross section and radial trimming on the plano-, or flatter, face. In addition to the radial trimming on the flat face, they are often trimmed on one side on the convex face. These cores closely resemble unstruck examples of Victoria West cores.

On all the primary form is unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	6-22 cm.	13.1 cm.	5.1 cm.	—
Width	6-17 cm.	9.9 cm.	3.4 cm.	—
Thickness	3-10 cm.	5.8 cm.	2.0 cm.	—
W/L	56-100	79	15.7	67
T/W	42-78	59	10.7	50

Plan	No.	Percent
Irregular	1	11.1
Ovoid	1	11.1
Round	2	22.2
Sub-quadrilateral	1	11.1
Sub-triangular	2	22.2
Elongate	2	22.2

Trimmed face	No.	Percent
Parti-bifacial	6	66.6
Bifacial	1	11.1
Dorsal	1	11.1
Ventral	1	11.1

Spindle Cores (2, 0.7%)

Both are bifacial, and the primary form is unidentifiable.

Dimensions	Range	Mean	Standard deviation	Mode
Length	11-15 cm.	13.0 cm.	2.8 cm.	—
Width	6-7 cm.	6.5 cm.	0.7 cm.	—
Thickness	4-5 cm.	4.5 cm.	0.7 cm.	—
W/L	47-55	51	39.3	
T/W	57-83	70	13.0	

Utilized Pieces
(83)

Polyhedral (1, 1.2%)

Dimensions: Length 6 cm.; Width 5 cm.; Thickness 4 cm.

Hammerstones (73, 88%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	6-16 cm.	10.3 cm.	2.1 cm.	—
Width	5-13 cm.	8.5 cm.	1.7 cm.	—
Thickness	4-9 cm.	6.2 cm.	1.3 cm.	—
W/L	58-113	83	11.6	100
T/W	38-114	74	15.6	71

Primary form: 23 chunks (31.5%); 50 pebbles (68.5%)

Anvils (9, 10.8%)

Dimensions	Range	Mean	Standard deviation	Mode
Length	11-19 cm.	14.9 cm.	2.7 cm.	—
Width	10-14 cm.	11.9 cm.	1.4 cm.	—
Thickness	4-15 cm.	9.1 cm.	3.3 cm.	—
W/L	63-109	84	13.7	87
T/W	54-125	88	22.2	—

Primary form: 7 boulders (77%); 2 chunks (22%).

LAYER 5 DISCUSSION

Within Layer 5 four occupation horizons were discovered and exposed. As discussed above, these horizons or surfaces appeared as concentrations of tools within a stratigraphic unit and were excavated as separate entities within the band in which they occurred. Layer 5 consisted of four bands, in each of which an occupation surface was discovered. The surfaces were numbered serially from top to bottom in the site so that surfaces I through VII occur in Layer 2 and surfaces VIII through XI in Layer 5.

A total of 1,468 artifacts were present on surface VIII, comprising 1,405 pieces of waste, 14 cores, 6 utilized pieces, and 43 tools. A more detailed breakdown appears in figures 28, 29, and 30. Although no obvious activity areas appear on the plot drawn of this surface (see fig. 31), there is a concentration of waste in squares 30 E and F and a cluster of larger pieces of waste as well as some tools nearby in the four squares 20 and 25 E and F. The assemblage from surface VIII closely approximates that of Layer 5 as a whole, with the exception of the hand-axes; only two hand-axes are present on surface VIII, but no great significance is attached to this since the number of tools is fairly small, and thus the presence or absence of a small number of tools makes a considerable difference in the percentages.

In the band below surface VIII, surface IX was discovered. Of the 1,424 artifacts on this surface, only 1.2 percent (17) were tools. The assemblage resembles that of the layer as a whole less than was the case with surface VIII, but again this is probably owing to the small size of the sample. The assemblage on surface IX taken as a whole, however, does generally resemble that of Layer 5 in two characteristics: the presence of the large amount of waste and nearly as many minimally trimmed and broken pieces as hand-axes and cleavers (see figs. 32, 33, and 34). There are several clusters of artifacts evident on the plot, one of large flakes or flake fragments in square 35 F, another of smaller pieces in 30 F, and yet another in 25 F. Unlike most of the other surfaces, in this surface there are more trimmed pieces in the 25 and 30 squares, nearer the front of the cave, than in the back part of the 30 and 35 squares toward the back of the cave (see fig. 35).

Surface X had a greater number of artifacts present, 1,812, than either surfaces VIII or IX, but again the assemblage is much like that of the whole layer (see figs. 36, 37, and 38). The percentage of tools present on this surface is greater than on any of the others, 5.8 percent, as opposed to 4.4 percent on surface XI and 1.3 percent on Layer 5 as a whole, and there are slightly more hand-axes and cleavers. There are concentrations of artifacts in the four squares 30 and 35 F and G and in 20 and 25 G as well (see fig. 39).

There was evidence of compaction in Layer 5 and this was particularly evident on surface X. The material in the deposit had been pushed down around large fallen rocks, but there was no evidence of any rearrangement of the artifacts, and the artifacts were plotted as if the surface had been flat. In other words, no attempt was made to make the plot look the way the surface would have appeared if photographed from above as we uncovered it. Instead the measurements were made along the dips and humps of the surface rather than across them.

The greatest number of artifacts present on any surface was found on surface XI, where 3,322 were recovered. Here again the assemblage is practically identical with those of the other surfaces, as an examination of figures 40, 41, and 42 will show. There are two very dense concentrations of artifacts, one in square 30 E and one in 35 F, and another concentration, this time of large tools and flakes, occurs next to the wall of the cave in square 25 G. The rest of the surface is more or less evenly covered with artifacts. Because of the extreme density of artifacts on this surface three plots are reproduced rather than

TABLE 8

Tools and Cores from Layer 5

	Surface VIII	Below Surface VIII	Above Surface IX	Surface IX	Below Surface IX	Above Surface X	Surface X	Below Surface X	Above Surface XI	Surface XI	Below Surface XI	Below Surface XI Sand
Hand-axes and hand-axe flakes	2	-	29	1	15	-	21	22	1	27	57	-
Cleavers and cleaver flakes	6	1	19	3	13	-	24	21	1	33	61	2
Knives	-	-	2	-	2	-	3	4	-	7	8	-
Discoids	-	-	-	-	-	-	1	-	-	1	-	-
Large scrapers	7	-	17	4	17	1	9	18	2	17	49	-
Core scrapers	3	-	1	-	4	2	2	5	-	1	9	-
Choppers	3	-	10	-	3	-	6	6	1	3	19	-
Polyhedrals	-	-	1	-	4	-	-	-	-	-	-	-
Small scrapers	2	-	17	-	13	-	1	8	1	6	26	-
Nosed tools	-	-	-	-	-	-	-	1	-	-	2	-
Pointed tools	-	-	1	-	-	-	-	-	-	-	1	-
Burin	1	-	-	-	-	-	-	-	-	-	-	-
Unidentified	-	-	-	-	1	-	-	-	-	-	-	-
Minimally trimmed flakes	3	1	13	1	9	-	8	15	1	13	29	1
Minimally trimmed chips	-	-	2	-	-	-	-	1	-	-	2	-
Minimally trimmed chunks	3	1	19	3	15	-	5	12	1	6	11	1
Biface tips	3	-	8	2	-	-	5	8	1	4	34	1
Biface butts	2	-	10	-	8	-	7	3	1	7	29	-
Cleaver bits	-	-	-	-	-	-	-	-	-	-	2	-
Bifaces	5	-	15	1	10	-	4	10	-	4	21	-
Chisel-ended bifaces	-	-	1	-	1	-	1	4	3	2	9	-
Push planes	1	-	1	-	2	-	2	2	-	6	2	-
Amorphous bifaces	-	-	-	1	-	-	1	2	-	-	1	-
Beaked bifaces	1	-	-	1	1	-	5	10	-	5	15	-
Twisted-bit bifaces	1	-	1	-	-	-	-	1	-	1	2	-
Gouge-ended bifaces	-	-	-	-	1	-	1	1	-	3	3	-
Hand-axe/choppers	-	-	-	-	1	-	-	-	-	-	3	-
Double-pointed bifaces	-	-	-	-	1	-	-	1	-	1	-	-
Single-platform cores	-	-	2	1	1	-	-	-	-	-	-	-
Disc cores	8	-	45	5	19	-	12	21	1	8	50	1
Formless cores	2	-	-	1	1	-	-	4	-	1	6	-
Irregular cores	-	-	4	1	4	-	-	1	-	-	2	-
Biconical cores	3	-	6	4	5	-	13	13	-	11	23	2
Plano-convex cores	-	-	-	-	-	-	5	2	-	-	2	-
Spindle cores	1	-	-	-	-	-	1	-	-	-	-	-
Totals	57	3	224	29	151	3	137	196	14	167	478	8

one in order to make the distribution clearer (see figs. 43, 44, and 45).

There is always a question about how closely the sample of material from an archaeological excavation represents the original assemblage, and this is particularly true in a situation like that at Montagu, where the site has known limits and part of the deposit has been removed so that it is impossible to secure material from all parts of the site. The question could be raised as to whether the material from this excavation, which took place at one side of the cave, accurately represents the original contents of the cave. I feel, however, that since the four surfaces described here are so similar to each other and to the Layer 5 assemblage as a whole the material from this excavation is a representative sample. The alternative would be to assume that the group or groups that visited the cave always used one side for a specific activity, and this seems unlikely. At least there is no evidence from other Acheulean occupation floors that anything like that kind of specialization occurred.

Since there was no significant variation among the surfaces in Layer 5, in figures 45, 47, and 48 the layer is treated as a unit. The combinations of tool types used in discussing Layer 3 are used here as well.

Scrapers, taken together, are the most frequently occurring tool, but when divided into large and small categories, this is no longer true. Cleavers then become the single most frequent type, comprising 15.8 percent of the tools. They are followed in frequency by the minimally trimmed pieces, hand-axes, and other bifaces. Next come the large scrapers and tool fragments, which make up 11.9 percent and 11.2 percent respectively, and those are followed in frequency by the heavy duty tools, 7.1 percent, and the small scrapers, 6.6 percent. Knives, discoids, and other small tools each make up less than 3 percent, the latter two less than 1 percent.

Of the total 85,163 artifacts in Layer 5, 98.6 percent is waste. It should be pointed out here that two random samples of waste were taken, and the analysis for those units, above surface IX in band 21 and below surface IX in band 21, is based on those samples. The cores, however, were not sampled since they had been described with the tools, so the two samples were taken only of the flakes, flake fragments, chips, and chunks. Sampling was done by the coning and quartering method (White and White, 1964:64). The flakes, and so forth from a square were put on a table and inspected to remove any small tools or utilized pieces, and the material was counted. It was then thoroughly mixed and heaped into a cone. Next it was divided and a portion selected for the sample. Thirty-eight percent (4,690) of the waste from above surface IX and 58.2 percent (5,119) of the waste from below surface IX were the sizes of the two samples.

Cores comprise 0.3 percent of the waste, and the frequencies of the different types are shown in figure 49. End-struck flakes comprise 48.2 percent and side-struck flakes 51.8 percent of the flakes.

The minimally trimmed pieces have again been included with the tools rather than being put into a separate "modified" category. There are slightly more minimally trimmed pieces than there are hand-axes, but this comparison would be impossible if these trimmed pieces were not included with the tools.

Utilized pieces make up a very small part (0.1%) of the total assemblage.

COMPARISONS

LAYER 1

The term "Wilton" has been applied not only to material from South Africa but also to other assemblages, from Rhodesia, through Zambia, and into the Horn. However, the descriptions of this material in the literature are very unsatisfactory when one attempts to make detailed comparisons. Often no artifact counts are given, and when they are provided, the "types" in terms of which the counts are given are not defined, so it is virtually impossible to correlate lists of tools from one site with those from another. The inadequate state of our knowledge about the later Stone Age has recently been summarized by R. R. Inskeep (1967). The following comparisons will be, perforce, somewhat superficial.

Peringuey illustrated a crescent from the Orange Free State in 1911, and later Hewitt (1921) reported crescents from Stillbay. In the same publication, Hewitt reported the occurrence of crescents, small scrapers, ostrich-eggshell beads, and other items from a rock shelter on the farm Wilton in the eastern part of the Cape Province of South Africa. Since that time, Wilton material has been found on many sites, and hundreds of thousands of artifacts have been collected. Although much of this material has come from surface sites, several caves along the coast of South Africa have been excavated and produced Wilton assemblages. The artifacts from Layer 1 at Montagu have their closest affinities with this Wilton material.

At Khami, a stratified open site in Rhodesia, Cooke excavated a lower, a middle, and an upper Rhodesian Wilton. The lower and upper units are distinguished from the middle by differences in the technique of manufacture, the presence of "large implements" in the middle Wilton, and differences in the raw material used (Cooke, 1957:37). The three units together total only 115 tools and so the percentages listed for each unit are likely to be misleading. Crescents account for 14.6 percent to 21.9 percent and "thumbnail" scrapers" for 20.8 percent to 30.8 percent of the tools. Backed blades make up from 27.1 percent to 34.6 percent of the tools. An examination of my figure 9 will show that the percentages of tools in these Khami occurrences do not resemble the Montagu occurrence, although in general the tool types present are similar. Wilton material was also reported from two caves in Rhodesia, Pomongwe and Tshangula (Cooke, 1963), but no list or counts of the occurrences are given.

Another site, which is closer to Montagu and which contained Wilton material, is the Oakhurst shelter located in the Cape Folded region near George. Oakhurst was excavated between 1932 and 1935 by Goodwin and reported by him in 1938. He asserted that there were three units present, one above another: Smithfield B at the bottom, above this Smithfield C, and Wilton at the top. Fagan (1960) has reexamined the material and concludes that it is, in fact, homogeneous from bottom to top. Schrire (1962) points out that Fagan had not examined all the original material and concludes from her analysis that Goodwin's original assessment was correct.

The descriptions provided by Fagan and Schrire are among the most detailed for any of the "Later Stone Age" occurrences in South Africa. Although there are no definitions of the types of tools, general comparisons can be made. The Smithfield B stratum contained no crescents and so will not concern us. The occurrences that are termed Smithfield C and Wilton respectively at Oakhurst are very similar to one another; scrapers are the most common in both, and both have crescents. Schrire states, however, that the scrapers in the Smithfield C level are significantly larger than those in the Wilton level and separates the two occurrences on this basis.

At Oakhurst in the Smithfield C level, scrapers are the most numerous artifacts, comprising 86.5 percent of the tools, and the same is true of the Wilton level where they make up 69.2 percent of the tools. In Layer 1 at Montagu, scrapers account for 71.9 percent of the tools. Single crescents make up 4 percent of the tools in the Smithfield C and 13.5 percent in the Wilton, whereas at Montagu 4.4 percent of the tools are single crescents. *Outils écaillés* are found in both the Smithfield C and the Wilton where they account for 2.1 percent and 3.8 percent of the tools respectively. At Montagu *outils écaillés* make up 11.4 percent of the tools.

From this brief comparison we can see that the Smithfield C and the Wilton at Oakhurst are similar to each other and that both are similar to the Montagu

Layer 1 occurrence. More detailed comparisons are not possible because of the differences in terminology, but if we compare Schrire's figures for the size of "convex flake scrapers" with the scraper category at Montagu, we find that the mean length for Smithfield C and Wilton is between one-half and one inch, whereas Montagu Layer 1 scrapers have a mean length of 28.4 mm. or about one and one-eighth inches. Schrire's analysis also used the area of the rectangles that can be described around a scraper as an important feature for distinguishing the Smithfield C from the Wilton. This information is not presently available for the Montagu material, so that comparison cannot be made. In general, however, it is clear that the three occurrences are similar to one another. In discussing the Smithfield, Clark (1959:211) points out that the Smithfield C has been called a crescentless Wilton; yet Schrire's use of the term contradicts Clark's statement and further confuses the issue.

Another cave site is that of Matjes River, which is reported by Louw (1960). Layer C of this stratified site contained an occurrence including small scrapers and crescents. Louw compares it with the Wilton material from Oakhurst and concludes that they are the same, so the Matjes River layer C material is probably similar to Montagu as well.

Clark (1959:209 ff.) discusses the Wilton and describes a "Western Cape" Wilton, the characteristic feature of which is the double-crescent—that is, a crescent backed on both sides to two convex edges. It is interesting to note that no double crescents occur in Layer 1 at Montagu, and so such implements may not be reliable markers of a geographic unit after all.

As the number of carbon-14 dates increases, the "Later Stone Age" is pushed farther back in time. In 1959 Clark felt that the dates from the Matjes River Cave, which placed the Wilton between 5,758 ± 400 B.C., and 3,443 ± 250 B.C., were surprisingly early and suspected contamination (Clark:1959:188). Cooke, discussing the date for the Wilton at Pomongwe, says "The Later Stone Age deposit, which on all visual evidence and other criteria should be dated during the last 1,000 to 1,500 years, continues to give dates very much earlier" (1963:147). The date for the Wilton at Pomongwe is 7,610 ± 110 B.P. Montagu is no exception to this trend, and a date (GRN. 4725) for Layer 1, taken on charcoal from feature 4, is 7,100 ± 45 B.P.

Recently, H. J. Deacon (n.d.:5) has suggested that the Wilton first appears approximately 8,000-9,000 years before the present, and that it may have been preceded by an earlier "large-tool tradition" with an age of 8,000-13,000 years B.P.

From this brief resumé, the general affinities of the Layer 1 occurrence at Montagu are clear. In basic makeup and chronology it certainly falls within the Wilton Industry of the "Later Stone Age," but our knowledge of the "Later Stone Age" is so unclear that the assignment of an Industry or Phase name to the Montagu occurrence is premature. There are many questions yet to be answered, such as the relationship of the Smithfield C as represented at Oakhurst to the Wilton. Are they really different, or are they only variants of the same Industrial Complex? Similarly, what kinds of differences are there in the Wilton that are attributable to activity variation? What do the high frequencies of *outils écaillés* and scrapers at Montagu mean when compared to the large quantity of crescents at Khami? The recent work of Hilary and Janette Deacon is helping to clarify these issues.

LAYER 2

In 1927 and again in 1928 Stapleton and Hewitt published papers in which they described the artifacts recovered from a rock shelter located in the pass called Howieson's Poort near Grahamstown. This aggregate, which was named Howieson's Poort, after the type site, has never been adequately described nor has it been found in many other sites. As a result, the following comparisons will be necessarily less specific and less extensive than those in the section dealing with the Acheulean from Montagu. Through the kindness of Mr. and Mrs. Hilary Deacon of the Albany Museum, Grahamstown, I was able to examine the Howieson's Poort type collection, and later Mr. and Mrs. Deacon inspected the material from Layer 2 at Montagu. All of us agreed that the two were the same. Since the type collection is only now being described by Mrs. Deacon, however, it is impossible to demonstrate this similarity, and their virtual identity can only be asserted.

Stapleton and Hewitt (1928:407) listed four features that they believed distinguished the Howieson's Poort aggregate from others. These were burins (the first burins described from South Africa are the ones from Howieson's Poort); large crescents; trimmed points, some of which were bifacial and often made on flakes with facetted butts; and obliquely truncated blades.

The crescents were larger than those known from Wilton and other sites, and the blades that they found were also larger than those usually associated with Wilton material. This was interpreted as indicating that the Howieson's Poort was pre-Wilton. The points were felt to have certain affinities with those known from Stillbay and other sites near the Cape Peninsula, and so the Howieson's Poort material was held to belong, with the Stillbay, in the "Middle Stone Age," but also to be in part contemporary with the Wilton. This interpretation was based on typological similarities, not on stratigraphic evidence.

In 1932 Goodwin and Malan excavated a cave on Cape St. Blaize near Mossel Bay and recovered an aggregate that has been called the Mossel Bay variant of the "Middle Stone Age." This material was described by Goodwin and Malan in 1935, and its assignment to the "Middle Stone Age" was based on its typological similarity to the Stillbay and on the fact that the "Howieson's Poort Variation cut into the Mossel Bay at this site (Cape St. Blaize Cave), much as it cuts into the Stillbay Culture at the Skildegat site" (Goodwin and Malan, 1935:138). The relationship of Howieson's Poort to Mossel Bay at Cape St. Blaize was based on the occurrence of a "single lance-head of Howieson's Poort type" (Goodwin and Malan, 1935: 124). I was able to work through the Mossel Bay collection, which is housed in the South African Museum, Cape Town, and I did not find Howieson's Poort-like material in the excavation unit to which Goodwin and Malan refer. There is an obliquely truncated blade present, but it came from an unstratified part of the deposit, so it is impossible to say what its associations were and how it is related to the rest of the occurrence. The Mossel Bay occurrence has been redescribed and its affinities discussed elsewhere (Keller, 1969). Suffice it to say here, there is no evidence to show that the Howieson's Poort "cuts into the Mossel Bay."

Skildegat Cave on the Cape Peninsula was excavated in the 1920s by two amateurs, a Mr. Peers and his son, who found the following stratigraphy: at the top, Wilton material; below, a "midden" with hammerstones and cores but no diagnostic tools; typical Stillbay material; material that was similar to the Howieson's Poort; a practically sterile zone, and at the bottom, Stillbay material (J. Deacon, pers. comm.). Jolly, in 1948, published the results of further excavation at Skildegat and concluded that the stratigraphic sequence outlined by the Peers was incorrect and that there was no Stillbay material between the Howieson's Poort and the Wilton, but rather a continuous change from Stillbay through Howieson's Poort to Wilton. At another cave on the Cape Peninsula, near Kalk Bay, Howieson's Poort material was found, but in the upper levels there were a few artifacts that were felt to be possibly "Later Stone Age" (Goodwin and Peers, 1953). These are the only presently known stratified occurrences of the Howieson's Poort.

Malan (1949) summarized the sequences from the "Middle Stone Age" to the "Later Stone Age" as they were known in the various parts of South Africa and equated the Howieson's Poort of the Cape Folded region with the post-"Middle Stone Age"/pre-"Later Stone Age" Magosian assemblages. These were named after the type site of Magosi in Uganda, which was thought to contain an industry typologically transitional between the "Middle Stone Age," with its emphasis on the "Levallois" type core, and the "Later Stone Age," with its emphasis on blades. The original Magosi collection has subsequently been shown to be mixed and this transition is not well-documented in South Africa. However, two sites in Rhodesia contain sequences of occurrences from the "Middle" to "Later Stone Age." It is with the material from these sites, Khami and Pomongwe, that the Montagu material can be compared.

The excavations at Khami and the material recovered from them were mentioned above. The "Magosian" levels produced points, scrapers, and crescents that are larger than those associated with the "Later Stone Age"—all of which are common to "Magosian" occurrences. Comparisons of tools from Layer 2 at Montagu with those from the "Magosian" levels at Khami are difficult to make, since Cooke's definitions are not detailed nor are the captions to his illustrations. All the features that Stapleton and Hewitt felt were diagnostic of the Howieson's Poort, however, seem to be present in the "Magosian" levels at Khami. Even had comparisons been possible, detailed comparisons of the tools recovered from two sites could have been misleading, since the activities carried out at a given site can drastically affect the kind of tools left there, and as a result a single group of people could be represented by two very different tool aggregates at two different sites.

A more profitable way of comparing material is to look at the techniques used in manufacturing the tools, as illustrated by the cores and waste, and to base assessments of similarity or lack thereof on this kind of evidence. Fortunately, Cooke has recorded not only the kinds of cores found but also the kinds of platforms present on the flakes recovered from Khami. There are some difficulties in the utilization of this information, but they are fewer than those encountered when attempts are made to compare tool types. For purposes of comparison, cores can be grouped into three categories: (1) those that have been trimmed radially, (2) those that have more or less parallel flake scars, and (3) miscellaneous other cores. Radially trimmed cores may have been so trimmed in preparation for the removal of a single flake (the "Levallois" type of core), or the trimming may have been done in order to procure several flakes. In any case, the main distinction is between the production of more or less irregularly shaped flakes, on the one hand, and parallel-sided, bladelike flakes produced by the cores with parallel scars, on the other. Of the 465 cores from the "Magosian" levels at Khami, 60.4 percent have radial trimming and 20.4 percent have parallel trimming. In contrast, 52.1 percent of the 614 cores from the Howieson's Poort layer at Montagu have parallel scars. This would indicate a preference at Khami for the kind of flake produced by a radially trimmed core whereas parallel flakes were preferred at Montagu.

Pomongwe, a cave site in Rhodesia also excavated and reported by Cooke (1963) as we mentioned above, contained a sequence similar to the one at Khami. Here again the figures indicate a preference for radially trimmed cores; 47.8 percent as opposed to 2.3 percent "blade" cores.

The platform found on a flake is often indicative of the technique used in detaching the flake from the core and also of the kind of core that was used. Facetted platforms are commonly held to be associated with the "Levallois" technique and very small, almost nonexistent platforms are felt to be the result of blades having been detached from cores by the punch technique. The terms "facetted" and "blade," as used by Cooke in the Khami report, are taken here to be the equivalents of "facetted" and "bulb only," as used for the Montagu material. Of the 1,301 flakes in the "Magosian" levels at Khami, 25 percent had facetted platforms and 27.5 percent had blade platforms. At Montagu 7.5 percent of the flakes had facetted platforms and 10.2 percent had "bulb only" platforms. Information about the flake platforms is not given in the Pomongwe report. The figures from Khami are interesting in that they apparently indicate the reverse of the preferences reflected in the core types, although the Montagu information agrees with the core types, whereas the percentages are much smaller than those from Khami.

It should be pointed out that 24.4 percent of the cores with parallel scars from Montagu have facetted platforms and so could have produced flakes with similar platforms. The problem is that one cannot assume that facetted platforms occur only on radially trimmed "Levallois" type cores. The platform of a core intended to produce parallel-sided flakes could be prepared in just the same way as a "Levallois" core. A more fruitful way to compare assemblages would be to look at the interrelationships of flake shapes and platform treatment as well as the platforms and shapes of the scars found on the cores. Unfortunately, this is not possible with either the Rhodesian or the Montagu material.

Cooke sees the "Magosian" at Khami as a direct outgrowth of the Stillbay, which precedes it. He says "The Magosian at Khami must be included as a Middle Stone Age industry . . . being it seems the final development of the Stillbay" (1957:41). Summers has much the same opinion: "The Magosian cores are in the main a development of MSA cores, and Magosian flakes are in the main facetted butt flakes struck from disk cores of a very advanced Levallois type" (Summers, 1957:57). Cooke thinks that the "Magosian" is the result of an autocthonous development on which "impinged a blade-burin industry," but that the "blade-burin" influence was slight, and the preference for "Levallois" cores and their products continued (Cooke, 1957:41). On the other hand, the Howieson's Poort is described as an "almost pure blade-burin culture."

From the foregoing review of the Montagu material, it is clear that the situation is far from being as simple as had been supposed. There are more "blade" cores in the Howieson's Poort from Montagu than in the "Magosian" from Khami or Pomongwe; "blade" cores make up almost half the cores from Montagu, and there are more flakes with "blade" platforms from Khami than there are flakes with facetted platforms. The types of tools found in the Howieson's Poort and the "Magosian" are broadly similar, and it would seem profitable to withhold judgment about the relationships of these industries until they have been more thoroughly studied.

The problem of chronology was mentioned briefly above, but it warrants further discussion. The various "Magosian" industries have been placed in the "Second Intermediate Stage," between the "Middle and Later Stone Ages," and they were thought to date between 6,000 and 10,000 B.C. (Clark, 1959:169). More recently, however, other dates have been obtained that make these industries much older, and the whole concept of the "Second Intermediate Stage" seems less useful than previously (Clark, 1970:105-137; H. J. Deacon, n.d.). Clark (1970:129) suggests that the "Middle Stone Age" may have begun 35,000 or even as much as 50,000 years ago. The chronology of the "Middle Stone Age" has been summarized by Klein (1971).

Carbon from the top of Layer 2 at Montagu gave a date of 23,000 $\pm$ 180; samples from the middle of the layer dates to 19,100 $\pm$ 110 B.P. and 50,800; and samples from the very bottom of the layer gave dates of 45,900 $\pm$ 210 B.P., and greater than 38,000—the latter date representing the counting limits of the laboratory. Certainly these dates are very surprising, particularly the earliest ones from Montagu, but there is no easy way to explain them away. It is unfortunate that the series of dates from Montagu is inconsistent, since this inconsistency partially obscures the issue raised by these and other surprisingly early dates (Mason, 1969; 1971). Charcoal is absent in Layers 3 and 5 at Montagu and so contamination of samples from Layer 1 by old charcoal is impossible, and in any case contamination usually results in dates that are too young rather than in those that are too old. Either there is a presently unknown mechanism of contamination in C-14 samples, or these early dates are accurate, and the younger dates have come from contaminated samples. If they are accurate reflections of the age of the artifacts associated with them then ideas of the Late Pleistocene prehistory of Africa will have to be changed.

To summarize then, the Howieson's Poort material from Layer 2 at Montagu has been compared with the "Magosian" from Khami and Pomongwe and has been found to be generally similar. There are differences, however, particularly in the kinds of cores used, but these differences seem to be less extreme than Cooke and Summers believed. Unfortunately, a clearer picture of the chronological and cultural relationships of the Howieson's Poort is unobtainable from the present literature.

COMPARISONS OF LAYERS 3 AND 5

In the following section the Acheulean material from the lower two artifact-bearing layers in Montagu Cave will be compared with each other and then with other appropriate sites in Africa. The comparison of these assemblages will be more extensive than the comparative sections dealing with Layers 1 and 2, first because two layers are available to compare with each other, and second because more recent and detailed work has been done on this kind of material than on artifacts of the kind in Layers 1 and 2.

The occurrences in Layers 3 and 5 are very similar to each other. Probably the most striking resemblance is in the amount of waste present: of the total, 99.1 percent is waste in Layer 3 and 98.6 percent in Layer 5, and as we will see, this is a higher percentage of waste than is known from any similar site. Both layers have similar percentages of large cutting-edge tools, that is, hand-axes, cleavers, and knives, 30.1 percent in Layer 3 and 33 percent in Layer 5. The percentages of biface fragments are similar, 14.2 percent in Layer 3 and 12.6 percent in Layer 5. "Other bifaces" amount to 9.7 percent in Layer 3 and 13.9 percent in Layer 5. The percentages of minimally trimmed pieces are less similar, 11 percent and 15.1 percent in Layers 3 and 5 respectively, but this is a distinctive class of artifact, and the fact that they are present at all in both occurrences is important.

One of the features in which these two layers differ is the scraper category. Scrapers comprise 30.8 percent of the Layer 3 tools but only 18.5 percent of the tools in Layer 5; small scrapers are most common in the upper layer, whereas large scrapers are the more frequent type in Layer 5. Heavy-duty tools are not very common in either layer, but they are less common in 3 than in 5; the reverse is true of the "other small tool" category.

Looking at the waste, we find that although both layers have large quantities of waste, there are differences in the kinds of waste present. Flakes and flake fragments make up 47.3 percent of the waste in Layer 3, whereas they make up 61.9 percent of the Layer 5 waste. On the other hand, chips and chunks are more common in Layer 3, comprising 52.2 percent, than they are in Layer 5, where they represent only 37.4 percent of the total. Cores account for less than 1 percent of the waste in each layer.

These variations in the waste are tantalizing but difficult to interpret. It seems reasonable to assume that some differences in the kind of chipping being done, or in the methods used, have resulted in these variations, since the raw material used in both layers was the same. Yet, as we have seen, the kinds of artifacts found were very similar in both layers.

In figures 27 and 49 the types of cores found in Layers 3 and 5 are shown. The disc core is the most common type in both layers, but there are slightly more biconical cores in Layer 5 than in Layer 3. There is a small number of other types of cores present in both layers; one of the most interesting features is the presence of the plano-convex cores in Layer 5. As has been remarked in the descriptive section, these are very similar to unstruck Victoria

West cores, which are well known from the Vaal River gravels.

Goodwin (1929:11-12) mentions differences in hand-axe shape between what we have called Layer 3 and Layer 5. Of his 77 "better specimens" (no waste or "unfinished" tools were saved) in Layer 5, 80.5% are "pear shaped," which appears to be equivalent to our lanceolate, and 19.5 percent are "almond shaped," which is similar to our ovate shape. In Layer 3, 16.8 percent of his 89 "better specimens" are "pear-shaped," 78.8 percent are "almond shaped," and 4.5 percent are "round." These figures have prompted some writers to suggest that the hand-axes at Montagu illustrate a trend toward the Fauresmith, but our figures indicate that this tendency is not so strong as Goodwin's figures lead one to believe. Goodwin's own figures for the Fauresmith and Stellenbosch in general (Goodwin and Van Riet Lowe, 1929:72) indicate a w/l ratio of 57 for the Fauresmith and of 51 for the Stellenbosch. The measurements were taken on fifty "advanced Stellenbosch" tools from twelve sites and on thirty "advanced Fauresmith" tools from six sites. Goodwin computed the mean length, width, and thickness for the tools and then derived an "average ratio" from the means, rather than computing the w/l for each specimen and deriving the means of those values as we have done.

More recently Glynn Isaac has measured and assigned to shape categories all the bifaces in the South African Museum from the 1919 excavation at Montagu, and he has very kindly put his work sheets at my disposal. Isaac's measurements were made on 121 hand-axes from our Layer 5 and 195 hand-axes from our Layer 3. This information is summarized in Figures 50 and 51, and Table 9. The relationship between the hand-axes of the two layers indicated by Isaac's figures are essentially the same as those suggested by our measurements of the 1964 material. The mean length of the Layer 3 hand-axes is about 2 centimeters less than the mean length of Layer 5 hand-axes. Similarly, the mean w/l index is higher for Layer 3 than for Layer 5. On the other hand, the frequency with which the ovate and lanceolate forms occur is different according to Isaac's classification. His "Pyriform" or Hemilemniscate category is the most common in both layers, 74.2 percent in Layer 5 and 61.7 percent in Layer 3, and the ovate forms increase from 5.2 percent in Layer 5 to 19.4 percent in Layer 3. Other forms account for 15.6 percent and 18.8 percent of the hand-axes from Layers 5 and 3 respectively. Clearly, the shift in both the 1919 and 1964 aggregates is the same, that is that ovates occur more frequently in Layer 3 than in Layer 5. However, in the 1919 collection ovates are less common than other forms in both layers, whereas the reverse is true in the 1964 collection. This difference is interesting, but the simplest explanation would seem to be that it is a reflection of differences in the classifier rather than in anything else, and this is supported by the similarities in mean lengths and w/l ratios.

The frequencies of the basic hand-axe shapes in the material from the 1964 excavation from Layers 3 and 5 are shown in figures 52 and 53. In these figures, all the varieties of the lanceolate shape have been combined into the lanceolate category, and the same is true for the ovates. The one exception is the ovate-acuminate form, which is so different from the rest of the ovates that it is included in the "other" category, with such shapes as "double pointed" and "limande." Ovates are the most common shape in both layers, whereas lanceolates make up 15.8 percent of the hand-axes in Layer 3 and 33.7 percent in Layer 5. The incidence of ovate forms is reflected in the w/l ratios for hand-axes since the mean ratio for Layer 3 is 60 and that for Layer 5 is 55. The mean length of Layer 3 hand-axes is 14.7 cm., and the mean length of the Layer 5 hand-axes is 16.6 cm. One feature, then, that differentiates the earlier Acheulean from the later at Montagu is the greater incidence of lanceolate hand-axes in Layer 5; further, the earlier hand-axes are somewhat larger than the later ones.

Among the cleavers the most common shape in Layer 3 is parallel sided, 60 percent, and the same is true of Layer 5 where parallel-sided forms amount to 51.6 percent. In both layers the next most common shape is convergent. The mean length of the Layer 3

TABLE 9

Hand-Axes from 1919 Excavation

Layer	Mean length	Mean width	Mean thickness	Mean w/l	Mean t/w
D	16.1 cm.	8.9 cm.	4.5 cm.	57	50
F	18.2 cm.	9.4 cm.	5.0 cm.	53	54

cleavers in 15.7 cm., and of Layer 5 cleavers, 17.5 cm.; the mean w/l ratio for cleavers is virtually the same, 58 in Layer 3 and 59 in Layer 5. So again, even though the shapes are similar in both layers, the trend for the later tools to be smaller continues.

To summarize, the assemblages in Layers 3 and 5 are very like each other. The percentages of conventional types of tools, such as hand-axes and cleavers, are similar, and the characteristics that (as will become apparent) are distinctive of Montagu, such as the high percentages of waste, the "other bifaces," minimally trimmed pieces and fragments of tools, are not only present in both layers but also are present in similar quantities. These characteristics are best interpreted as indicating that the cave was used as a factory or workshop site. Although there are some differences between the two assemblages, these differences are far outweighed by the similarities, and for the purpose of a comparison of the Montagu material with that from other sites, the two layers are discussed as a unit.

A question can be raised about the accuracy with which the 1964 collection reflects the total assemblage of the cave. Cooke (1963:120-121) has shown that there were significant variations in the assemblage from one part of the cave to another within a single layer at Pomongwe, and this might apply equally to Montagu. One could ask, might not one side of the cave have been used primarily for workshop activities? This is possible, but not very probable. The likelihood that a site would be occupied intermittently over a long period of time, with one period of abandonment lasting probably several thousand years, and that exactly the same kinds of artifacts would be left in the same part of the cave, with no trace of the artifacts from the other parts of the cave, seems very small. To my knowledge nothing comparable has ever been demonstrated or even suggested for any other site in the world. In addition, Isaac's figures for the 1919 collection suggest that the density of tools in the other parts of the cave was about the same as in the area we excavated.

COMPARISONS WITH OTHER SITES

Hand-axes and cleavers from gravel deposits have been collected for many years in South Africa. They were discussed by Peringuey (1911), and later Goodwin and van Riet Lowe (1929) referred to them as the Stellenbosch industry, after a site near the town of Stellenbosch in the Cape. The first Pan-African Congress on Prehistory recommended that the term "Acheulean" be substituted for the term "Stellenbosch," which had been confined to the Republic of South Africa (Leakey:1952). An aggregate that lacked hand-axes and cleavers but was thought to be contemporary was called the "Hope Fountain" after a site in Rhodesia. But the work at Isimila and at Olorgesailie and Kalambo Falls (Howell and Clark, 1963; Clark, 1964a) has shown that the small tool units are, in fact, part of the industrial complex that contains hand-axes and cleavers.

The excavation of Acheulean occurrences in undisturbed archaeological contexts has shown that there is a considerable range of variation in their composition and these variations have been described in detail (Kleindienst, 1961; Howell and Clark, 1963; and Clark, 1964a). As a result, more precise comparisons can be made between the Acheulean occurrences from Montagu and from other sites than was possible with the occurrences from Layer 1 or 2.

Kleindienst (1961), and later Howell and Clark (1963), have outlined three, or perhaps four, types of aggregates that contain tools resembling those found in Layers 3 and 5 at Montagu. Type "A" (Howell and Clark, 1963) is distinguished by a high frequency of hand-axes/cleavers/knives, and the frequency of waste is low. The frequencies of large cutting-edge tools on floors that have type "A" aggregates range from 58.9 percent on Olorgesailie surface 7 to 77.5 percent on Isimila J 12. Waste frequencies range from 40.5 percent on floor 7 at Olorgesailie to 71.6 percent on Isimila K 19. The Montagu collections fall considerably outside these ranges, as an examination of figures 25 and 47 will reveal.

A second type is "B," which contains low percentages of large cutting-edge tools, a high frequency of small tools, and "substantial" frequencies of waste. Frequencies of large cutting-edge tools range from none on Olorgesailie surfaces 12 and 13 to 20.5 percent on Isimila K 18. The frequencies of small scrapers and other small tools combined on these floors range from 56.3 percent at Broken Hill to 100 percent on Olorgesailie surfaces 12 and 13. Waste frequencies range from 75 percent on Olorgesailie surface 11 to 35.4 percent at Broken Hill. Once again, an inspection of figures 25 and 47 will show that the Montagu occurrences fall outside these ranges.

Type "C" is characterized by a high percentage of heavy-duty tools, and one well-documented example is H 15 at Isimila, where heavy-duty tools account for 46.3 percent of the total number of tools. Another site where an aggregate of this kind has been found is Mufo in Angola where the artifacts occur in river gravels, and here chopping tools make up 96.5 percent of the total (Clark, 1963:94). Once again the Montagu material does not approach these figures.

A fourth kind of aggregate is intermediate between "A" and "B" in that large cutting-edge tools and small tools are present in about equal frequencies. This clearly does not apply to Montagu (see figs. 25 and 47).

The floors at Kalambo Falls have not been mentioned in this discussion, but the information about these floors published by Clark (1964a) indicates that they are no more like Montagu than the others summarized above. Material from Acheulean floor 8 at Kalambo approaches that from Montagu in the amount of waste, 91.5 percent, and has a moderate number of large cutting-edge tools, 45.5 percent, but it also has 36.4 percent small tools, and this is quite unlike Montagu. The situation is the same with Acheulean floor 6B, which has about equal amounts of large cutting-edge tools and small tools.

From these comparisons it is clear that the Montagu Acheulean occurrences do not conform to the classification from other sites in Africa. These comparisons have been made in terms of the artifact categories that Montagu shares with these sites, but no mention has been made of the more distinctive features in the Montagu occurrences. First, Montagu has a higher frequency of broken bifaces than do the other sites. The frequencies of broken bifaces at Olorgesailie range from 0 percent to 10.7 percent and at Isimila from 0 percent to 8.4 percent whereas Montagu Layer 3 has 14.2 percent and Layer 5, 12.6 percent.

Another distinctive characteristic at Montagu is the minimally trimmed pieces. As stated in the descriptive section, these are artifacts, often flakes, that have had a small amount of trimming but that have not been worked into any standardized shape, nor has any special kind of working edge been fashioned. Often the bulb and platform of the flake have been removed or reduced. Artifacts of this kind are nearly as common at Montagu as hand-axes or cleavers, yet few, if any, pieces of this kind are reported from the other sites with which Montagu is being compared. In fact, Kleindienst says, "The characteristics of the sites for which the classification is designed largely eliminate the problem of dealing with 'unfinished' tools or 'roughouts'" (1962:84).

The problem of what is "finished" and what "unfinished" is difficult for the archaeologist to solve since it requires knowledge of the intentions of the makers of the tools. For this reason I have named this category "minimally trimmed objects" instead of something like "roughouts." Nevertheless, the number of hand-axes and cleavers, as well as other tools, that are made on flakes on which the bulb and platform have been removed or reduced makes one suspect very strongly that these minimally trimmed pieces represent the first stages in the process of manufacturing some kind of bifacial tool and are not end products in themselves. The presence of these forms suggest that Montagu was used as a factory site.

Another feature of the Montagu material is the "other biface" category. In the introduction I gave my reasons for following Kleindienst's typology, and this has been done with considerable ease except for the "other biface" category. Clark (1960:315) has made the distinction between formal tools, such as hand-axes and cleavers, and informal tools, such as small scrapers and other small tools. The distinction is based on the recurrence of a constellation of attributes —such as size, plan, and cross section—in a single combination that produces the great similarity of the formal tools over a wide area for a long time period. Informal tools are so named because they do not exhibit a recurring combination of traits but rather have an enormous variation in form and edge. At Montagu there are a number of tools, which are combined in the charts under "other biface" category, that are less amorphous than the informal tools but less regular than the formal tools. In the descriptions these tools are split into a variety of categories, such as twisted-bit bifaces, chisel-ended bifaces, push planes, beaked bifaces, and others. There are so few examples in each category that they become statistically meaningless. Yet when all are lumped together, they exhibit so much variation in form, type of working edge, and size that the group is not typologically very convincing. That is, the differences appear to outweigh the similarities, yet these types resemble each other more than they resemble other types. These "other bifaces" comprise 9.7 percent of the tools in Layer 3 and 13.9 percent of the tools in Layer 5; thus, they are nearly as common as hand-axes. I found considerable difficulty in applying Kleindienst's terms to these tools.

An examination of Kleindienst's typology shows that she does include categories such as "twisted-bitted chisels," "end-notched bifaces," and "various bifacial tools," but the definitions of these terms are very brief. Tools of this kind are lumped together in the "other large tool category" by Kleindienst (1961:49-50), and the frequency of this category ranges from 0 percent to 2.1 percent at Olorgesailie and from 0 percent to 9.8 percent at Isimila. The frequency of "other large tools" at Kalambo Falls ranges from 0 percent to 1.9 percent (Clark, 1964a:101). Initially then, it is possible to say that "other bifaces" occur more frequently at Montagu than at the other sites.

Since so little material from these sites has been illustrated, it is difficult to make direct comparisons of these "other bifaces" between Montagu and the other sites; nonetheless, a few comparisons are possible. The similarity between the beaked bifaces at Montagu and picks from other sites was mentioned in the descriptions, and a comparison of the tools illustrated herein on plates XLVI:3 and LII:1 with Clark (1964b) plate I:4 and Clark (1963) Plate 6:3 will show these similarities. The Montagu tools are smaller than the others, however, and beaked bifaces illustrated in plates XXII:3 and 6, XXXVI:3, and XLIV:2 will make it clear that these resemble picks only in that the points are heavy and thick. There are no tools at Montagu that resemble the large pick from Angola illustrated by Clark (1963, Plate 6:4). Kleindienst's pick category has subsequently been subdivided into picks and core-axes, and the latter form has been described by Clark (1964a:96).

Other tools have been called hand-axe/choppers by Clark (1964b, Plate I:1; 1963:52 and Plate 6:1 and 2). These illustrated tools resemble some of the Montagu "other bifaces," and the core-axe illustrated by Clark (1964b, Plate II:2) resembles in plan those pieces from Montagu illustrated in plates XLI:1 and XLVII:5. However, the Montagu tools lack the characteristic core-axe trimming described by Clark (1964a:96) and consequently have been placed in the hand-axe/chopper category.

This question is confused even further because picks, core-axes, and hand-axe/choppers from other sites that have been discussed above are all part of the post-Acheulean Sangoan or Sangoan/Lower Lupemban assemblages, whereas the Montagu hand-axe/choppers come from the earlier Acheulean, Layer 5.

In discussing core-axes, Clark has said, "Considerable difficulty has been experienced in finding a suitable term to describe the numerous types of bifacial core tools associated with the later Pleistocene cultures in the Congo Basin . . . . Considerable variation in shape, thickness, nature of secondary working and working edges is apparent from the literature" (1963:50). Obviously the situation is much the same with regard to the "other bifaces" of the Acheulean. One problem is that there are not many of these "other bifaces" on any one site. According to the figures in Howell and Clark (1963), there are 15 of these tools at Isimila, 5 at Olorgesailie, 8 at Kariundusi, 8 at Lochard, 6 in the collection from Homestead on the Vaal River, and 16 from Kalambo Falls (Clark, 1964a:101), a total of 58 tools. This is obviously a small number of items on which to base a typological category, and the problem is increased because the tools are so varied in form. At Montagu, however, there are 214 tools that have been placed in this typological category. There were significant numbers of similar tools in the collections (which I had the opportunity to examine) from Amanzi near Port Elizabeth and Mulder's Vlei near Paarl, both in the Cape Folded Belt. Clearly there needs to be a thorough comparative study made of these tools from as many sites as possible so that the ranges of variation can be defined and useful attributes for description and comparison discovered.

Because of differences in terminology and, in some respects, differences in the basic approach to archaeological material, less precise comparisons are possible with the collections described by Revil Mason from the northern part of South Africa. However, some interesting information can be derived from Mason's figures.

Mason (1962:221) cites hand-axe length figures for Earlier, Middle and Later stages of the Acheulean that show no clear trend. These are summarized below in table 10. The mean lengths for all stages are less than the means for either of the Montagu Acheulean layers.

TABLE 10

Hand-Axes from the Transvaal Earlier Stone Age

Stage	Mean length	Mean w/l
Early	12.1 cm.	60
Middle	13.2 cm.	54
Late*	12.5 cm.	63

*These figures are a mean of means from four occurrences.

In terms of the w/l ratios, also summarized in table 10, again there is no clear trend but the hand-axes from the Later Acheulean are slightly broader for their length than the Earlier ones. The Montagu Layer 5 hand-axes resemble most closely the Transvaal Middle Acheulean, and the Layer 3 hand-axes resemble either Mason's Earlier or Later Acheulean. Mason (1965:5) has made a statement about the frequency with which end-struck and side-struck flakes occur. This question has been discussed elsewhere (Isaac and Keller, 1968); briefly, it is apparent that the Montagu waste flakes resemble the waste from East Africa more than they resemble the Transvaal waste with regard to the occurrence of end-struck and side-struck flakes. It is possible that the form in which the raw material occurs—some in slabs in the Transvaal contrasted with boulders at Montagu and Kalambo Falls, for instance—contributed to the production of end-struck flakes.

The percentages of artifact types shown by Mason (1962:218) remain virtually the same from the Earlier to the Later Acheulean, with the exception of four new classes added in the Later Acheulean. In fact these assemblages show much less variation through what must be an enormous time span—if in fact they do represent the Acheulean from Earlier to Later—than do relatively contemporary assemblages from the East African Late Acheulean. This conservatism is difficult to explain in the current state of knowledge. The samples on which the descriptions are based are reasonably large, but all but one of the assemblages have come from scree or gravel deposits, and it is possible that noncultural factors influence the content of these aggregates. None of the contexts from which Mason's material has been gathered is comparable to the Montagu or East African sealed primary contexts, and this detracts from the validity of the comparisons.

For all of these difficulties and differences, there are similarities between the Montagu and Transvaal Acheulean, and Mason's illustrations of later Acheulean artifacts (Mason, 1962: figs. 94-97, pp. 110-120) make these clear. For instance, his hand-axe, figure 94:3, would certainly have been placed in my "other biface" category, as would figure 95:2, and the large cores, figures 118:3, 119:1 and 2, and 120:2, are very similar to the "plano-convex" cores of Layer 5 at Montagu.

To summarize, then, the occurrences in the two layers, Layers 3 and 5 at Montagu, resemble each other very closely and much more than they resemble comparable aggregates from other sites. This is true not only for the frequencies of categories, such as hand-axes and cleavers or waste, which Montagu shares with these other sites, but also for those high-frequency categories that are characteristic of Montagu, that is, minimally trimmed pieces, other bifaces, and biface fragments. None of the four types of aggregates that have been defined from other sites fits the Montagu material, and since these variations have been interpreted as the manifestations of different activities, Montagu must reflect an activity that is not represented by material from any of the other sites.

This makes it difficult to answer the question of whether there is spatial variation within the Acheulean of Africa, since one possible hypothesis would be that those items that are characteristic of Montagu are connected with the special activity represented there and, therefore, would not be expected to be present at other sites representing other activities. This is certainly a justifiable position as far as the high quantities of waste, broken bifaces, and minimally trimmed pieces are concerned. But the presence of the "other bifaces" in relatively large numbers at Montagu and the presence within the same region of similar tools at other sites that lack large quantities of waste and of minimally trimmed pieces would suggest that regional differences will be found in the "other biface" category. This is not at all improbable if the variations possible within the formal tools were rigidly delineated by the makers and the informal tools were allowed to be so amorphous as to defy a stricter organization. It is, then, to what might be called "semiformal" tools that we should look for regional differences, and yet it is just this class of tool which has been least well described and about which least is known.

CONCLUSIONS

In the preceding pages the setting of Montagu Cave and its stratigraphy and contents have been described as well as the methods of excavation and analysis used in this study. The assemblages from the four tool-bearing layers have been compared with other assemblages and some of the problems that thwart such comparisons discussed. In the following pages the conclusions reached as a result of this work are summarized.

The assemblage from Layer 1 falls within the range of the "Later Stone Age" both typologically and chronologically, but to make a more precise designation is difficult. As pointed out above, the Montagu Layer 1 assemblage would have been called "Wilton" on the basis of the crescents found there. However, Schrire's work indicates that there are crescents in the "Smithfield 'C'" as well, and, as we have seen, in one characteristic at least—the length of the scrapers—the Montagu assemblage resembles the "Smithfield 'C'" more than it does the "Wilton." But neither the "Smithfield 'C'" nor the "Wilton" is really well described, nor has either been described from enough sites to make possible a clear idea of the range of variation that exists. For these reasons, then, the assemblage from Layer 1 at Montagu should be referred to simply as an occurrence of the South African "Later Stone Age" Industrial Complex. After additional comparable material has been described, it should be possible to make a more precise designation.

The situation is somewhat more clear-cut with regard to the assemblage from Layer 2. As was pointed out, this assemblage is virtually identical with that from Howieson's Poort. However, the exact chronological relationship of the Howieson's Poort material to the other aggregates is not at all clear. The carbon-14 dates from the Howieson's Poort shelter and from Montagu Layer 2 are earlier than one would have predicted. Nor is the relationship clear of the Howieson's Poort material to other aggregates with which it has been asserted to be typologically equivalent. The evidence for regarding the Howieson's Poort as representative of a "pure" blade and burin industry is not conclusive by any means. The Howieson's Poort does not appear to be identical to the "Magosian" as it is known from Rhodesia. Consequently, pending more absolute dates, more descriptions, and more evidence of the stratigraphic relationships of the later "Middle Stone Age," this assemblage from Layer 2 should be called an occurrence of the Howieson's Poort Industry.

It was indicated earlier that it is possible to say more about the Montagu Acheulean from Layers 3 and 5 than from the other assemblages present in the cave because more work has been done on the Acheulean than on other industries in Africa. It has been demonstrated that the aggregates from Layers 3 and 5 are very similar to each other and different from the other known Acheulean material. The Montagu Acheulean is the result of workshop activities, the site being visited and occupied repeatedly for the exploitation of raw material in the stream below the cave. The existence of such sites has been assumed from the East African evidence (Kleindienst, 1961:46). J. Wymer has recently excavated an Acheulean butchering site at Hopefield in South Africa, and the indications there are that the tools had been manufactured elsewhere and brought to the site (pers. comm.).

One of the original objectives of the project was to investigate what regional variations might be present in Acheulean assemblages, but the problem was complicated by the discovery of a previously undescribed activity variant. In addition to the purely workshop elements present at Montagu, there is a broad class of tool, the "other bifaces," which seem different from the East African tools. Although it is not possible to say definitely whether these "other bifaces" are part of a factory assemblage, I do not believe that they are. There is sufficient cause to refer to the Layers 3 and 5 aggregates as the Montagu Phase of the Acheulean Industrial Complex because they represent a previously undescribed activity variation. It seems probable that as other assemblages from Acheulean sites in the Cape Folded Belt are described, more evidence of regional variation between East and South Africa will be discovered.

APPENDIX I

A DESCRIPTIVE CLASSIFICATION FOR THE EAST AFRICAN LATE ACHEULIAN ASSEMBLAGE

I. ARTIFACTS OF STONE

A. TOOLS

1. Shaped Tools

The final form depends upon human workmanship. (The general groupings are broadly applicable to utilized tools as well.)

a. Large implements the general form of which is controlled by a primary linear rock mass, usually large flakes struck off unprepared cores.

1) Implements characterized by cutting edges, of any size, having unifacial or bifacial trimming. Rarely less than 10 cm. (4 inches) or more than 30 cm. (12 inches) in greatest dimension (length). The average length:width:thickness ratio approximates 4:2:1 (width:length .50; thickness: width .50; thickness:length .25).

a) Hand-axes (bifacial) and

pointed flakes (unifacial).

Characterized by a cutting edge around the entire circumference of the tool, or more rarely around the entire circumference with the exception of the butt. The emphasis in manufacture, if distinguishable, seems to have been upon the point and both edges. Usually bilaterally symmetrical, and more-or-less biconvex in major and minor sections (i.e., along the major and minor axes). Points range from exceedingly acuate to linguate. There is large variation in size, degree and quality of workmanship, and plan-view. Classified on the basis of variation in plan-view, primarily according to the curvature of the edges, the length:width ratio, and the placement of the greatest width relative to the length of the tool.

1/ Lanceolate. Edges straight or slightly concave from greatest width to apex; greatest width no higher than 1/3 of the distance from the butt, relative to the length of the tool. Length:width ratio usually greater than 2:1 (maximum length is over twice the maximum width).

2/ Narrow Lanceolate. Edges convex—a much attenuated long ovate shape—with greatest width higher than 1/2 of the distance from the butt. Length:width ratio markedly greater than 2:1.

3/ Long Ovate. Edges convex, with greatest width higher than 1/3 of the distance from the butt. Length:width ratio approximately 2:1 or slightly greater.

4/ Asymmetrical Long Ovate. Not bilaterally symmetrical—one edge straight, the other convex. Length:width ratio 2:1 or slightly greater.

5/ Pointed Long Ovate. Long ovate in overall form, with slight concavity of the edges near the point, producing an attenuated point which causes the length:width ratio to exceed 2:1

6/ Ovate. Edges markedly convex. Greatest width higher than 1/3 of the distance from the butt, and often about mid-section. Length:width ratio less than 2:1.

7/ Asymmetrical Ovate. Not bilaterally symmetrical—one edge straight, the other convex. Length:width ratio less than 2:1.

8/ Pointed Ovate. Ovate in overall form. Slight concavity of the edges near the point may produce an attenuated point which slightly exceeds the 2:1 ratio.

9/ Broad Ovate. Length:width ratio approaches 1:1, but distinct point present.

10/ Discoidal. Length:width ratio 1:1, without a point.

11/ Cordiform. Definite basal shoulders, rounded and not higher than 1/4 of the distance from the butt. Edges straight or slightly convex from greatest width to apex.

12/ Elongate Lanceolate. Edges slightly concave near the attenuated point, without definite break in the plan-outline. Length:width ratio markedly greater than 2:1.

13/ Ovate-acuminate. Ovate with definite upper shoulders (break in the plan-outline), and an extended point—either linguate or acuate. Both edges convex from butt to shoulder, concave from shoulder to apex.

14/ Single-shouldered Ovate. Ovate with definite shoulder on one edge; opposite edge is convex.

15/ Single-shouldered Narrow Lanceolate. Narrow lanceolate with distinct shoulder on one edge.

16/ Ovate with twisted point. Extremely asymmetrical ovate, single-shouldered in some cases, with the point angled to one side of the long axis.

17/ Triangular. Approximates equilateral triangle in plan-view, with definite angular basal shoulders. Butt nearly perpendicular to the long axis. Length:width ratio less than 2:1.

18/ Elongate triangular. Approximate isoceles triangle, with angular basal shoulders. Butt nearly perpendicular to the long axis. Length: width ratio 2:1 or greater.

M. R. Kleindienst, "Components of the East African Acheulian Assemblage: An Analytic Approach," Actes du IV^e Congrès Panafricain de Prehistoire et de L'Etude, Section III, Pre- et Protohistoire, 1962, pp. 85-101.

19/ Sub-triangular. Approaches triangular form, often that of obtuse triangle with butt at an oblique angle to the long axis. Length:width ratio less than 2:1.

20/ Double-pointed. Pointed butt; no definite shoulders. Convex edges, with greatest width about mid-section.

21/ Diamond. Pointed butt, with definite shoulders 1/2 to 1/3 of the distance from the butt.

22/ Truncated Diamond. Diamond with lower (butt) apex truncated. Definite shoulders about 1/3 of the distance from the butt. Length:width ratio usually less than 2:1.

23/ Limande. "Double-pointed" form in which both ends are equally rounded (linguate) or squared off. Greatest width near mid-section. Convex edges. Length:width ratio less than 2:1.

24/ Elongate Limande. Length:width ratio 2:1 or greater.

25/ Asymmetrical Limande. Limande in which the long axis describes a curve.

26/ Untrimmed Butt ("Micoque-type"). Well-worked point with straight to concave edges. Butt minimally trimmed or untrimmed. Approaches triangular plan-view. (This type is not primarily classified according to the plan-view).

27/ Various. Occasional combinations of form, or extreme asymmetry.

b) Cleavers (bifacial) and

cleaver flakes (unifacial).

Characterized by worked butt and/or edges, and a bit at one end more-or-less perpendicular to the long axis of the tool. The bit is formed by two intersecting positive flake surfaces, by intersecting positive and negative flake surfaces, or even by flake surface and cortex, giving a long, sharp, cutting edge which is rarely retouched. There is large variation in size, workmanship, minor cross section, and plan-view—in part due to the technique(s) used in producing the original flake, and in part to subsequent trimming. Cleavers made on nodules are rare. Classified according to the trend of the bit, the position of the edges relative to the long axis, and by the shape of the butt. The following classification is a simplification of the large number of varieties theoretically possible in such classification.

Arbitrary standards for determining guillotines, convergence, and divergence were established to insure uniformity in typing: A guillotine bit departs 15^{o} or more from a line parallel to the minor axis when the implement is oriented along the major axis; a straight bit is thus more-or-less perpendicular to the long axis. An ultra-convergent cleaver is defined as one in which the length of the bit is 1/3 or less of the greatest width of the tool. The margin of convergence is defined as a line midway between the ultra-convergent margin and a line parallel to the long axis. The margin of divergence is set an equal distance outside this parallel line. (These standards were set after study of several hundred cleavers. If the class still occurs in significant proportions, having thus allowed a bias for parallel-edged cleavers, deliberate shaping for convergence or divergence can be assumed). U-shaped or rounded butts, V-shaped or pointed butts, and squared butts more-or-less perpendicular to the long axis occur in all categories. Bit varieties such as concave, convex, pointed, straight, or irregular could be noted as secondary features.

1/ Parallel-edges, straight or guillotine bit. Edges parallel to the long axis of the implement from greatest width of the tool to the ends of the bit. On the "high" side of a guillotine bit the edge may curve in sharply.

2/ Asymmetrical parallel, straight or guillotine bit. The long axis describes a curve rather than a straight line. Two varieties occur: one with a straight edge opposing a concave edge; the other with a convex edge opposing a concave edge.

3/ Convergent edges, straight or guillotine bit. Edges converge from the greatest width of the tool toward the ends of the bit.

4/ Ultra-convergent edges, straight or guillotine bit. The degree of trimming is similar to that of hand-axes but a narrow transverse bit is retained, whose length is 1/3 or less of the greatest width of the tool. Shouldered ultra-convergent varieties occur.

5/ Asymmetrical convergent, straight or guillotine bit. The long axis describes a curve. Edges converge.

6/ Shouldered-convergent, straight or guillotine bit. Definite break in the plan-outline (shoulders) on both edges. Edges usually convex from butt to shoulders, concave from shoulders to ends of the bit.

7/ Divergent edges, straight or guillotine bit. Edges diverge from the butt to the ends of the bit, which is the widest point on the tool. Edges straight or convex.

8/ Splayed edges, straight or guillotine bit. The edges diverge from the butt to the ends of the bit, with a marked concavity near the bit.

9/ Side Cleaver. Bit on one side of the implement, more-or-less parallel to the long axis.

10/ Burin-blow Bit. A form of cleaver not defined according to plan-outline. At least one face of the bit is formed by a flake scar in which the flake was driven off the bit end in the manner of a burin. The bit is at an angle to the horizontal plane, and relatively narrow. Made on chunks or nodules.

c) Knives.

Characterized by having one side, or part of one side, blunted or "backed" while the opposing side, or opposing side and one end, has a sharp cutting edge. The backing may be an original surface—cortex or a fracture plane in the raw material; it may be the striking platform of the flake, plain or facetted; or it may be a deliberately trimmed surface. The cutting edge may be untrimmed, formed by intersecting flake surfaces, unifacially trimmed, or bifacially trimmed. If trimmed, it is thinned and sharpened. The backed edge is markedly thicker in minor section than the opposing cutting edge.

1/ Pointed. One end is pointed; the cutting edge extends up to, or around the point. Fine examples grade into a single-shouldered hand-axe, and this tool might be considered a subtype of hand-axe not classified according to plan-view.

2/ End-and-Side. The cutting edge extends along one side and around one end. This might be considered a subtype of cleaver, not classified according to plan-view.

3/ Disc. The form varies between a square with rounded corners and a discoid. These tend to have a wedge-shaped cross section in one direction and a plano-convex or bi-convex section in the other direction.

4/ Various. Implements which have little consistency in plan-view, but which have in common a cutting edge on one end, or on one end extending down the side(s). These may be fashioned on pebbles, slabs, chunks, etc., and like other knives have the feature of a blunt back opposing a cutting edge.

d) Elongate bifacial tool with cutting ends.

Minimally worked, large, bifacial implements with quadrilateral minor sections at mid-section, and well-worked cutting edges on one or both ends.

e) Round-bitted Biface (bifacial) and round-bitted flake (unifacial).

Well trimmed cutting edge at one end, rounded in plan-view, with slightly trimmed or untrimmed butt. More-or-less limande shaped in total plan-view.

2) Implements characterized by scraping edges, over 10 cm. (4 inches) in greatest dimension. "Flake tools" in that the implements retain their primary artifact form—usually that of a flake—and were used in that form, or had only the edges modified in such a manner as not to obliterate the original form. Some are made on slabs or chunks. Trimming produces a unifacial or bifacial scraping edge; if more than one edge is worked, the trimming may be on opposing faces. Edge trimming can be described as "shallow," "blunt," or "steep," in order to express the angle of flaking and the resulting thickness of the edge relative to the size of the tool. The classification is largely based on edge form, and not on the overall form of the tool.

a) Side Scrapers

The working edge(s) is more-or-less parallel to the long axis. One or both sides are trimmed. Edge forms are similar to small scrapers (cf. below), but the variety found is more limited.

b) End Scrapers

The working edge(s) is more-or-less perpendicular to the long axis. One or both ends are trimmed. Edge forms are similar to small scrapers (cf. below), but the variety found is more limited.

c) Combined End and Side Scrapers.

The working edge occurs on one or both sides, and one or both ends; it may not be a continuous edge (cf. below).

d) Various Forms.

Forms classified by overall shape (cf. below).

3) Other tool types with uncategorized edges, usually exceeding 10 cm. (4 inches) in greatest dimension. Workmanship varies, but is often minimal. Classified on overall form.

a) Chisels.

Minimally-trimmed, bifacial tools with a sharp bit at one end which is sometimes hollow or gouge-like. The bit may be trimmed, or formed by intersecting flake scars. Both major and minor sections are thick, relative to the size of the tool: the major section may be wedge-shaped.

1/ Straight-bitted. The bit is in the horizontal plane.

2/ Twisted-bitted. The bit is at an angle to the horizontal plane.

b) Pushplanes.

Implements which tend to be flat-based and highbacked, with an emphasis upon one end. These may bear a sharp, unworked edge on one end, and scraping edges along the sides. Unifacial or bifacial trimming. Usually made on thick flakes from which the bulb has been removed.

1/ Shallow-nosed. The working end is thin, has shallow trimming or lacks trimming. The butt is thick in minor section, and usually trimmed. The nose has a "dished-out" appearance in major section.

2/ Bitted. Thick minor cross section over the whole length of the tool. Steeply trimmed or untrimmed sharp bit on one end, set at approximately a 45° angle to the base. The butt is unifacially or bifacially worked.

c) Discoid.

Bifacially worked, discoidal implement with biconvex cross section. Secondary trimming on the edge and, often, utilization, distinguish these from cores.

d) End-notched Biface.

Variously shaped in plan-view, but having trimmed and/or utilized concavity at one end.

e) Various bifacial tools.

Bifacially worked implements which can only be described according to plan-view, as "rectangular" or "elongate." Characterized by a minimum of trimming, asymmetry, and thick cross sections.

b. "Heavy Duty Tools."

A group of implements which have in common a minimum of trimming and less standardization in form than do the implements in preceding categories, but which are a constant component of an East African Late Acheulean assemblage. Large tools, usually exceeding 10 cm. (4 inches) in greatest dimension, but occasionally as small as 5 cm. (2 inches), which are made on compact rock masses—thick flakes, nodules, or chunks. Classified according to overall form.

1) Picks.

Sturdy tools with a minimum of overall trimming, but with emphasis upon a point as such rather than upon edge retouch. Individual pieces tend to be distinctive. Width:length ratio in the cutting tool range (c. 1:2 or .50); thickness:width exceeds .80; thickness:length exceeds .40.

a) Trihedral.

Point triangular in minor section, with dorsal median ridge extending from point toward butt for most of the length of the tool. The ridge may not occur on the butt, which is slightly trimmed or untrimmed. The base tends to be flat and untrimmed, but the point may be worked on all three faces.

b) Bifacial.

Bifacially trimmed, with a tendency to a lenticular minor cross section, especially at the point. The butt may be heavy and little trimmed. Tend to be either long ovate or elongate triangular in plan-view.

c) Roughly trimmed butt.

Butt slightly trimmed, and heavy, with a greater degree of attention paid to the point. The cross section at the butt tends to be quadrilateral, at the point, lenticular. Unifacial or bifacial trimming.

d) Untrimmed butt.

Unifacially or bifacially trimmed point, often well-worked, with a heavy untrimmed butt. If made on cobbles, cortex is retained on the butt, and in unifacial examples, on the ventral surface.

e) Flat-based, high-backed.

Quadrilateral in minor section over almost total length of tool. Trimming on the dorsal face may be from both the base and the top; the ventral face may or may not be worked.

f) Flat-based, beaked.

Both sides trimmed, upward from the base and downward from a median dorsal ridge. Point is worked to a greater degree and is trimmed back into the base, so that it is perpendicular to the plane of the base.

g) Point on cobble.

Elongate, spiky point trimmed on a cobble. Cortex is retained on the butt. Tend to be about 15 cm. (6 inches) in length.

h) Block.

Point fashioned on a chunk or slab of rock by a minimum of trimming.

i) Spindle.

Picks, generally of small size—under 15 cm. (6 inches) in length—with minimal gross bifacial trimming; narrow relative to their length, double-pointed, with a characteristic spindle "twist," resulting in a more-or-less diamond-shaped minor section. May be worked from the median ridge, as well as radially.

j) Core.

Minimal radial trimming on one or both faces. Convex ventral surface; dorsal median ridge.

k) Various.

A number of picks must be individually described.

2) Core Scrapers.

High-backed tools characterized by steep trimming from a flat surface along some segment of the circumference. The steeply trimmed edge is of scraper type, but tends to be "undercut" by step-flaking (cf. "trimming stones" in van Riet Lowe 1952:42). Usually large tools, but may range down to 5 cm. (2 inches) in greatest dimension.

a) Flat-based, steep.

Fits the class specifications. Examples with the greatest degree of trimming tend to have a high "domed" appearance in section. The working edge may be convex, straight, or concave.

b) Flat-based, blunt.

Trimming is less steep, with less tendency to undercut the edge.

c) Bevelled-base, steep.

Similar to a), but the base is formed by two intersecting planes, with the edge trimmed against one.

d) Bevelled-base, blunt.

Trimming is less steep.

e) Keeled.

High-backed, flat-based, with a well-worked dorsal ridge on top.

f) Double-edged.

A cross-section through the working edges forms a segment of a circle. The arc is trimmed from two flat surfaces, forming two scraping edges, each against a flat base.

g) Core.

Appears to be primarily some variety of core, on which a scraping edge has been trimmed.

3) Trimmed Pebble or Chunk.

Minimal, unifacial, usually steep trimming against a flat surface at one end or side of a piece, which forms a steep scraping edge.

4) Choppers.

Implements, usually with bifacial trimming, characterized by a chopping edge. These are usually made on compact rock-masses—chunks or nodules or cobbles—and only occasionally on thick flakes. Classified according to the form of the raw material, or on the overall form of the tool. These may be secondarily classified according to the placement, or extent, of the working edge relative to the long axis.

a) Pebble.

Chopping edge worked on the side or end of a waterworn piece. The major portion of the implement surface retains the original cortex.

b) Chunk.

Similar, but worked on a chunk or nodule.

c) Flake.

Thick flake, with chopping edge.

d) Core.

Piece which has complete bifacial radial trimming, with a chopping edge on much of the circumference. These may have been cores, but chopper status is indicated by a markedly sinuous edge, and in most cases by utilization as well.

e) Side.

Crescent-shaped in plan-view, with a sinuous chopping edge around the arc, and an unsharpened back along the chord of the arc. In some cases the back was deliberately trimmed and blunted.

f) Discoidal.

More-or-less round in plan-view and biconvex in section, with a chopping edge around much of the circumference. Secondary edge workmanship indicates that these are primarily implements and not cores.

5) Stone Balls.

Artifacts which fit a general category of more-or-less deliberately shaped, more-or-less spheroidal forms. These have been variously called "stone balls" (Clark 1955), "bolas stones" (Leakey 1953: 58-59), or "polyhedral stones" (van Riet Lowe 1952:171). Classified on the bases of type and degree of workmanship.

a) Missile.

Roughly spherical artifacts which have been largely shaped by nature, but which show some signs of having been subsequently shaped by man. These may approach the polyhedral in form by having been facetted over a portion of the surface.

b) Polyhedral.

Roughly spherical artifacts which have been shaped by man over most or all of their surface area. These are facetted by intersecting negative flake scars.

c) Bolas.

Artifacts which are nearly spheres, and which have been pecked or battered to a nearly smooth surface over most or all of their surface area.

c. Small Implements.

Implements generally under 10 cm. (4 inches) in greatest dimension, which fall into various categories but which are characterized by recurrent techniques in manufacture, as well as by size and form.

1) Small implements characterized by scraping edges, fashioned on flakes, chunks, or other small pieces of raw material, which retain the original form except on the working edge(s). Edge trimming may be shallow, blunt, or steep. The classification is based primarily on the form of the modified edges, rather than on overall form; in this respect it is comparable to the classification used by Clark (1950:79 and 81) for the Northern Rhodesian "Hope Fountain." Scrapers may be unifacial or bifacial, and if more than one edge is worked, may be trimmed on opposing faces—the latter being a secondary characteristic.

a) Side Scrapers.

Single or double; working edges are more-or-less parallel to the long axis of the tool. In double forms, any combination of edge form may theoretically occur.

1/ Convex. Worked edge has marked convexity.

2/ Straight. Worked edge is more-or-less straight.

3/ Concave. Worked edge has marked concavity.

4/ Notched. Worked edge has two or more small concavities or notches, which are few in number relative to the size of the tool.

5/ Denticulate. Worked edge has many small notches, which are numerous relative to the size of the tool.

6/ Rounded. Worked edge is continuous around approximately 1/2 of the circumference of the tool, without an angular break in the plan-outline.

7/ Pointed. Worked edge extends around a point.

8/ Irregular. Worked edge is irregular in outline.

b) End Scrapers.

Single or double; working edges are more-or-less perpendicular to the long axis of the tool. In double forms, any combination of edge form may theoretically occur.

1/ Convex. Worked edge has marked convexity.

2/ Straight. Worked edge is more-or-less straight.

3/ Concave. Worked edge has marked concavity.

4/ Notched. Worked edge has two or more small concavities or notches, which are few in number relative to the size of the tool.

5/ Denticulate. Worked edge has many small notches, which are numerous relative to the size of the tool.

6/ Rounded. Worked edge is continuous along part of both sides and around the end with no angular break in the plan-outline.

7/ Pointed. The worked edge extends around a point.

8/ Irregular. Worked edge is irregular in outline.

c) Combined End and Side Scrapers.

A trimmed edge on one or both sides in combination with a trimmed edge on one or both ends. Any of the edge forms may theoretically occur.

d) Various scraper forms, classified according to overall shape.

1/ Angled. Two worked edges meet at an acute angle, with a sharp break in the plan-outline.

2/ Nosed and Winged. A form with a rounded, protruding nose produced by concavities or broad notches on either side. Base may or may not be trimmed.

3/ Round (unifacial) or discoidal (bifacial). Worked edge extends nearly or completely around the circumference of the tool. More-or-less round in plan-view.

4/ Steep. Steeply trimmed, high-backed scrapers—analogous to large core scrapers, but lacking an undercut edge. Worked edge may occupy a large portion of the circumference.

5/ Thumbnail. A very small scraper, under 3 cm. (1.2 inches) in greatest dimension, with a rounded working edge. Highbacked relative to the size of the tool, and often bearing a minature graver point as well.

6/ Pointed. Two scraping edges meeting in a point.

7/ Triangular. Triangular in plan-view, with three worked edges.

8/ Various. Forms not otherwise classified.

2) Small implements with various types of edges, fashioned on flakes, chunks, and other forms of raw material. Most bear points or bits on a miniature scale. These are classified according to overall form.

a) Protoburin.

One or two flakes driven off an end, in the horizontal plane, to form a sharp edge (Clark 1959: in press) considers these a type of core, but in many examples the flake(s) removed is very small, and the resulting edge is utilized.

b) Burin.

Tools which have a typical burin blow—more-or-less in the vertical plane, producing a sharp, transverse edge. The tool may be trimmed and/or utilized on other edges as well.

c) Point (bifacial) or pointed flake (unifacial).

Made on flakes generally, thin in cross section relative to the size of the tool if compared with a small hand-axe. Trimmed from the edges. Comparable to "points" in later stone industries.

d) Chisel-ended.

Tools which have in common bits formed by a single flake scar running longitudinally along the tool. In some cases this may be accidental; in others the flake has been driven off the bit end. A high-backed, flat-based variety is common. The tool may be trimmed and/or utilized on other edges. Usually unifacially trimmed.

e) Elongate Bifacial Tool.

Bifacially worked small tool, with rather indifferent point, radial trimming, and irregular plan-outline due to gross minimal trimming. These lack cutting edges. Signs of utilization, if present, occur on the pointed end. (Chisel ends also occur.)

f) Bifacial Tool with Bevelled End.

Similar to the above, but with a marked bevel on one face at the pointed (or chisel) end.

g) Discoid.

Small, round, bifacially worked implements.

h) Borer.

Small, generally under 3 cm. (1.2 inches) in greatest dimension, with a sharp point. In some, the butt has been retouched on the opposing surface to the point trimming.

i) Pointed Tool.

Various forms on which a point has been prepared. A flat-based, high-backed variety is common.

j) Various. Forms not otherwise classified.

2. Modified Tools

Trimmed, and often utilized, but fit no shaped-tool form category. May be separated into large (exceeding 10 cm. [4 inches] in greatest dimension) and small (under 10 cm. in greatest dimension) size ranges. Classified according to the type of trimming and the form of the raw material used, such as flakes, chunks, slabs, etc.

a. Unifacially trimmed.

b. Bifacially trimmed.

c. Variously trimmed.

For example, flakes trimmed only on the flaked surface.

3. Utilized Tools

Identified only by signs of use. May be categorized according to edge types and grouped with the appropriate shaped tool category.

a. Hammerstone.

Various stones, usually natural chunks or cobbles, which show signs of battering and bruising on restricted areas of the surface, and which are therefore interpreted as due to human agency.

b. Anvil.

Various large chunks, which may be naturally shaped or roughly trimmed, on which the aretes have been heavily battered and bruised.

c. Utilized waste products which show signs of use on one or more edges. May be classified by size range, by type of artifact, and/or by distinctive kinds of utilization such as notching, nibbling, jagged edges, etc.

1) Utilized Cores.

2) Utilized Flakes.

3) Utilized Chips and Chunks.

4) Utilized Natural Pieces.

B. WASTE PRODUCTS

Presumed to be waste products produced in the process of manufacturing tools. Show no observable signs of trimming, modification, or utilization (although for certain purposes the utilized waste products may be retained in the category).

1. Cores

Artifacts assumed to be the waste products left after the workman had struck off the desired flakes. In part the system devised by Paterson and Fagg (1940:16-19) and Paterson (1945:8-12) has been followed.

a. Pebble.

Flakes were struck off a pebble, using prior negative flake scars for subsequent flakes. A major portion of cortex is retained, compared to the area of flaking.

b. Bashed Chunk.

Similar, but a chunk or nodule rather than a water-worn piece of raw material was used.

c. Formless.

A piece which has had flakes removed from most or all of the surface area. Flakes have been struck off in all directions, using the negative flake scars as platforms for subsequent flakes.

d. Pyramidal.

A core which approximates a pyramid in side-view. Flakes, some of which were flake-blades, were struck off from one direction, around the basal circumference of the core. The base may be a natural surface, or formed by one or more negative flake scars.

e. Biconical.

Biconical in side-view. May be conceived as bifacial, and more-or-less round in plan-view. Flakes were struck off the periphery, forming a more-or-less sinuous edge around the core. Flake scars converge toward central foci on both faces. The flakes may be struck alternately, or one face completely worked before the other. Trimming is described as radial.

f. Bevelled-base Biconical.

One face is formed by two intersecting planes, with radial trimming on the obverse.

g. Discoidal.

Lenticular, or biconvex, in side-view. More-or-less round in plan-view. Flakes struck off as in a biconical core, with radial trimming.

h. Struck.

Representatives of the "Levallois" or "facetted-platform" technique, in which the core was prepared in order to remove one or several comparatively large, well-shaped flakes. Platform preparation minimal, if present at all. These cores are recognizable as prepared cores only because they have been struck; unstruck examples, although so intended by the maker, would probably not be identifiable as different from biconical/discoidal cores. Radial trimming.

i. Double-struck.

Two flakes struck off parallel to each other.

j. Angle.

Found at Kalambo Falls where slabs of raw material were used. Flake-blades or short quadrilateral flakes were removed from two faces at approximately right angles to each other, by using prior negative flake scars as a platform.

k. Large Cores.

The cores from which the flakes were struck for the making of large implements are present at Isimila, but not at Olorgesailie nor in the collection from Kalambo Falls in the Rhodes-Livingstone Museum. These are known to reach 60 cm. (24 inches) in length at Isimila. From them large side-struck flakes were obtained, with a minimum of prior preparation, if any. The technique has been described as "Tachenghit" by Goodwin (1933:111-116), and has been used elsewhere to describe cores in an East African assemblage (van Riet Lowe 1952:38). However, it is now known that a rather specialized form of prepared core was used in the Tabelbalat-Tachenghit region of the Sahara (Tixier 1957:919), and the term "Tachenghit" might better be reserved for that form.

2. Debris

Assumed to be the waste products produced either in striking flakes off cores, breaking up raw material, or in the process of manufacturing shaped or modified tools.

a. Flakes.

Struck off cores, or in the process of shaping tools.

1) Large Flakes.

Over 10 cm. (4 inches) in greatest dimension generally. Presumably produced in the process of trimming cores, and in the size range from which large tools might have been made.

2) Small Flakes.

Under 10 cm. in size. Either struck off cores, or from shaping tools. In the size range from which small implements could have been made. Tool-trimming flakes, tool resharpening flakes, and core-trimming flakes can be partially differentiated.

3) Levallois Flakes.

Flakes, which from the number of radial dorsal scars, type of platform—generally right angle, sometimes facetted—and general shape probably were struck off prepared cores.

4) Flake-blades.

Those flakes in which the length:width ratio is 2:1 or greater. Often show parallel dorsal scars.

5) Short Quadrilateral Flakes.

Those flakes which have parallel dorsal scars and a rectangular or quadrilateral shape, but in which the length:width ratio is less than 2:1.

6) Cleaver-edged Flakes.

Flakes in the large size range which have a cleaver-bit edge, but which have not been secondarily trimmed. Of the type on which cleavers or other large implements could have been made. Presumably, the shape is due to the type of core used.

7) Pointed Flakes.

Similar flakes, but pointed, either fortuitously or because of the type of core used.

b. Chips and Chunks.

Various debris resulting from the trimming of cores and tools. May be classified according to size.

II. WOOD, BONE, OTHER ARTIFACTS

Artifacts of materials other than stone: wood, bone, other. These are unfortunately not yet a classificatory problem, although wooden implements occur at Kalambo Falls (Clark 1954:55-56).

III. EXOTIC MATERIALS

Materials not of local origin—"exotic"—presumed to have been introduced by human agency; imported stone, fauna, vegetal remains, etc. Depends upon the type of site and its locality. May also include fauna and vegetal remains which were not imported by early man, but which are assumed to have formed part of his diet.

DISCUSSION

The foregoing descriptive classification constitutes the East African Late Acheulian assemblage on the basis of artifactual material excavated from occupation sites in archaeological context. Almost all of the various tool types (underlined), and the majority of subtypes, occur at all of the occupation sites. Although studies are not yet at a stage where it is possible to conclude definitely which subtypes have most significance for temporal or spatial or cultural interpretations in the East African region, some conclusions as to the usefulness of consistent quantitative analysis can be drawn from the preliminary work on assemblages from Isimila and the other sites.

Types and classes of artifacts can be correlated with differences in the type of raw material used in the occupation areas where a variety of raw materials was available—primarily at Isimila and Kalambo Falls. At Isimila large cutting-edge implements, large scraping-edge implements, and other large tools primarily manufactured on large flakes are made of several varieties of fine-grained silicious cataclasites, but also in quartz, quartzite, and granite. Heavy-duty tools, also hammerstones and anvils, tend to be made in such massive, durable materials as quartz, quartzite, and granite. Small implements—and also most utilized flakes—tend to be made of the most homogeneous material which was available, i.e., quartz.

APPENDIX II

A PROVISIONAL INTERPRETATION OF THE SEDIMENTARY SEQUENCE FROM MONTAGU CAVE (CAPE PROVINCE), SOUTH AFRICA

By

Karl W. Butzer
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Introduction.

Montagu Cave is located in the side of a small ravine cut through the Table Mountain Sandstone, near the town of Montagu. Facing ENE the cave seems to be developed near a structural contact in low-grade metamorphics, where shear and tension have favored greater friability and removal of cementing minerals in solution. Sediments with archeological materials are found in the larger and outer of 2 chambers, with a mouth width of c. 11 m, a maximum length of c. 17 m and a vault elevation of as much as 13 m. The site was first excavated in 1919, with a second excavation undertaken 1964-65 by Charles M. Keller (University of Illinois) (Keller, 1966). Since the site contains two major archeological levels and two quasi-sterile strata, all predating 50,000 B.P., Montagu Cave potentially spans the little-known transition of Middle to Upper Pleistocene in South Africa. For this reason the writer studied seven samples (see Table 1), collected by Keller in 1965, attempting a broader interpretation of the sediment sequence.

In addition to macroscopic examination of structure and consolidation, color (dry) was determined by the Munsell Soil Color Charts, texture by hydrometer and wet-sieve analyses, carbonate content by the Chittick method, and pH (electrometrically) in distilled water (see Butzer and Hansen, 1968, appendix A). Textural classes are given according to both the Wentworth and U.S.D.A. classifications. Subsequent microscopic scanning of sand-sized residues included a semi-quantitative estimate of quartz-grain frosting and rounding. Non-quartz aggregates in the sand fraction were found to be soluble in 20 percent hydroxide. These analyses were carried out in the Paleo-Ecology Laboratory (Anthropology Department) of the University of Chicago, with the assistance of Daniel C. Bowman.

Since the samples themselves were too limited in scope to allow an adequate description of the sedimentary strata, a good series of detailed color slides was studied, as explained and amplified by Dr. Keller, and supplemented by the descriptions earlier provided by Keller (1966). Although the overall results are not conclusive, they do show that the strata convey potential paleo-environmental data. The very fact that Montagu is situated within the Cape Folded Ranges, at the edge of the semi-desert Karroo, places it in a climatically sensitive transition.[1]

Bedrock.

The bedrock exposed in Montagu Cave is a white, coarse-grained sandstone that has been moderately metamorphosed. Although it does not deserve the designation "quartzite," the quartz grains have been sufficiently deformed and partially fused to merit the label of a "metamorphosed sandstone."

Grain-size is 50 percent in the 200-500 micron size-range, and the individual grains are quite angular. All the sand-sized quartz grains of the cave sediments fall within the shape and type of this local sandstone, and differences in degree of microscopic rounding are almost negligible. The primary quartz grains show a degree of atypical frosting, which is somewhat more prominent in the cave sediments, particularly in the lower beds. This micro-pitting is almost certainly due to chemical or biochemical agencies operating during and after sedimentation in the cave (see Butzer and Gladfelter, 1968), and offers no paleo-environmental clues. There is no cementing substance in the sandstone, so that the "rock" is quite friable, breaking down during even gentle sample pretreatment. However, the differences of sand size components among the cave sediments depend primarily on the degree of fractionation of these quartz grains—which can be attained by modest weathering or by prolonged stirring at high speed in a blender. Unfortunately, this property of weak cohesion precluded any systematic study of coarse,

[1]Montagu itself is at 223 m elevation, and has a mean annual precipitation of only 312 mm, concentrated in the transitional seasons. The Köppen climatic classification is BSk (cool-steppe climate), that of Thornthwaite DB_2d (semiarid mesothermal, with little water surplus).

detrital components in the sediments. The bedrock is weathered, in that there is a small clay component of almost 5 percent (compared with 5-12 percent in the cave sediments) and that the rock matrix (presumably silica and sesquioxides) has been at least partly removed. Finally, the bedrock lacks organic components other than intrusive, carbonized roots.

Simple breakdown of the sandstone should provide approximately 90 percent sand-sized quartz, with a minor component of silt and clay. Consequently the quartz sand content of the successive cave strata provides a useful index to the extraneous "complications." On this basis, the limited number of samples suggests that materials introduced by man, animals, and inorganic agencies account for as little as 10 percent and as much as 60 percent of the different layers.

A last point of interest is the black, finely laminated precipitate found on parts of the cave wall and tentatively attributed to hyrax urine (Keller, personal communication). This precipitate has not been identified but contains at least some ferric components. Small grains of identical material (in the 0.6 to 6.0 mm grade) were found in 3 samples (1713, 1714, 1715), probably indicating that rockfalls had introduced it to accumulating floor sediments.

Levels 7 and 6.

The basal accumulations of the cave have been described by Keller (1966) as (a) unsorted sand, with rare artificial materials—level 6; and (b) fine-grained sandy clay, with decomposing fragments of bedrock, presumably a weathering residual—level 7. The basal horizon is about 5 cm thick, the succeeding accumulation varies from 15 to 60 cm. No samples were available for study.

Level 5.

The thickness of the Acheulian level 5 increases rapidly from about 30 cm near the front of the cave to some 150 cm farther inside. The lower boundary is smooth and abrupt, the upper wavy and abrupt; both clearly mark discontinuities in sedimentation. The internal bedding is very pronounced, with undulating, alternating bands of 5 to 12 cm dark, organic sands and white, clean sands. There also are occasional, short lenticles of clean sand. Rock debris, angular and ranging from 1 to 25 cm in diameter, is common and dispersed throughout the bed.

Two samples were analyzed. The "organic" facies represents a weakly structured reddish gray, sandy loam, with abundant diffuse humus and a trace of macroscopic organic matter. The reddish color comes from red silts introduced to the cave and now adhering in part to the autochthonous quartz sands. There are no extraneous quartz or silcrete grains, so that the source of the silt is obscure—man, fissure-wash, or eolian dust. Tool débitage (gray quartzite and white quartzitic "chert" with biotite veins) in the 2-5 mm grade accounts for 2 percent of the sample; there are traces of such biotite in samples 1710 and 1712.

The "inorganic" facies is a white loam with next to no organic matter, and slightly greater compaction (coarse, sub-angular blocky structure). Tool débitage is completely absent, supporting the inference of non-occupation. At least 4.0 percent of the material consists of sesquioxide-stained silcrete aggregates in the 25-500 micron size-grade. These aggregates are clearly extraneous, and are most probably of eolian origin. This explanation is compatible with the well-stratified or laminated, wedgelike character of the lenses in which such aggregates abound. It would also be a reasonable process during times of cave-abandonment. Nonetheless, even allowing that some of the finer quartz grains were blown in after short transport distance, eolian components constitute only a small part of the total sediment. Weathering or fissure-wash must have continued to supply silts and some clay.

Level 4.

The so-called sterile horizon, level 4, includes a lower, occupation zone—with many diagnostic properties of Level 5—and a massive, upper horizon, rather different in character.[2]

The lower level has a maximum thickness of 20 cm towards the cave interior, and consists of well-stratified lenses of undulating aspect, interspersed with crude rockfall debris. The material is a dark brown, loamy sand, weakly structured, with moderate concentrations of diffuse humus and a trace of macroscopic, organic matter. About 4.5 percent of the sediment consists of 2-5 mm tool débitage, although artifacts as such are very rare. Silcrete grains are absent, although extraneous red silt is indicated.

The upper level, separated by a clear, wavy contact, ranges from 75 to 90 cm in thickness. It is rather homogeneous and the stratification is horizontal and undisturbed, with limited amounts of relatively small, roof debris. No sample was available for study, but it is expected that the material lacks organic inclusions or appreciable weathering products. Eolian components are a probability.

Level 3.

The second major Acheulian deposit, Level 3, has the lowest sand content of the entire cave sequence; instead, there is unusually abundant silt (50-60 percent).

[2] Dr. Butzer has included the band that includes surface VIII in layer 4 rather than in layer 5 as I have done [C.M.K.].

The basal surface is smooth and abrupt, the upper contact wavy and abrupt, in part coinciding with a major rock collapse and suggesting disconformities. Thickness of the stratum varies from 30 to 60 cm, and internal bedding is undulating, as is also characteristic of Level 5. There are basal and intermediate "inorganic" horizons.

The normal, "organic" facies is a weakly structured, very dark brown, silt loam, with abundant diffuse humus, some macroscopic organic matter, and traces of silcrete aggregates. Micro-débitage (2-5 mm) accounts for about 1 percent of the sample. Probably a half of the extraneous material (including soil sediment) can be safely assigned to human activities, and at least a good part is fine mineral ash.

The "inorganic" bands consist of light gray silt loam with greater compaction (very coarse, subangular blocky structure), and with traces of both diffuse and macroscopic humus. Some micro-débitage and occasional artifacts further indicate that occupation was reduced in intensity but not entirely absent. Silcrete aggregates suggest eolian activity, but the general prominence of silt and soil sediment is nonetheless enigmatic.

Level 2.

The Middle Stone Age stratum, Level 2, has Groningen radiocarbon dates (from top to bottom) of 23,200, 19,600, greater than 50,800, and 45,900 B.P. (GrN 4726-4728), inferring a time-depth of almost 30,000 years. The nature of the deposits does not contradict this: the level has a thickness varying from 25 to 160 cm and, despite good stratification in detail, is disrupted by a number of major rockfalls. Given the careful pretreatment of GrN radiocarbon samples in general, and the unlikelihood of pure charcoal's ever being too old, it would seem imperative to explore all other possibilities before concluding that the C^{14} dates are substantially incorrect. The deposit, it goes without saying, is sufficiently complex to allow for a long period of successive accumulations.

The basic sediment is a weakly structured, very dark gray, sandy loam, with abundant diffuse and macroscopic humus. Silcrete aggregates are moderately prominent. Micro-débitage (1-5 mm) accounts for 2.2 percent. Possibly the abundance of large and small sandstone detritus contributes to the high overall sand content. Derived soil sediments are present.

Unlike the lower occupation strata, Level 2 includes seven distinct "surfaces" (i.e., horizontal concentrations of artifacts) with hearths (Keller, 1966); similarly, charcoal in different size grades is fairly abundant throughout. However, the undulating nature of the strata, building up from the cave entrance, indicates substantially the same mode of cultural deposition as for 5, 4 (lower), and 3. The only difference appears to be partial decomposition of the related organic material (e.g., matting, bedding, etc.) from the Acheulian levels.

Level 1.

The thin surface level, varying from 0 to 30 cm in thickness, had been partially removed by early guano hunters. It consisted of a "brown sand" littered with surface rubble, and containing artifacts and traces of hearths with LSA. A C^{14} date of 7100 B.P. (GrN-4725) was obtained. No sample was available for study.

General nature of the cave sediments.

Perhaps the most striking aspects of the cave sequence can be numerated as follows: (1) The extremely acid pH (3.0-3.5) exceeds any of the surface "Greyish-brown to dark brown soils" developed on Table Mountain Sandstone (see v. d. Merwe, 1963). The high acidity must be attributed in good part to prolonged and repeated cave occupance. (2) The high organic content —whether macroscopically visible or decomposed to amorphic humus—as well as the weak structure and rather dusty nature of the bulk of the sediments are rather apparent. This reflects on the lack of cohesive clays, the basic sandy grade of the autochthonous sediments, and the predominant silt size of all extraneous matter. (3) The strongly undulating and conspicuous nature of the stratification was noted by the writer in several LSA accumulations near Plettenberg Bay and appears to be peculiar to organic middens of the type associated with many LSA sites (see Deacon and Deacon, 1963; Wells, 1965; Deacon, 1969). In part, this may reflect differential compaction as organic components rot out, in part it bears upon the exceptional stratification caused by grass matting, etc. (4) The small yet conspicuous component of sesquioxide-stained silcrete grains in the 25-500 micron grade is noteworthy. It certainly appears to be eolian, yet it would be difficult to prove this point by rigorous criteria. (5) The variable silt component of the strata, associated with extraneous soil sediments of some sort, remains difficult to explain. The relative proportions introduced by man, by fissure-wash, and by eolian activity cannot be determined, and their identification would be crucial to a firm paleoenvironmental interpretation. Montagu Cave will require field examination and further sample collection by a Pleistocene geomorphologist, and pollen analyses should be rewarding, if not essential to a more detailed interpretation.

TABLE 1

Sediment Data from Montagu Cave

	Sample Color (dry) Number	Wentworth Textural Class	U.S.D.A. Textural Class	$CaCO_3$ (%)	pH	Silcrete Aggregate (%)	%Quartz over 60 microns
1 (No sample)							
2	1715 10 YR 3/1 (v. dark gray)	Silty Coarse Sand	Sandy loam	0.0	3.4	1.0	67.0
3 (Organic)	1714 10 YR 2/2 (v. dark brown)	Med.-sandy silt	Silt loam	0.0	3.0	0.5	36.0
3 (Inorganic)	1713 10 YR 7.5/2 (lt. gray)	Med.-sandy silt	Silt loam	0.0	3.5	2.5	30.0
4 (Upper) (no sample)							
4 (Lower)	1712 10 YR 4/2 (dk. brown)	Silty coarse sand	Loamy sand	0.0	3.2	0.0	76.5
5 (Organic)	1710 5 YR 5/2 (red. gray)	Silty coarse sand	Sandy loam	0.0	3.3	0.0	52.5
5 (Inorganic)	1711 7.5 YR 10/2 (white)	Silty coarse sand	Loam	0.0	3.3	4.0	62.0
6 (No sample)							
7 (No sample)							
Bedrock	1716 10 YR 8/1 (white)	Coarse sand	Sand	0.0	4.8	0.0	90.0

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Note. [C.M.K.]

The following table indicates the results of spectographic analyses of samples of cave sediment. The provenience of the samples is:

Sample A	Bedrock
Sample B	Layer 4
Sample C	Layer 2
Sample D	Layer 3 (inorganic)
Sample E	Layer 5 (organic)

The values for Fe are excessive and probably in error, but there has been no opportunity to reanalyse the sample.

A series of samples was examined by X-ray diffraction. Samples A and B appeared to be virtually pure quartz. The other samples, notably Sample D, produced a diffraction pattern that resembles that of cristobalite. This mineral usually occurs in metamorphic and igneous rocks, particularly andesite. Since rocks of this kind are not present in the area a more probable explanation is that some mineral or minerals that are isomorphic with cristobalite are present.

Finally, the following values for organic and inorganic constituents were derived after drying and ashing the samples.

Sample	Percent Organic	Percent Inorganic
A	0.40	99.60
B	1.46	98.54
C	8.90	91.10
D	2.68	97.32
E	22.10	77.90

Element	Sample	Wavelength	Approximate Concentration (%)	Wavelength	Approximate Concentration (%)	Wavelength	Approximate Concentration (%)
Ti	A	2942	4.0	-	-	-	-
	B	2942	0.5	3088	0.40	-	-
	C	2942	0.5	3088	0.50	-	-
	D	2942	1.0	3088	1.50	-	-
	E	-	-	3088	0.05	3373	0.05
Ca	A	4227	0.005	-	-	-	-
	B	4227	0.003	-	-	-	-
	C	4227	0.000 (4.6×10^{-5})	-	-	-	-
	D	4227	0.050	-	-	-	-
	E	4227	0.0005	-	-	-	-
Fe	A	2937	2.60	3000	0.7	-	-
	B	2937	51.0	3000	27.0	2973	71.0
	C	2937	11.0	-	-	2973	9.0
	D	-	-	3000	80.0	-	-
	E	2937	7.5	-	-	2973	6.0
Mg	A	2779	0.035	2852	x	-	-
	B	2779	0.035	2852	0.08	-	-
	C	x	x	2852	0.04	-	-
	D	2779	0.26	2852	x	-	-
	E	x	x	2852	0.01	-	-
Cu	A	3774	0.0002	-	-	-	-
	B	3774	0.0044	-	-	-	-
	C	3774	0.0032	-	-	-	-
	D	3774	0.0100	-	-	-	-
	E	3774	0.0034	-	-	-	-
Al	A	2568	1.0	2652	3.0	-	-
	B	2568	4.0	2652	3.0	-	-
	C	2568	3.0	2652	1.0	-	-
	D	2568	6.0	2652	21.0	-	-
	E	2568	0.9	2652	0.2	-	-

Element	Sample	Wavelength	Exp. Concen. (%)	Prob. Concen. (%)	
Si	A	2443	x	100	(x - 0) % T or no background and, or line)
	B	2443	143	50-80	
	C	2443	88	70-80	
	D	2443	216	60-80	
	E	2443	16		

APPENDIX III

ANALYSIS OF BOTANICAL SPECIMENS FROM FEATURE 3

In the description of feature 3 in Layer 1, reference was made to the charred floral material present on the bottom of the feature. A section of this material roughly four inches square was coated with Glyptal, a cement, and lifted intact. The specimen was submitted to Michael J. Wells of the Botanical Research Institute, Albany Museum, Grahamstown, South Africa, for analysis. Mr. Wells has done the analysis of botanical remains from Scott's Cave, a "Later Stone Age" site, and has assisted with the work on botanical specimens from the Acheulean site at Amanzi. The following factual information is derived from his work.

From three ounces of the sample it was possible to isolate 84 "clearly recognizable" fragments of corm or bulb scales in addition to carbonized small twigs and two fragments of what are possibly seeds.

> The corm scales isolated from the Montagu Cave are, in my opinion, almost certainly those of a species of _Moraea_ or _Homeria_, two closely related genera of the _Iridaceae_ or Iris family. The coarse "herringbone" reticulations of the scales are an excellent match of those found on Herbarium specimens of some of the smaller _Moraea_ spp., e.g., _M. papilionacea_, _M. fimbriata_, _M. agusta_, _M. setacea_, _M. edulis_, and _Homeria_ spp. such as _H. collina_. No other taxa have been found with reticulate scales which could be confused with those from Montagu Cave (Wells, pers. comm.).

Wells refers to Watt and Breyer-Brandwijk, _The Medicinal and Poisonous Plants of Southern and Eastern Africa_ (1962), who say that most species of _Moraea_ and _Homeria_ are poisonous but that the corm of _Moraea edulis_ is edible and tastes like a boiled chestnut.

The indication that many of the _Moraea_ and _Homeria_ species are poisonous raises the question of whether feature 3 might have been used for the preparation of arrow poison rather than of food. But the analysis that has been done of ethnographically known arrow poisons does not suggest that anything like the _Moraea_ or _Homeria_ corms were ever used for this purpose (Shaw _et al._, 1963).

The evidence, then, suggests strongly that feature 3 was not used for preparing poison. Wells says,

> Because selective preservation favours the extremely tough corm scales above most seeds, the presence or absence of seeds may or may not be significant. However, I agree that there is a considerable chance that the pit was used for pounding or bruising roots. . . . With the available evidence I would favour the likelihood that the corm scales belong to an edible species, or to a relatively inoffensive species used for medicinal, mastic, or other purposes (pers. comm.).

Hopefully as more excavations are conducted at "Later Stone Age" sites, additional information about the utilization of floral resources will come to light, and the uses of such features as feature 3 will become better understood.

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ABBREVIATIONS

Layer 1

pln	plain
simp fac	simple facetted
fac	facetted
bo	"bulb only"
rem	removed
shpd	shaped
utzd	utilized
wst	waste
cres	crescents
ba bl	backed blades
ob tr bl	obliquely truncated blades
th sc	thumbnail scrapers
hw sc	hollow scrapers
sc	scrapers
ot ec	*outils écaillés*
ch	chisels
bu	burins
d	discoids
pt	points
tr flk	trimmed flakes
tr chp	trimmed chips
pt tl	pointed tools
c	choppers
cs	core scrapers
flk	flakes
flk frg	flake fragments
chp	chips
cnk	chunks
lq	long quadrilateral
sq	short quadrilateral
tri	triangular
irr	irregular

Layers 3 and 5

ha	hand-axes
clv	cleavers
knv	knives
d	discoids
s	large scrapers
hd	heavy duty
lg flk	large flake
sing plat	single platform
disc	disc
frm	formless
irr	irregular
bic	biconical
tri	triangular
ov	ovate
ss	small scrapers
ost	other small tools
mtr	minimally trimmed pieces
frg	fragments
obi	other bifaces
sm flk	small flake
plno cnx	plano-convex
spl	split pebble
stk	struck
splt cbl	cobble
pbl	pebble
lanc	lanceolate
o	other

Layer 2

mlt hw sc	multiple hollow scraper
str sc	strangulated scraper
tr cnk	trimmed chunk
nsd tl	nosed tool
pt frg	point fragment
p	pestle

un	unidentifiable
	flakes and flake fragments
	chips and chunks
	tools
	natural stones
	excavated but not plotted

FIGURES

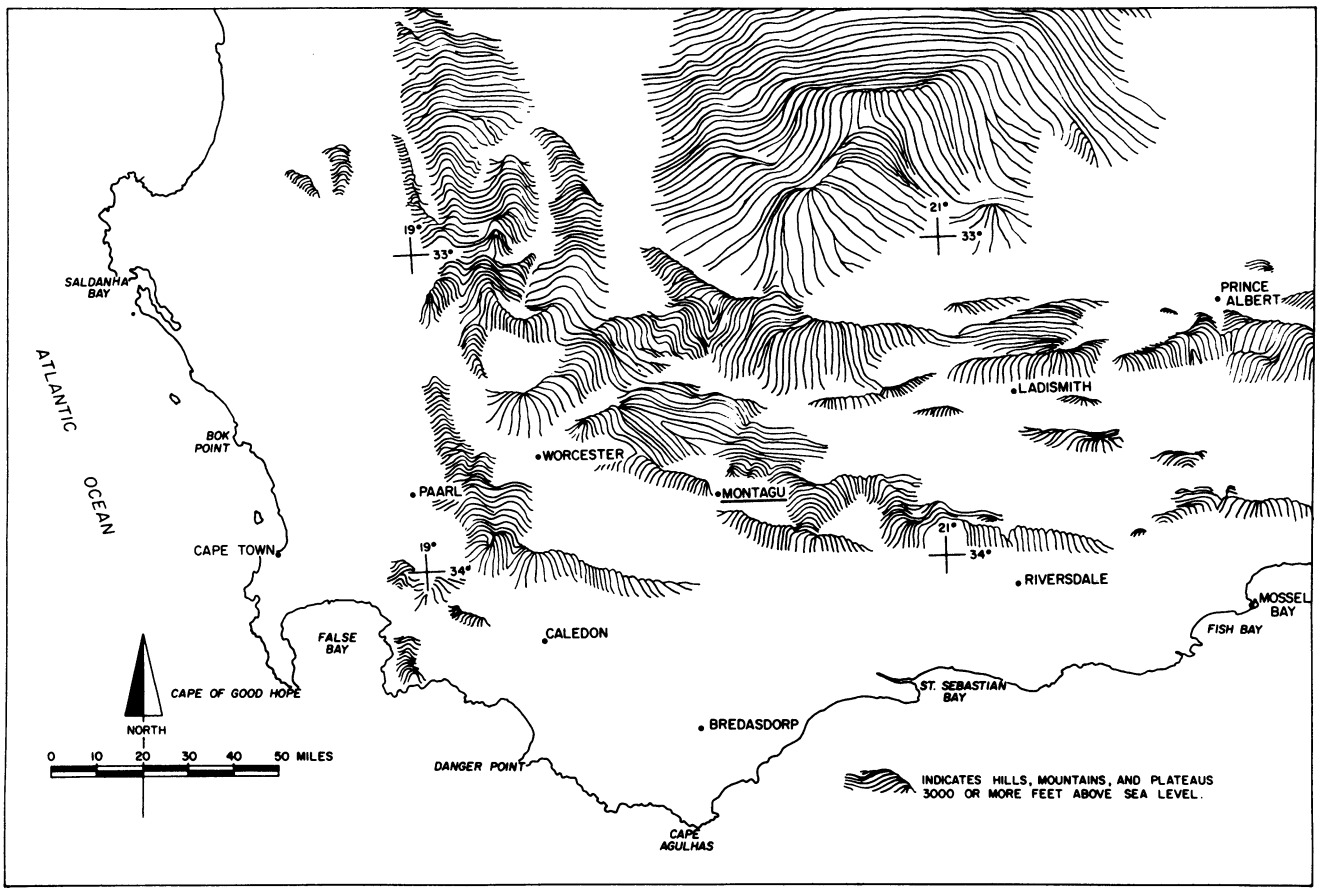


Fig. 1. Map of the Southern part of Africa.

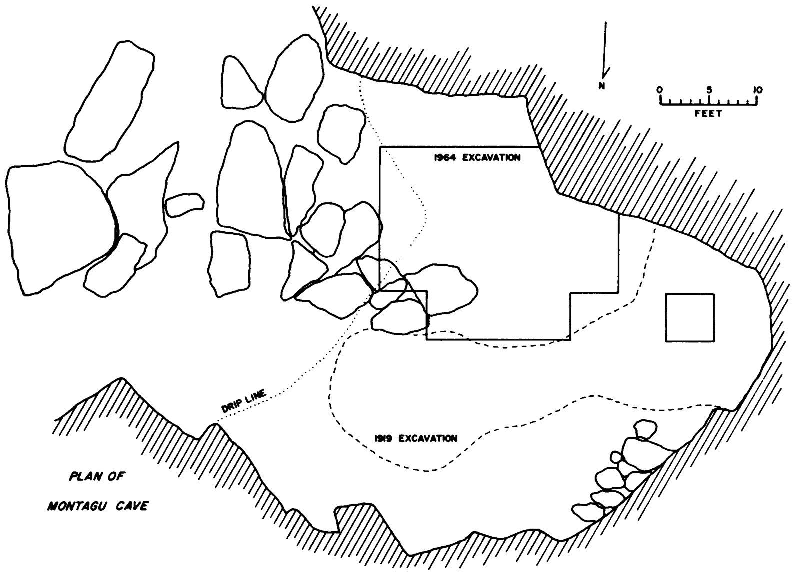


Fig. 2.

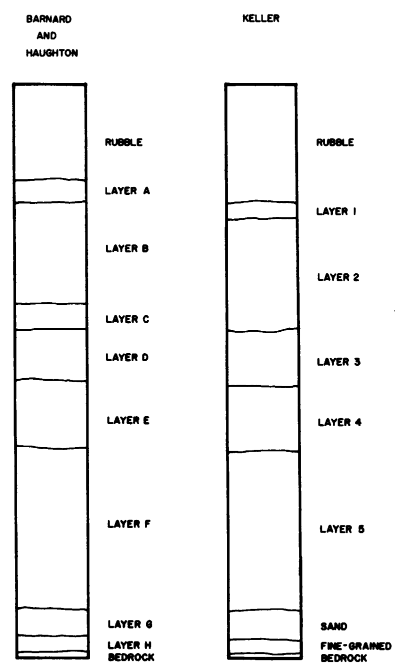


Fig. 3. Comparison of the Stratigraphy Recognized in the 1919 and 1964 Excavations.

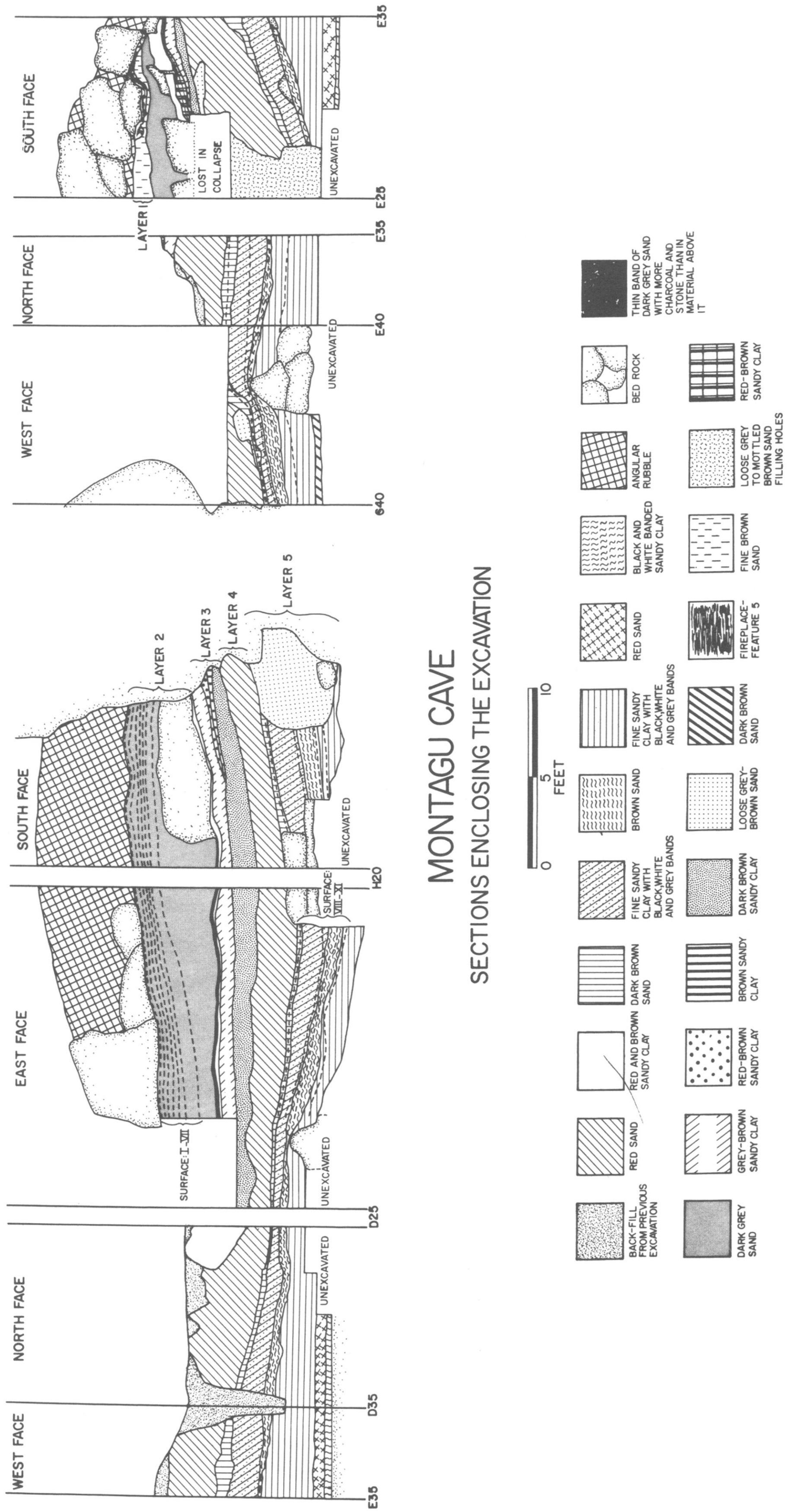


Fig. 4. Sections Enclosing the Excavation.

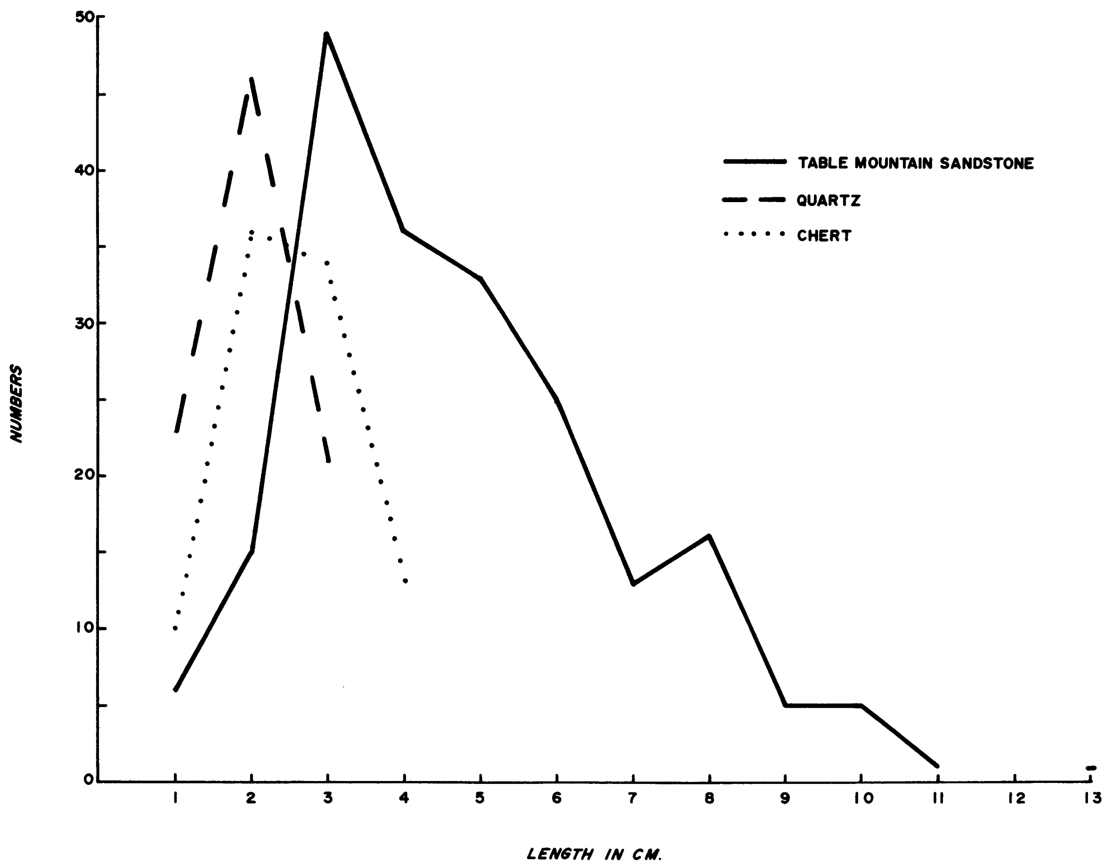


Fig. 5. Lengths of Layer 1 End-struck Flakes shown by Material.

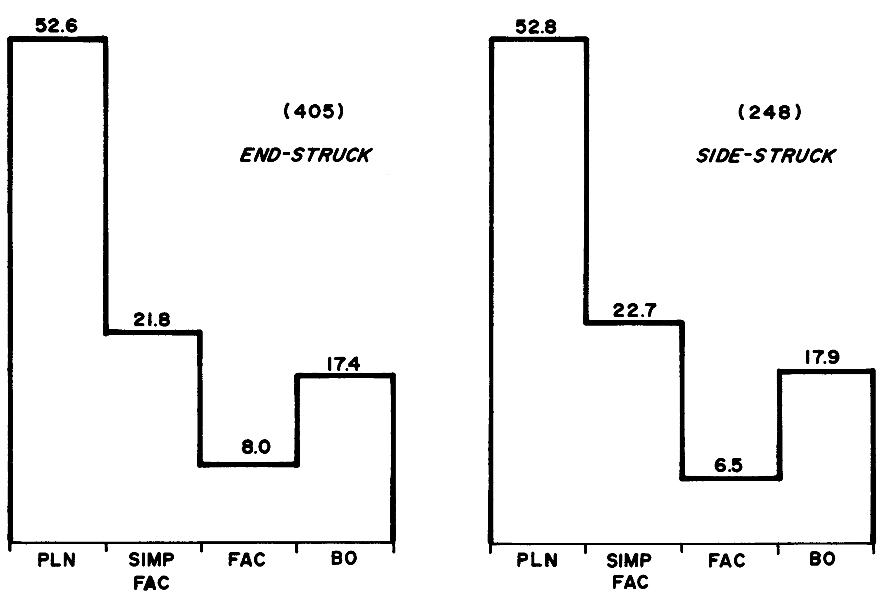


Fig. 6. Platforms on Layer 1 Flakes.

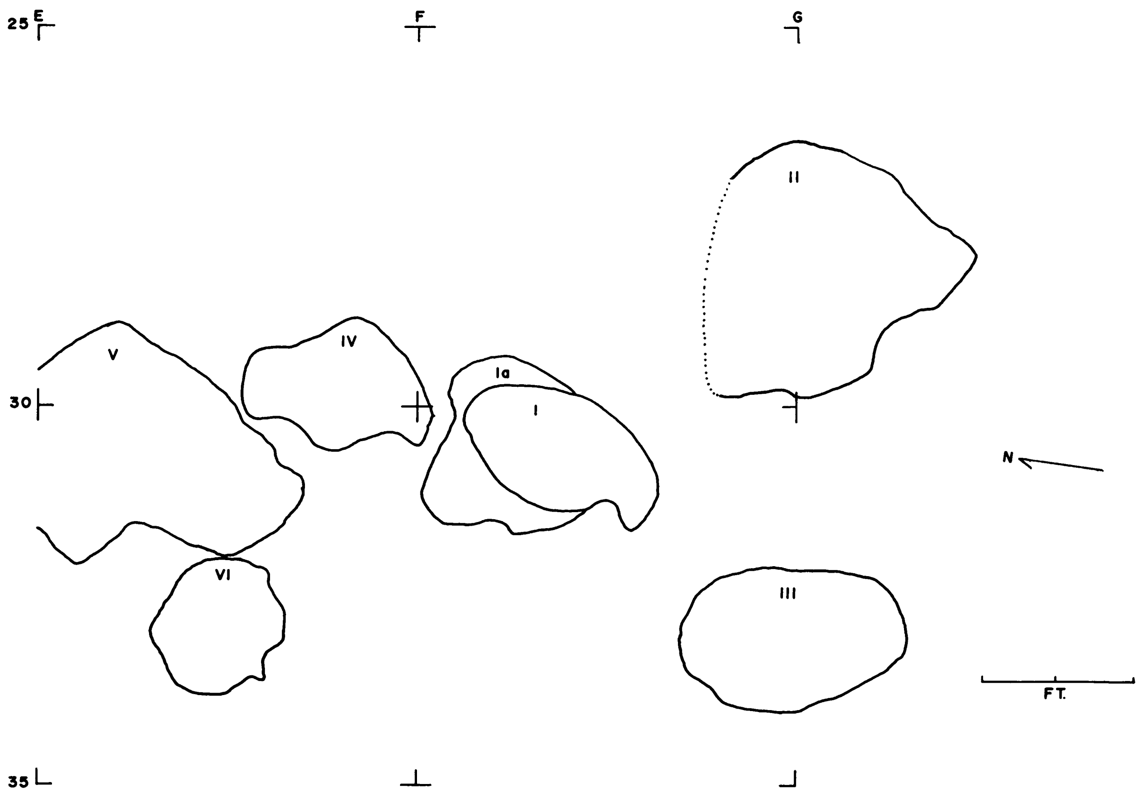


Fig. 7. Plan of the Features Found in Layer 1.

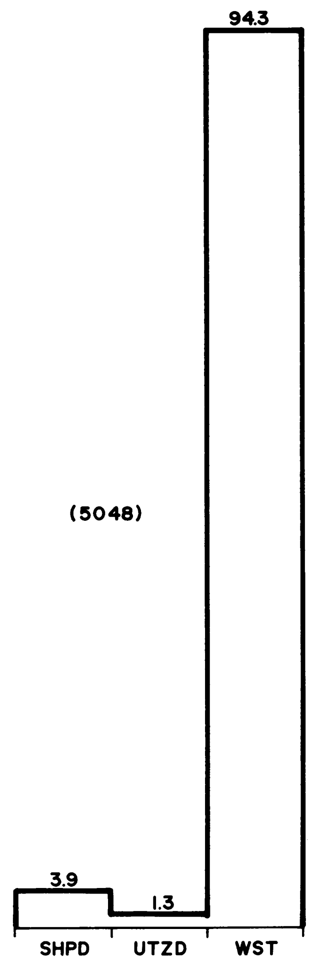


Fig. 8. Artifacts from Layer 1.

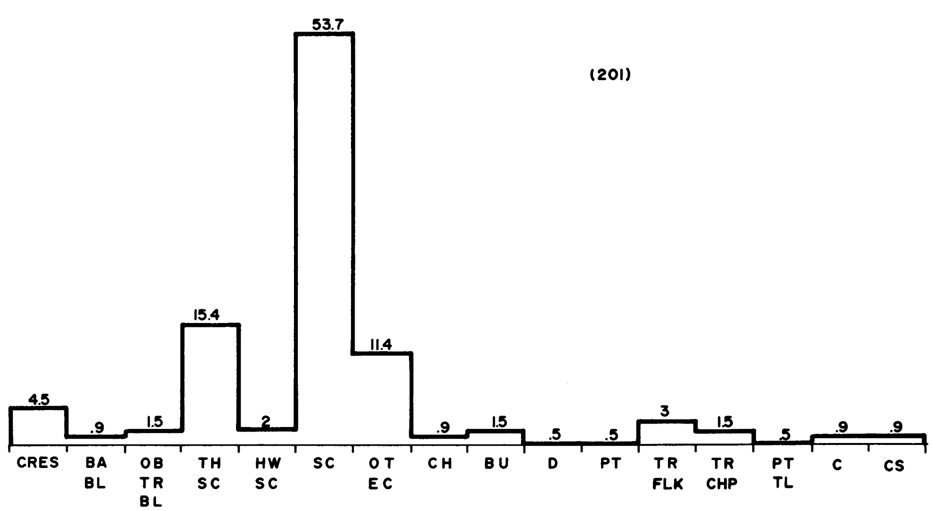


Fig. 9. Tools from Layer 1.

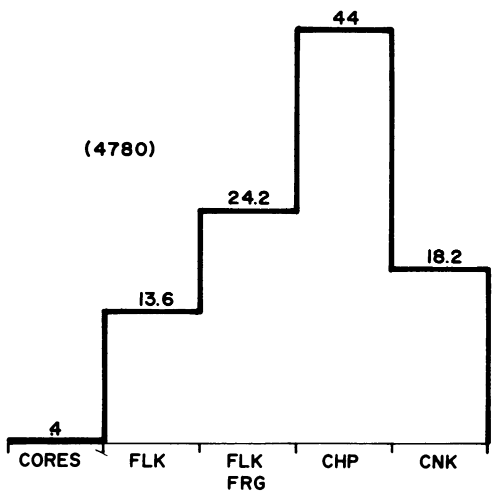


Fig. 10. Waste from Layer 1.

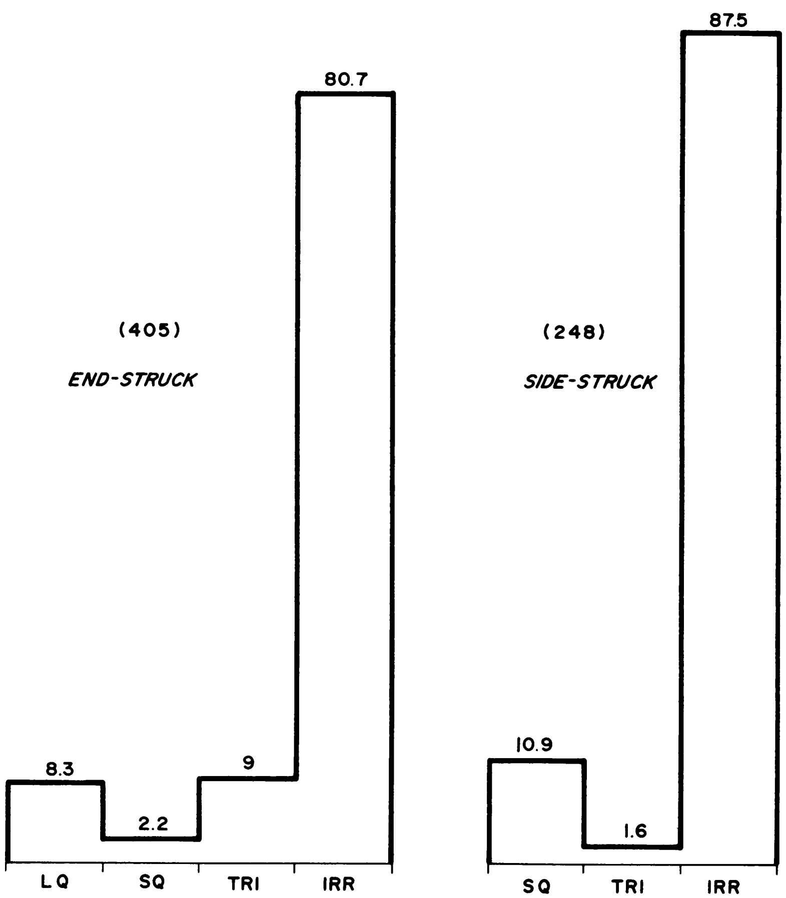


Fig. 11. Shapes of Layer 1 Flakes.

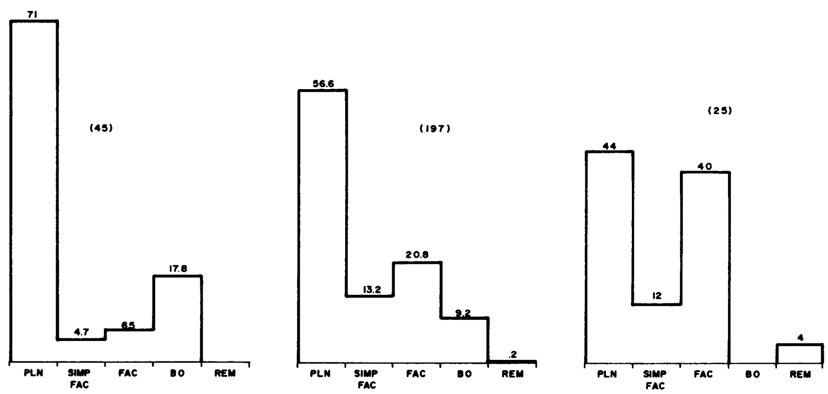


Fig. 12. Platforms on Selected Tool Types from Layer 2.

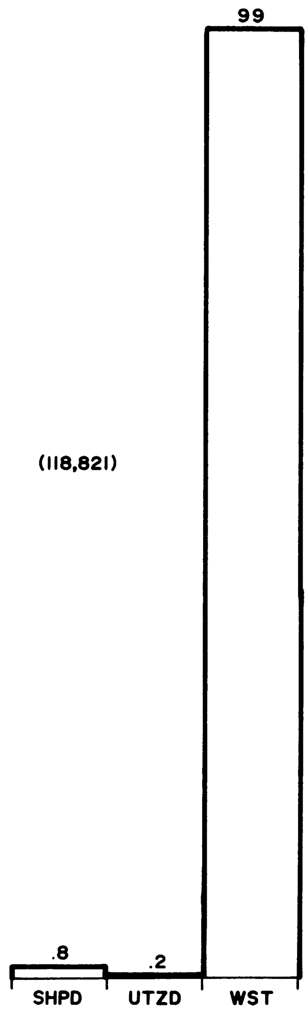


Fig. 13. Artifacts from Layer 2.

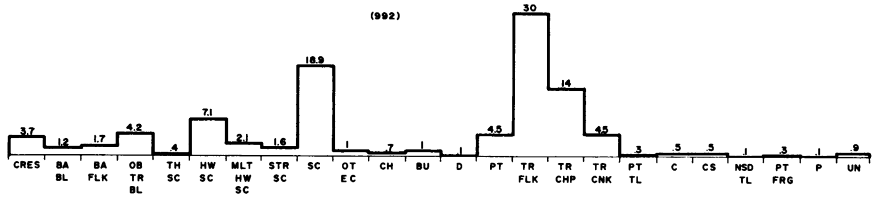


Fig. 14. Tools from Layer 2.

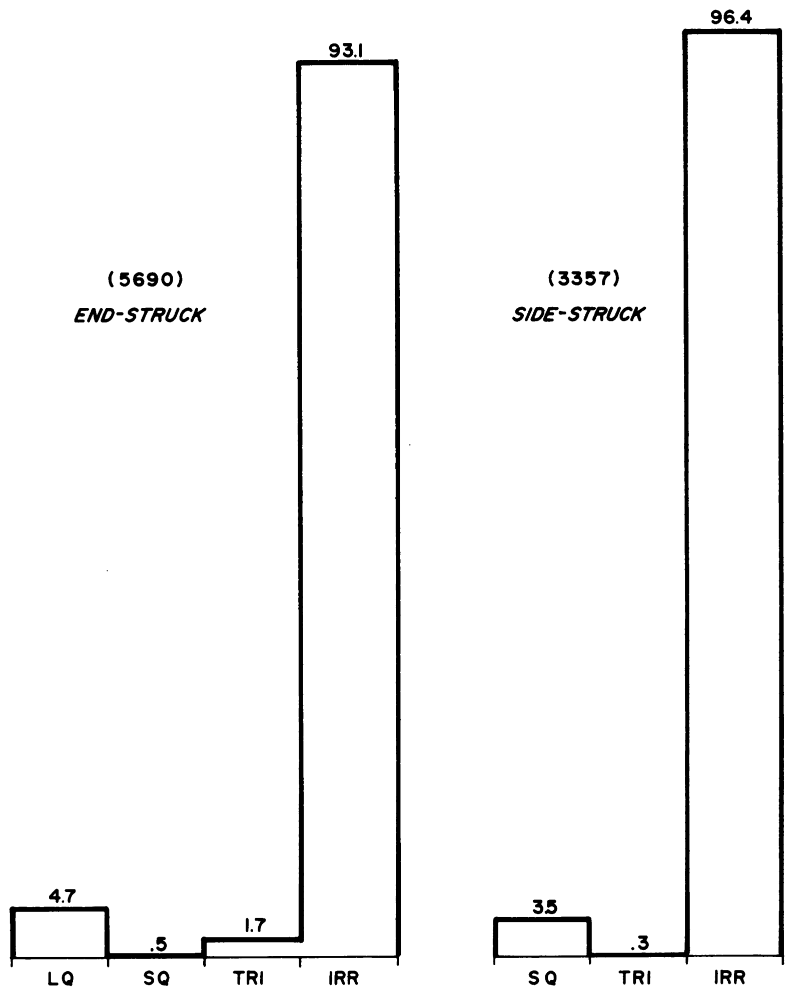


Fig. 15. Shapes of Layer 2 Flakes.

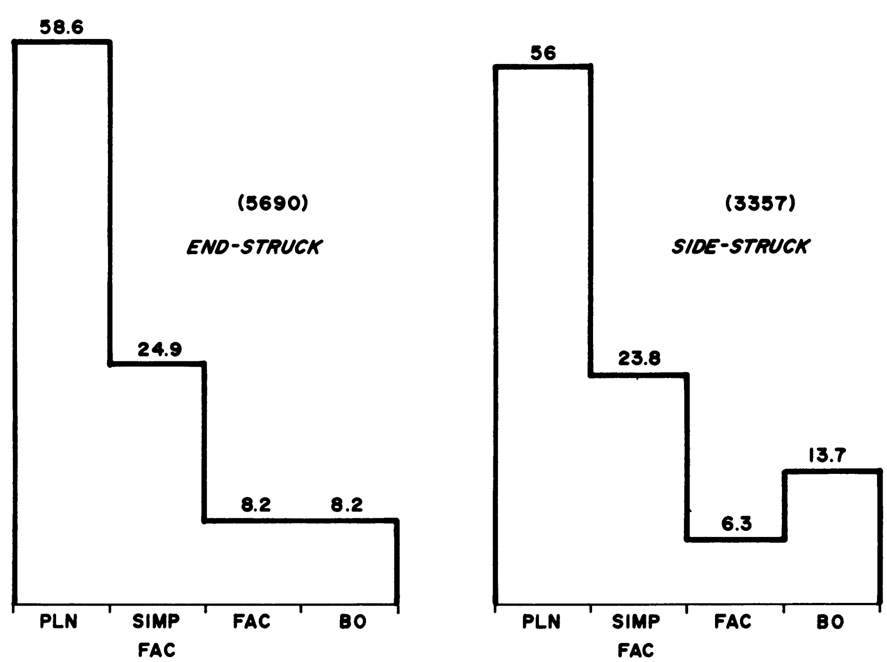


Fig. 16. Platforms on Layer 2 Flakes.

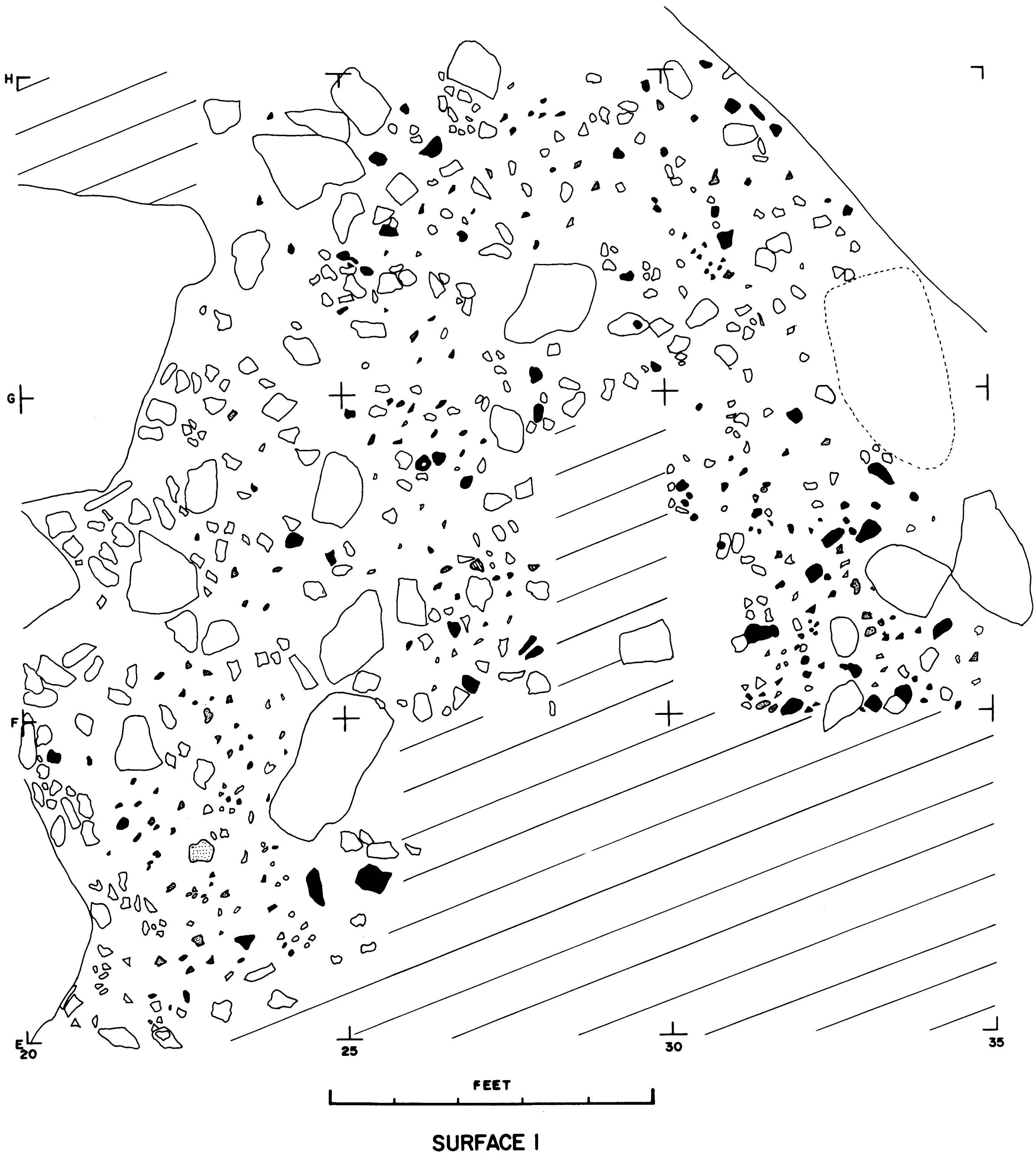
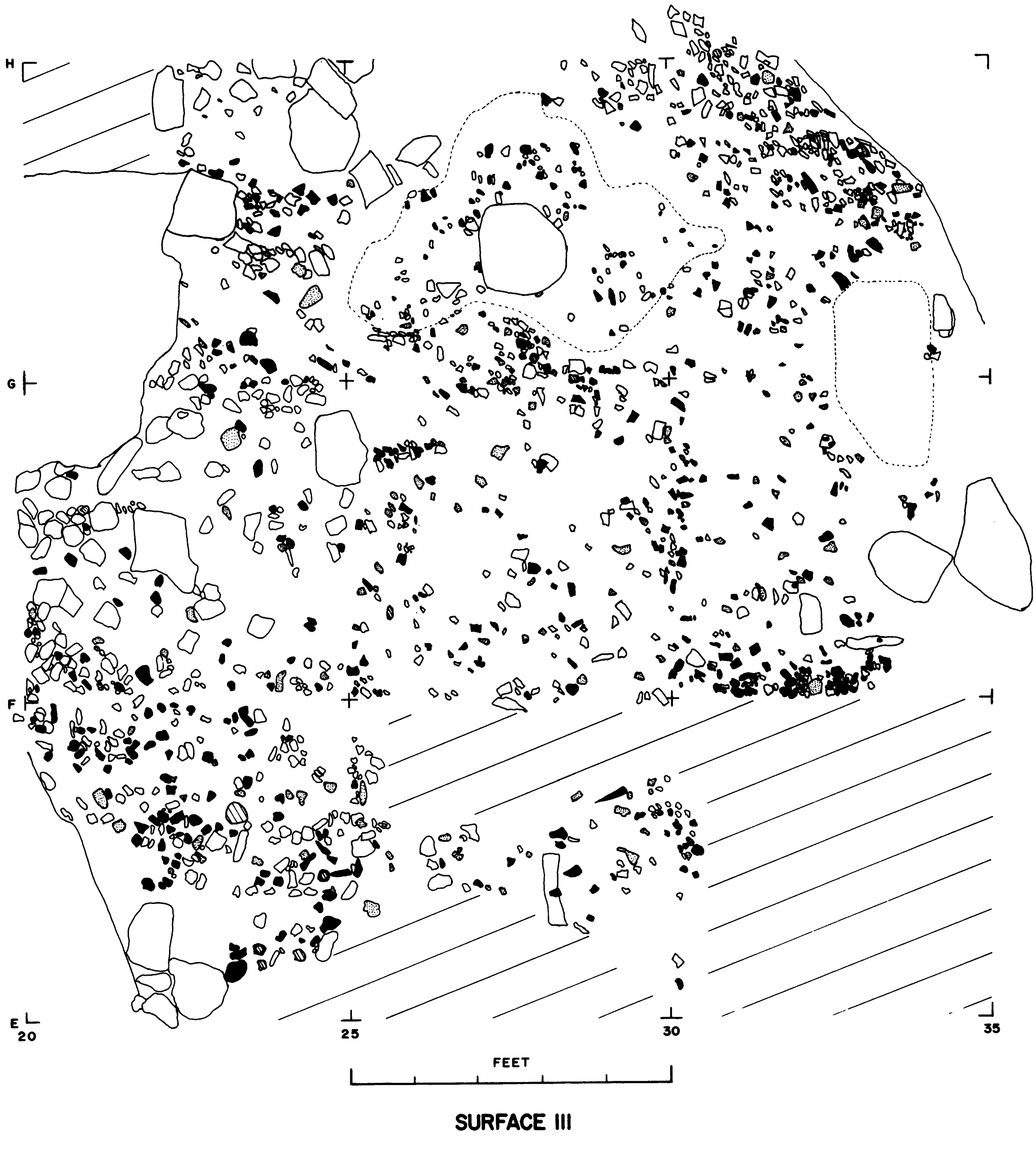


Fig. 17.

Fig. 18.



SURFACE III

Fig. 19.

Fig. 20.

Fig. 21.

Fig. 22.

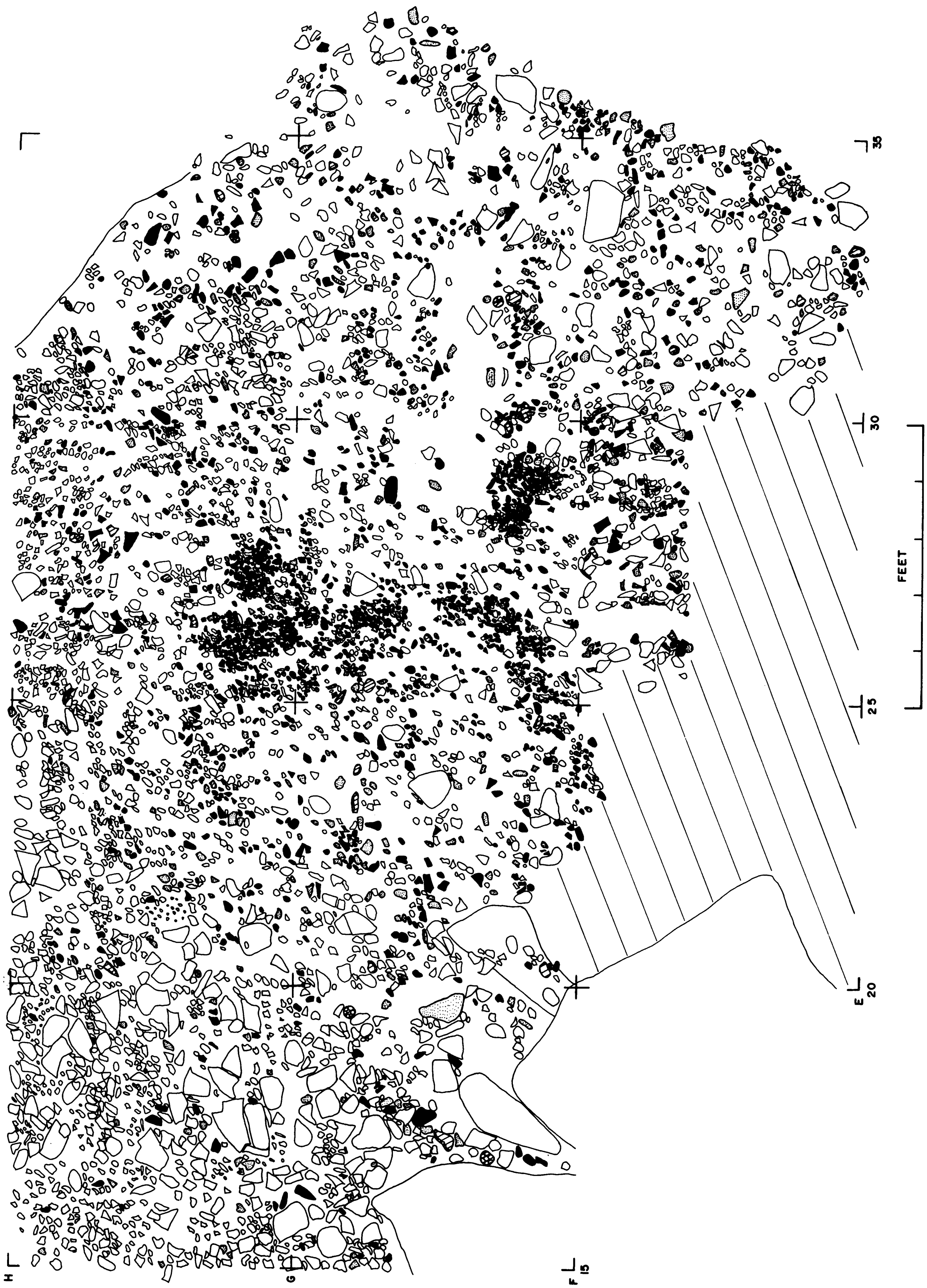


Fig. 23.

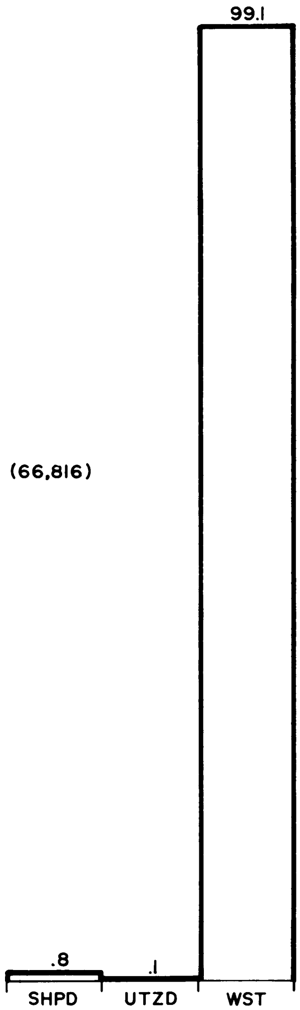


Fig. 24.
Artifacts from Layer 3.

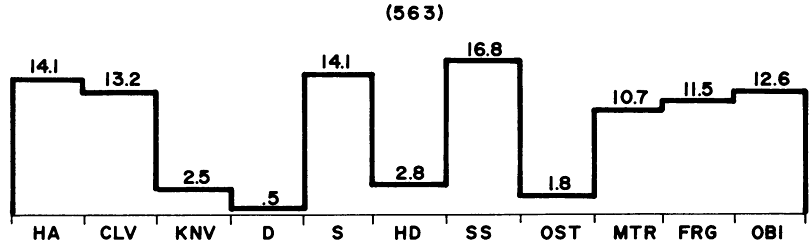


Fig. 25. Tools from Layer 3.

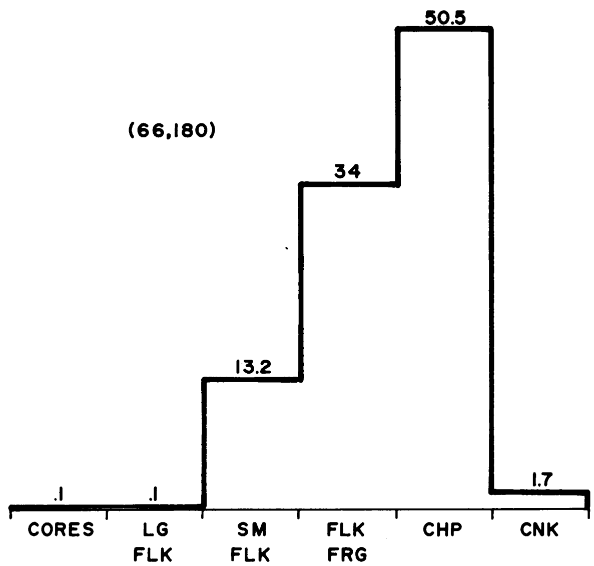


Fig. 26. Waste from Layer 3.

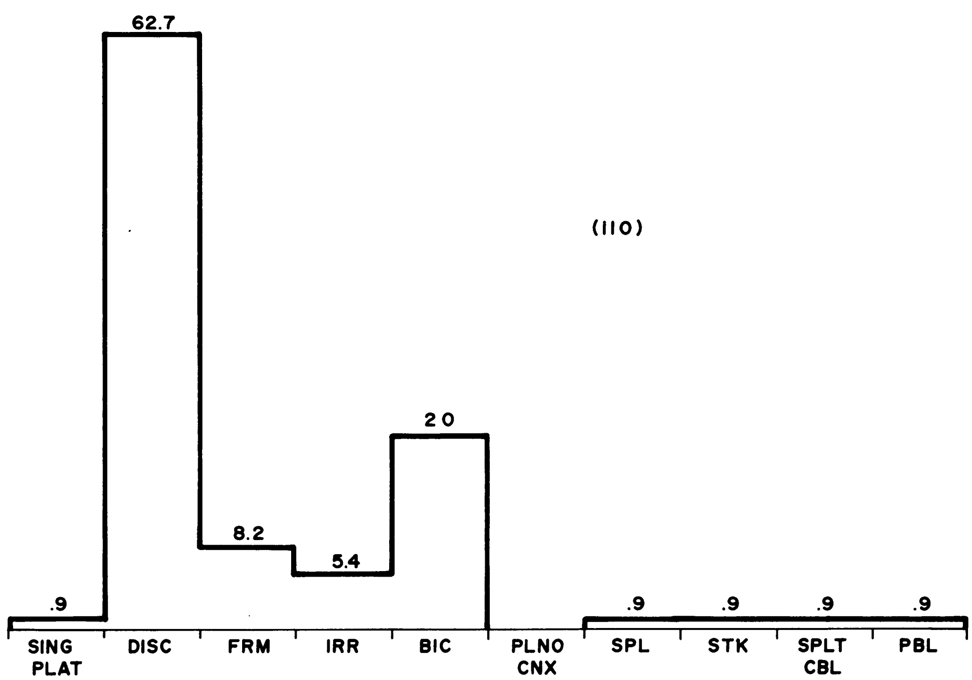


Fig. 27. Core Types from Layer 3.

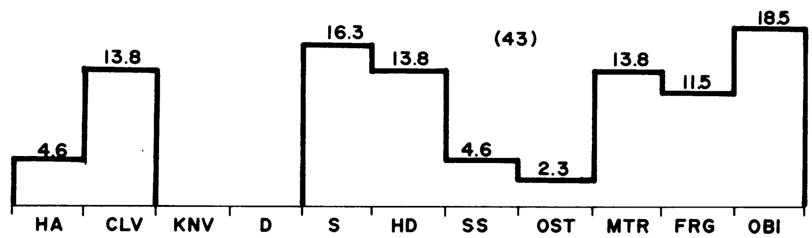


Fig. 29. Tools from Surface VIII

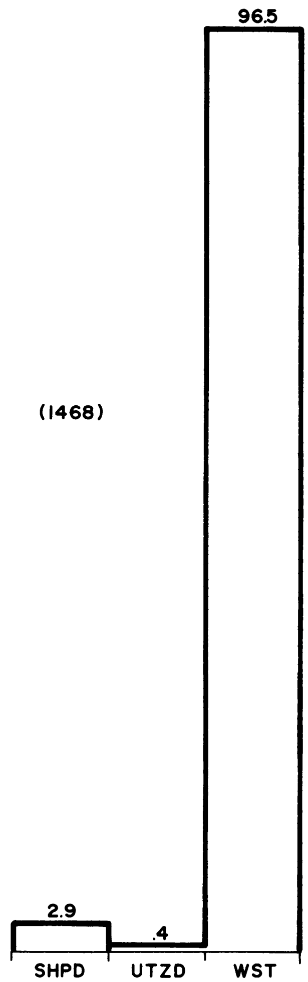


Fig. 28. Artifacts from Surface VIII.

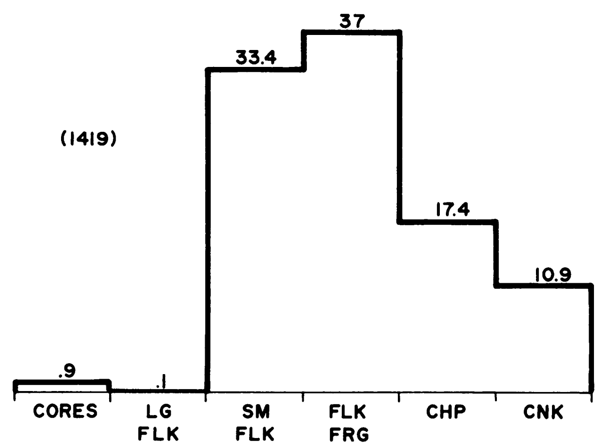


Fig. 30. Waste from Surface VIII.

Fig. 31.

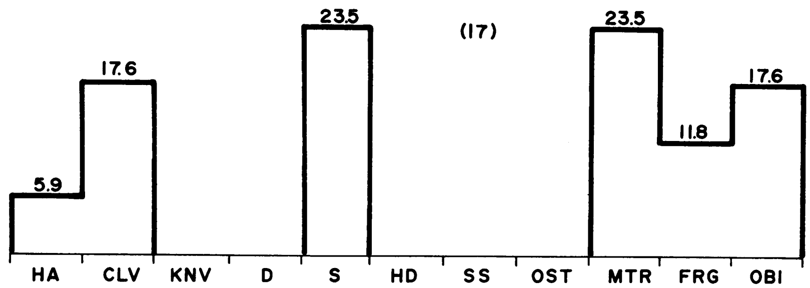


Fig. 33. Tools from Surface IX.

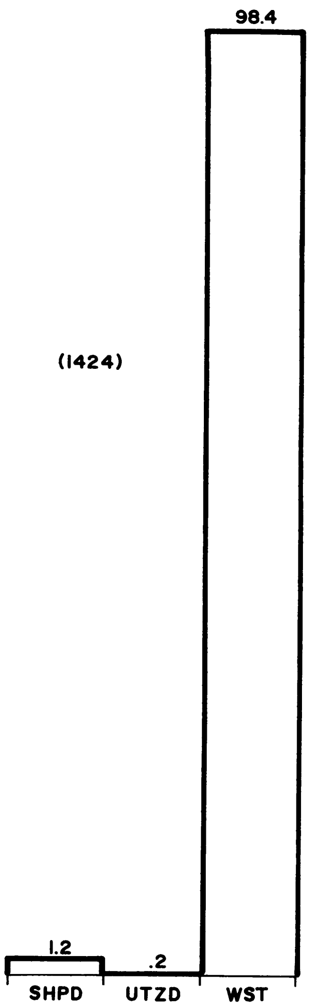


Fig. 32. Artifacts from Surface IX.

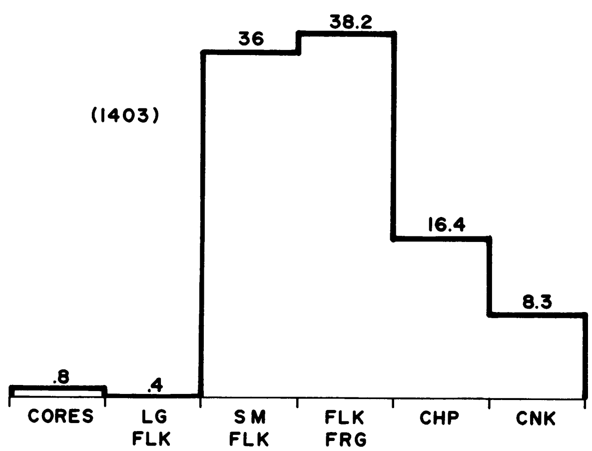


Fig. 34. Waste from Surface IX.

Fig. 35.

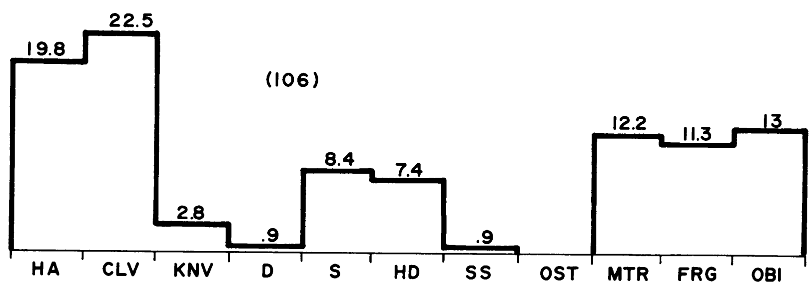


Fig. 37. Tools from Surface X.

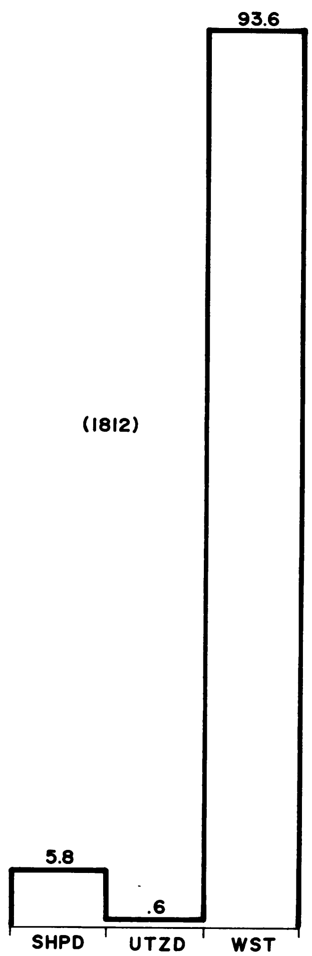


Fig. 36. Artifacts from Surface X.

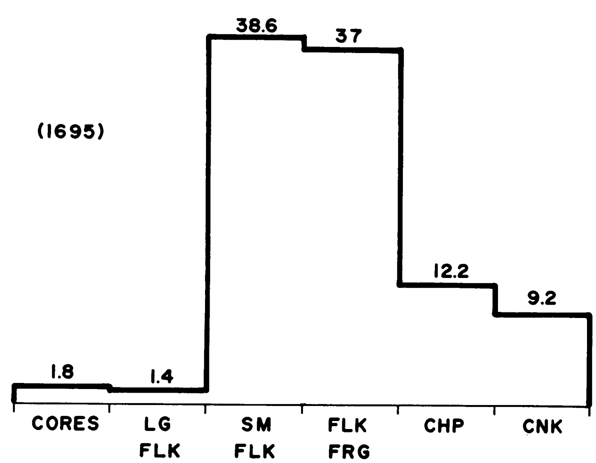
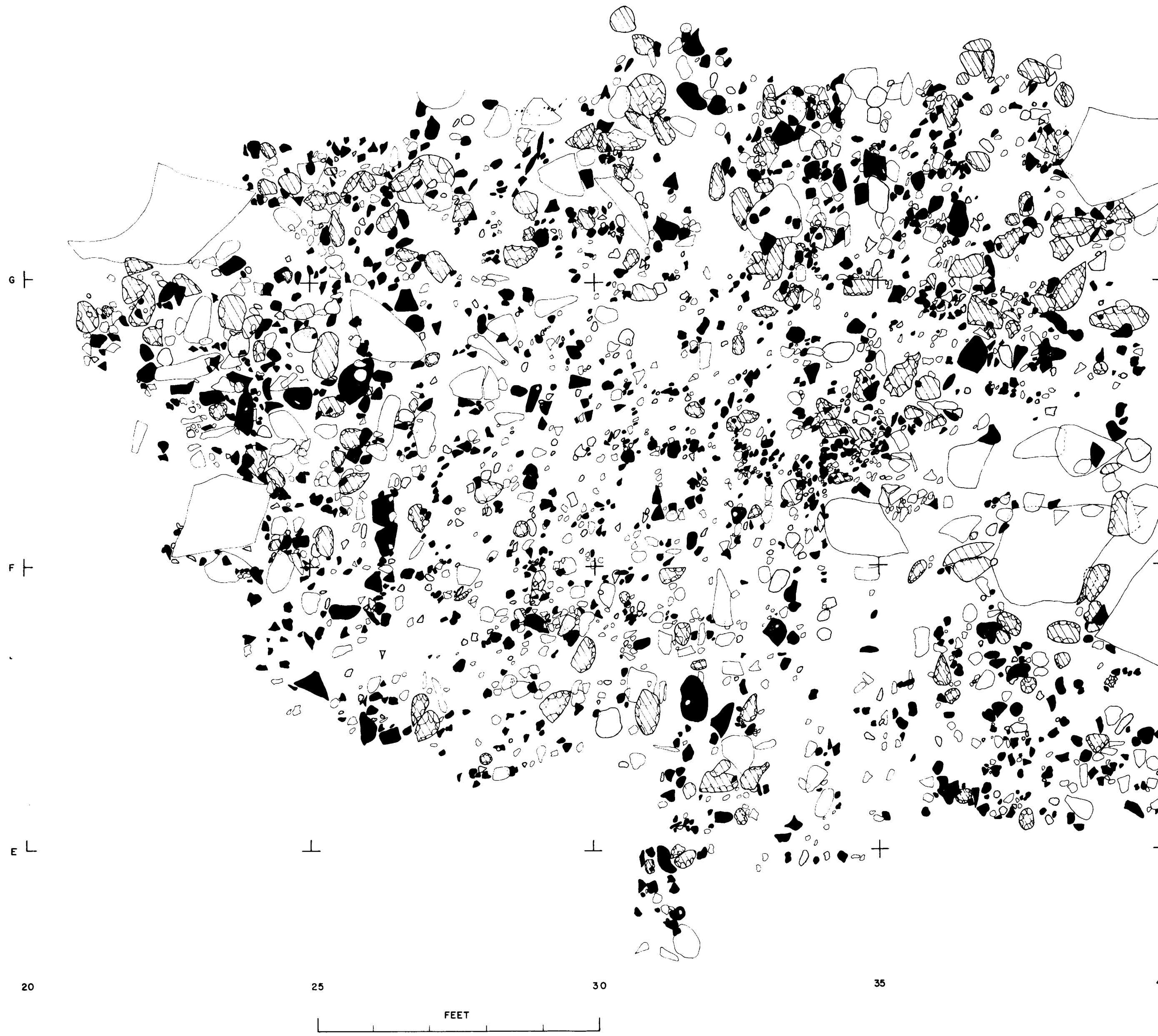


Fig. 38. Waste from Surface X.



SURFACE X

Fig. 39.

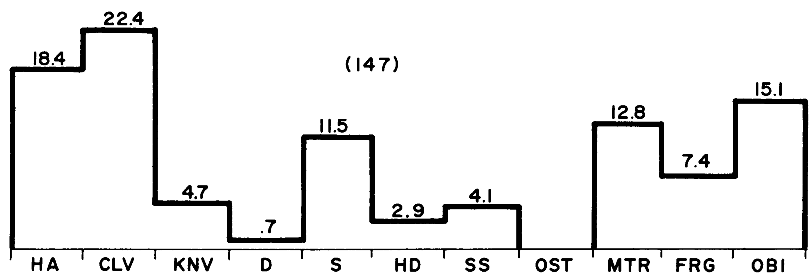


Fig. 41. Tools from Surface XI.

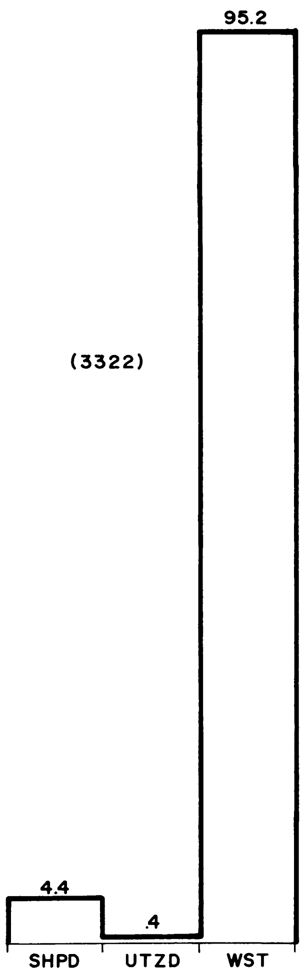


Fig. 40. Artifacts from Surface XI.

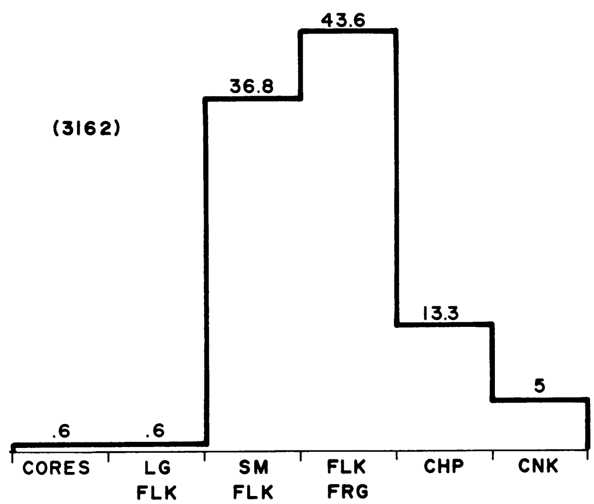


Fig. 42. Waste from Surface XI.

Fig. 43.

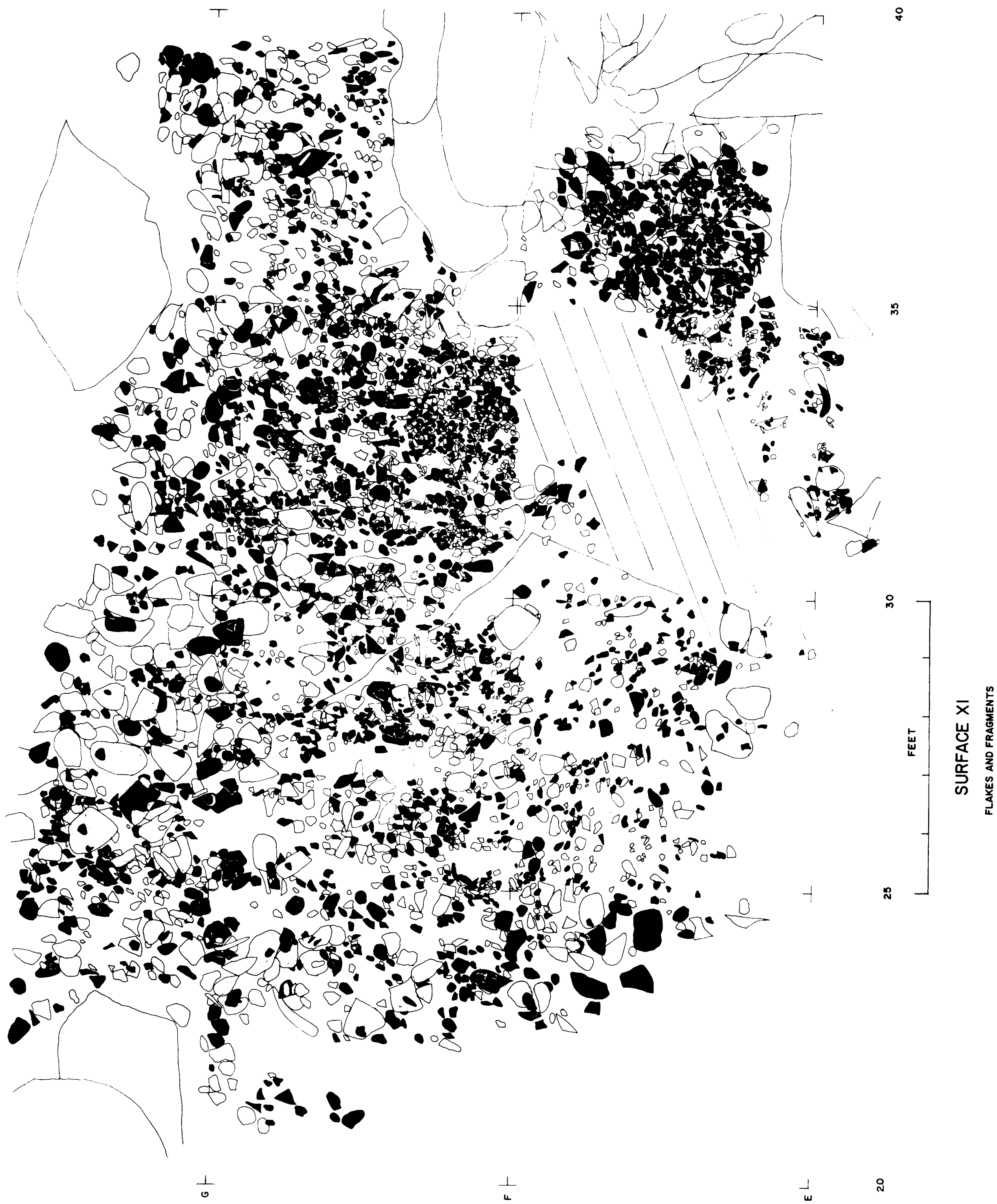


Fig. 44.

Fig. 45.

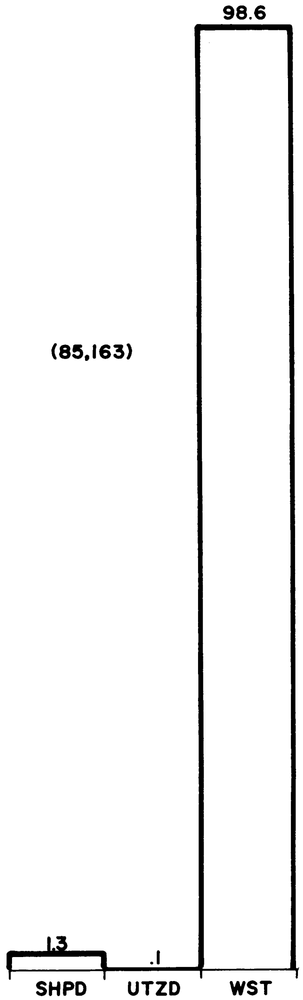


Fig. 46. Artifacts from Layer 5.

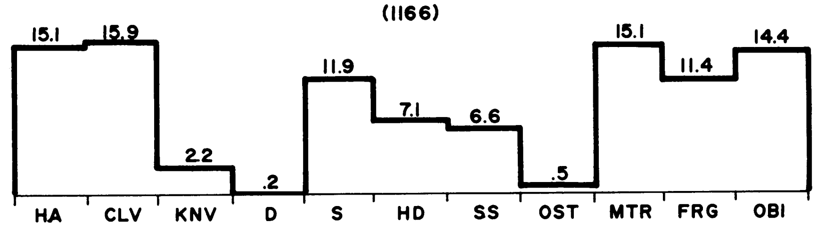


Fig. 47. Tools from Layer 5.

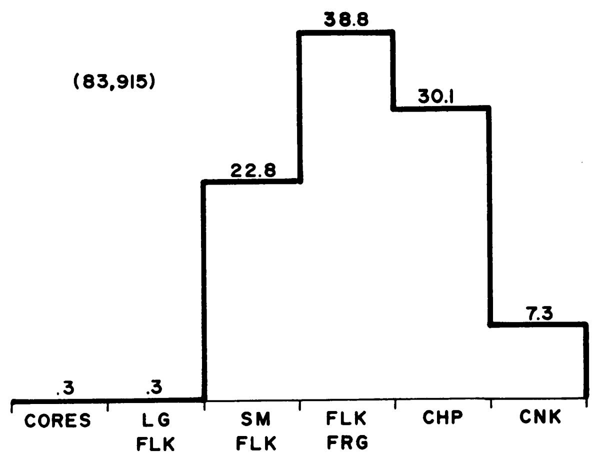


Fig. 48. Waste from Layer 5.

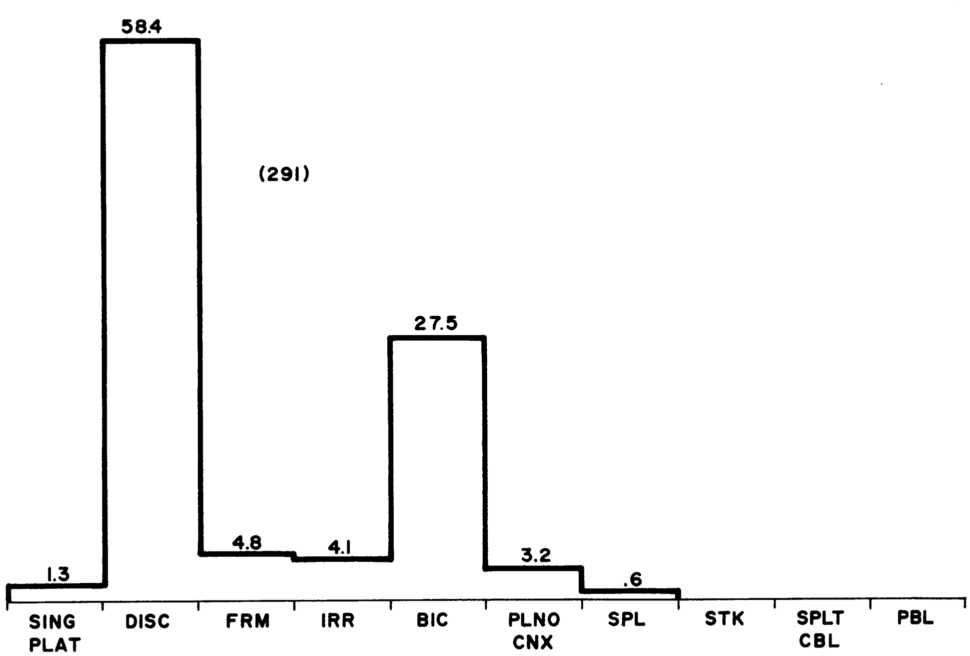


Fig. 49. Cores from Layer 5.

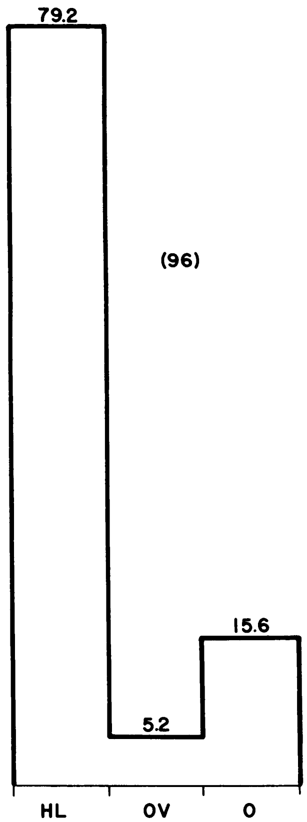


Fig. 50. Hand-Axe Shapes in Layer D, 1919 Excavation.

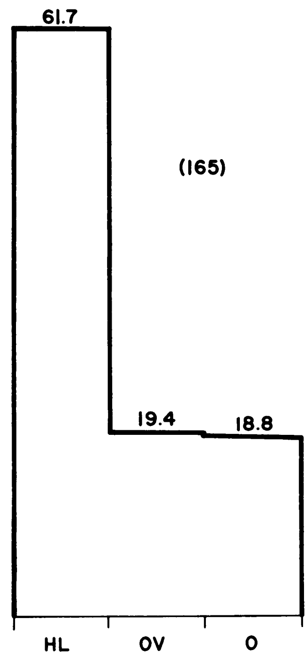


Fig. 51. Hand-Axe Shapes in Layer F, 1919 Excavation.

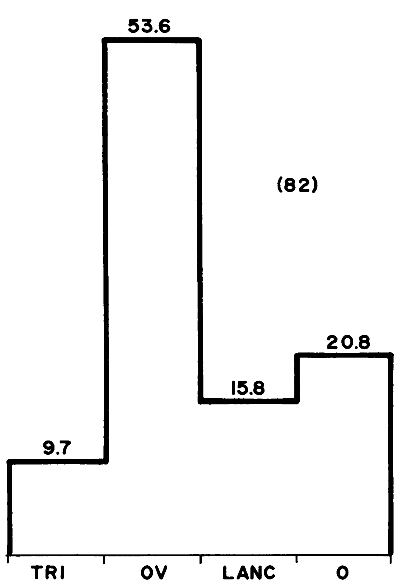


Fig. 52.
Hand-Axe Shapes in Layer 3.

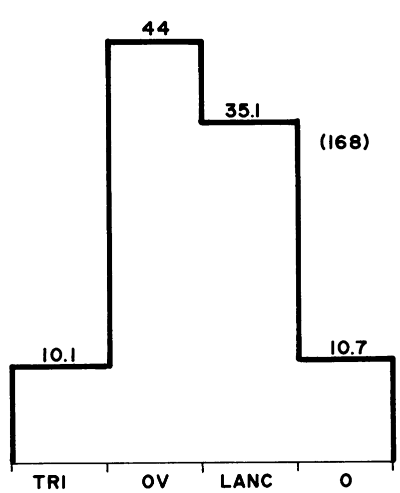


Fig. 53.
Hand-Axe Shapes in Layer 5.

PLATES

PLATE I

Layer 1

"Later Stone Age"

1. Short quadrilateral side-struck flake. Plain platform. Dorsal face is pebble cortex. Quartzite. 62 x 61 x 16 mm.
2. Long quadrilateral end-struck flake. Plain platform and irregular dorsal scars. Quartzite. 88 x 35 x 16 mm.
3. Trimmed flake. Long quadrilateral end-struck flake with plain platform and irregular dorsal scars. Trimmed on one side to irregular straight blunt edge and on opposite side for part of its length to straight steep edge; both on dorsal face. Quartzite. 96 x 37 x 13 mm.
4. Point. End-struck flake with plain platform. Trimmed on two sides on the dorsal face up to the tip. Weathered. 57 x 46 x 16 mm.
5. Thumbnail scraper. Convex blunt edge on distal end on dorsal face of end-struck flake with plain platform. Used on one side to straight shallow edge. Except where flaked, dorsal face is crystal face. Crystalline quartz. 32 x 19 x 8 mm.
6. Thumbnail scraper.
7. Scraper. Irregular side-struck flake with plain platform. Convex blunt edge on distal side trimmed on the dorsal face. Chert. 16 x 17 x 6 mm.
8. Thumbnail scraper. Irregular side-struck flake with plain platform. Convex shallow edge on the distal side on the dorsal face. Chert. 11 x 12 x 4 mm.
9. Concave scraper. Blade with a "bulb only" platform. Two concave blunt edges on one side on the dorsal face; and on the ventral face, a straight shallow edge. On opposite side there are two concave shallow edges on the ventral face, and a concave shallow edge on the dorsal face. Distal end has snapped off. Chert. 31 x 12 x 4 mm.
10. Outil écaillé. Made on a quartz crystal. Trimmed bifacially at one end to a biclino blunt edge. Shows the characteristic outil battering. One flake removed from one face from the opposite end. Crystalline quartz. 22 x 11 x 10 mm.
11. Blade. Plain platform and parallel dorsal scars. Chert. 14 x 6 x 1 mm.
12. Crescent. Made of crystalline quartz. Backed on dorsal face. 19 x 8 x 2 mm.
13. Crescent. Made of crystalline quartz. Backed from both ends on dorsal face; backing does not meet in middle. 16 x 8 x 3 mm.
14. Single-platform core. Trimming on one face of a chunk from a negative scar platform on one end. Chert. 28 x 23 x 16 mm.
15. Single-platform core. Trimmed from a fracture face on one end of a crystal chunk. Crystalline quartz. 25 x 15 x 11 mm.

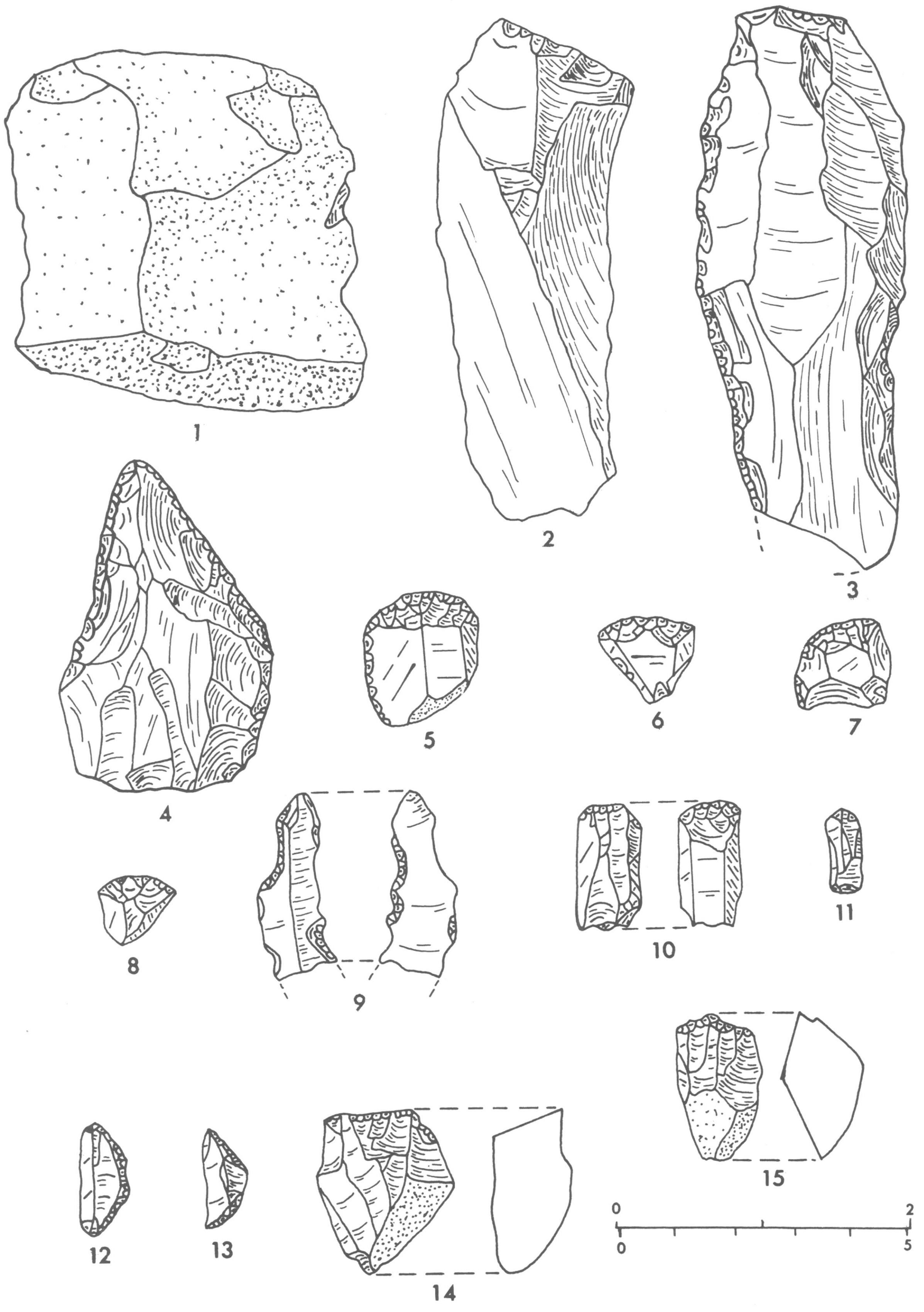


PLATE II

Layer 1

"Later Stone Age"

1. Thumbnail scraper. Convex blunt edge on one side of a chip on dorsal face. Used on an adjacent side to straight denticulate shallow edge. Chert. 15 x 16 x 5 mm.
2. Thumbnail scraper. Convex blunt edge on the side of a chip on the dorsal face. Quartzite. 15 x 14 x 6 mm.
3. Scraper. Convex blunt edge trimmed on one end and side of a chip on the dorsal face. Chert. 19 x 22 x 9 mm.
4. Thumbnail scraper. Convex steep edge on end of a chip on the dorsal face. Trimming runs around onto one side. Amorphous quartz. 23 x 19 x 9 mm.
5. Scraper. Irregular, convex steep edge on dorsal face on distal side of irregular side-struck flake. No platform trimming on proximal side prior to detaching flake. Chert. 14 x 21 x 7 mm.
6. Core trimming flake. Irregular end-struck flake with a "bulb only" platform. Cross section is triangular. One face carries the leading edge of the core. Platform of core was plain. Chert. 31 x 8 x 8 mm.
7. Thumbnail scraper. Convex steep edge on distal side on the dorsal face of a short quadrilateral side-struck flake with plain platform. Crystalline quartz. 12 x 12 x 7 mm.
8. Thumbnail scraper. Convex blunt edge on distal side of dorsal face of irregular side-struck flake with plain platform. Used on one end to straight blunt edge. Chert. 13 x 13 x 5 mm.
9. Single-platform core. Trimmed on one face from one end from a facetted platform on the opposite face. Crystalline quartz chunk. 22 x 11 x 8 mm.
10. Obliquely truncated blade. Crystalline quartz end-struck flake with a "bulb only" platform truncated on the dorsal face on the distal end. 18 x 8 x 4 mm.
11. Obliquely truncated blade. Backed along one side and obliquely truncated on the proximal end; all on the dorsal face. Chert. 24 x 9 x 3 mm.
12. Crescent. Backed on the dorsal face. Used on sharp edge to denticulate shallow edge on dorsal face. Crystalline quartz. 12 x 6 x 2 mm.
13. Crescent. Backed on the dorsal face. Central part of backed side not backed. Amorphous quartz. 16 x 7 x 3 mm.
14. Scraper. Convex blunt edge trimmed on one side on dorsal face of chip. Quartzite. 38 x 46 x 17 mm.
15. Short quadrilateral end-struck flake. Plain platform and irregular dorsal scars. Quartzite. 86 x 56 x 19 mm.
16. Scraper. Convex blunt edge on distal end and one side of irregular end-struck flake with plain platform. Trimmed on the ventral face. Chert. 37 x 27 x 11 mm.

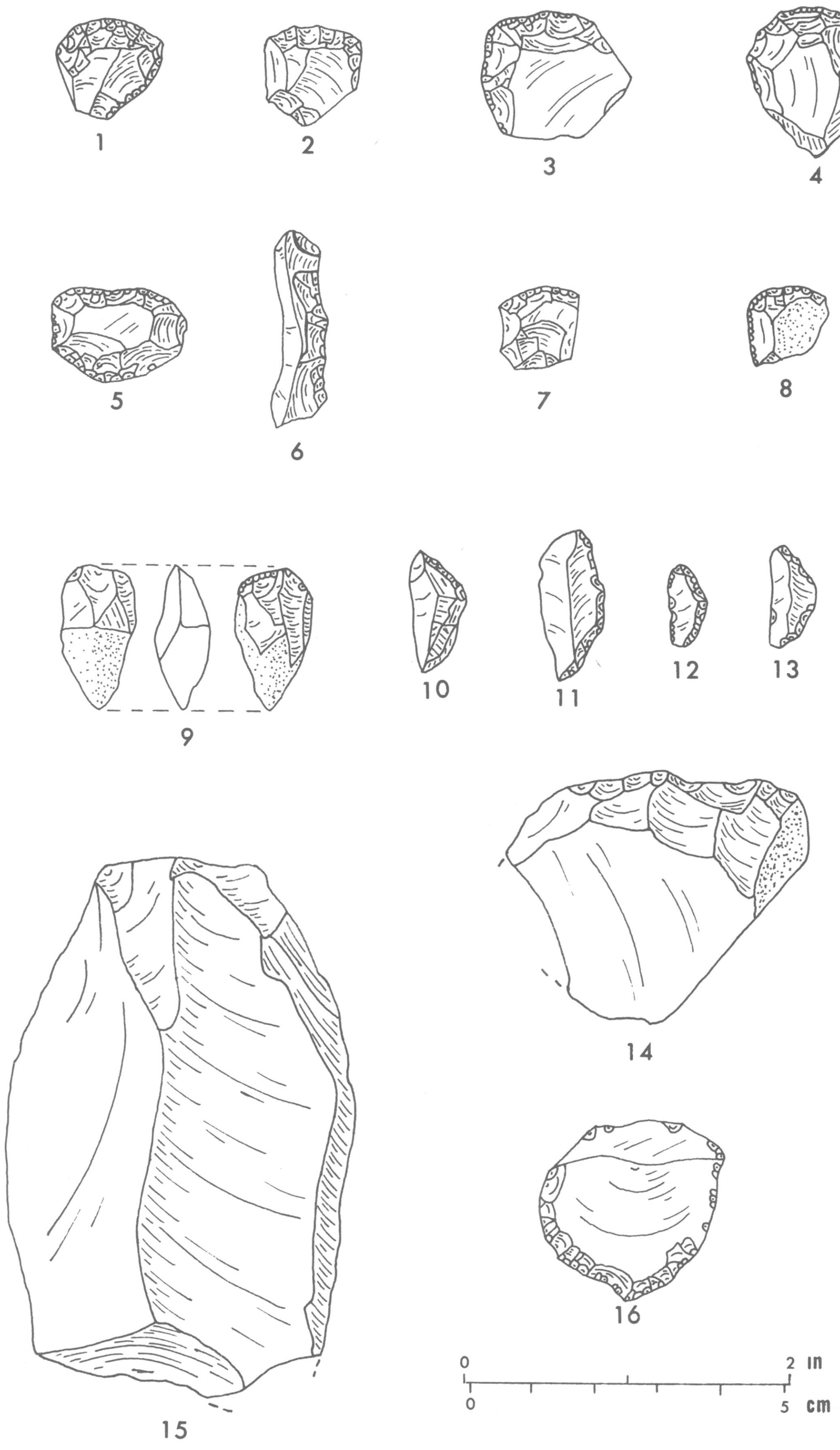


PLATE III

Layer 2

Howieson's Poort

Surface I

1. Trimmed flake. End-struck triangular flake with plain platform trimmed on part of both sides on the dorsal face. Convergent dorsal scars. Irregular blunt edge. Quartzite. 103 x 43 x 22 mm.
2. Irregular end-struck flake with simple-facetted platform. Irregular dorsal scars. Quartzite. 102 x 47 x 19 mm.
3. Trimmed flake. Triangular end-struck flake with simple-facetted platform trimmed on one side on dorsal face to straight shallow edge. Convergent dorsal scars. Quartzite. 98 x 43 x 13 mm.
4. Short quadrilateral end-struck flake. Plain platform and irregular dorsal scars. 71 x 35 x 14 mm.
5. Trimmed flake. End-struck flake with facetted platform trimmed on one side to convex shallow edge on dorsal face. Chert. 81 x 16 x 9 mm.
6. Fragment of trimmed flake. Trimmed on both sides on dorsal face. One side is straight blunt edge; the other is denticulate blunt edge. Snapped at both ends. Quartzite. 93 x 28 x 10 mm.
7. End-struck triangular flake. Simple-facetted platform and convergent dorsal scars. Quartzite. 52 x 35 x 12 mm.
8. End-struck triangular flake. Facetted platform. Used on one side on dorsal face to straight shallow edge. Irregular dorsal scars. Chert. 30 x 23 x 8 mm.
9. End-struck flake. Plain platform and convergent scars. Quartzite. 46 x 31 x 10 mm.
10. Fragment of trimmed flake. Trimmed on both sides on dorsal face. One blunt straight edge and one convex shallow edge. Quartzite. 27 x 28 x 8 mm.

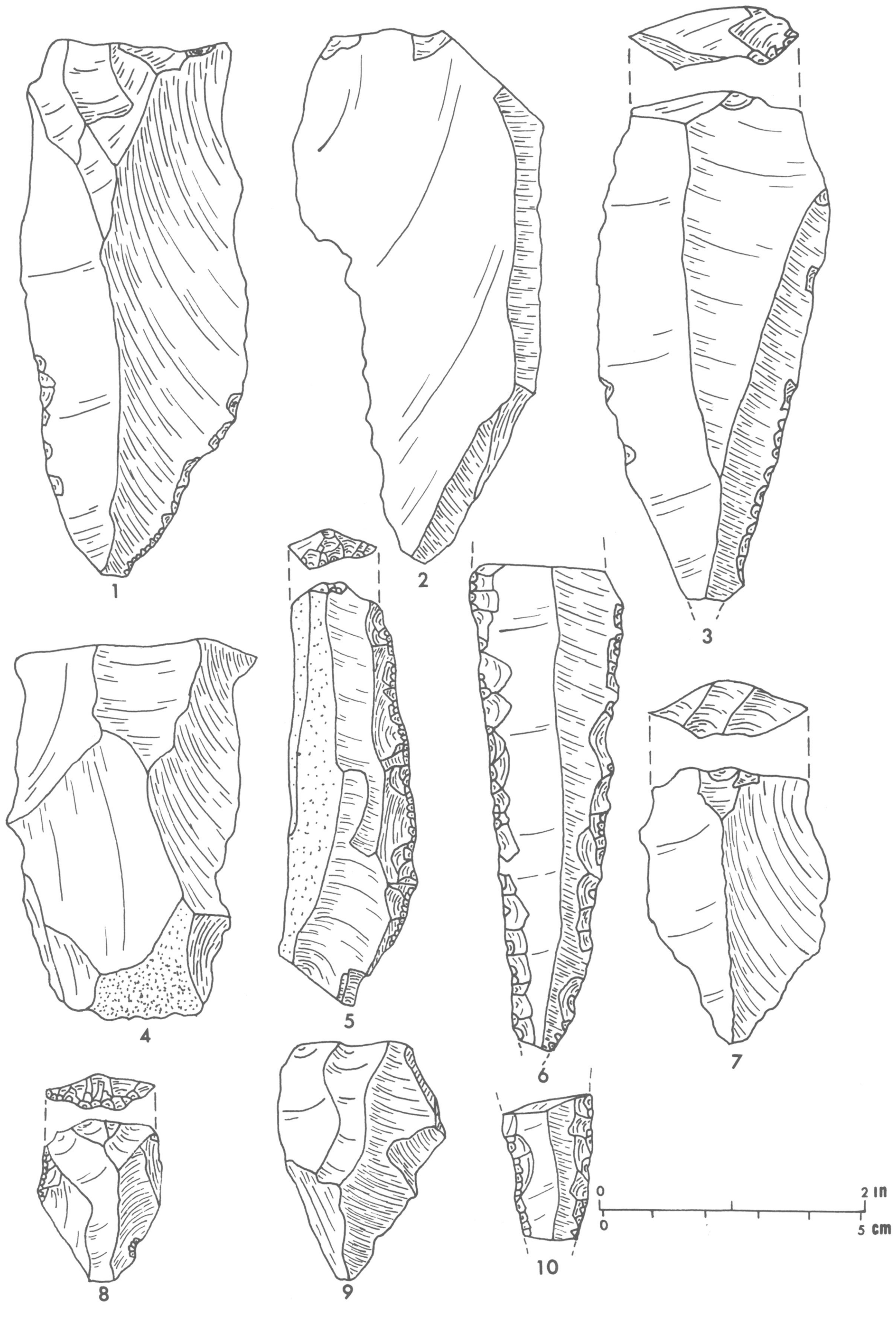


PLATE IV

Layer 2

Howieson's Poort

Surface II

1. Fragment of trimmed flake. Irregular end-struck flake with facetted platform. Trimmed on one side and distal end on ventral face to irregular blunt edge. Irregular dorsal scars. Quartzite. 104 x 64 x 25 mm.
2. Scraper. Irregular side-struck flake with plain platform. Irregular dorsal scars. Irregular convex blunt edge on one side, and straight shallow edge on opposite side both on dorsal face. Quartzite. 72 x 72 x 30 mm.
3. Irregular end-struck flake. Facetted platform and convergent scars. Quartzite. 54 x 34 x 14 mm.
4. Trimmed flake. Long quadrilateral end-struck flake with plain platform trimmed on one side on dorsal face to straight shallow edge. Parallel dorsal scars. Quartzite. 105 x 52 x 14 mm.
5. Fragment of end-struck triangular flake. Facetted platform and convergent dorsal scars. Quartzite. 27 x 26 x 9 mm.
6. Irregular end-struck flake. Facetted platform and parallel dorsal scars. Quartzite. 74 x 35 x 14 mm.

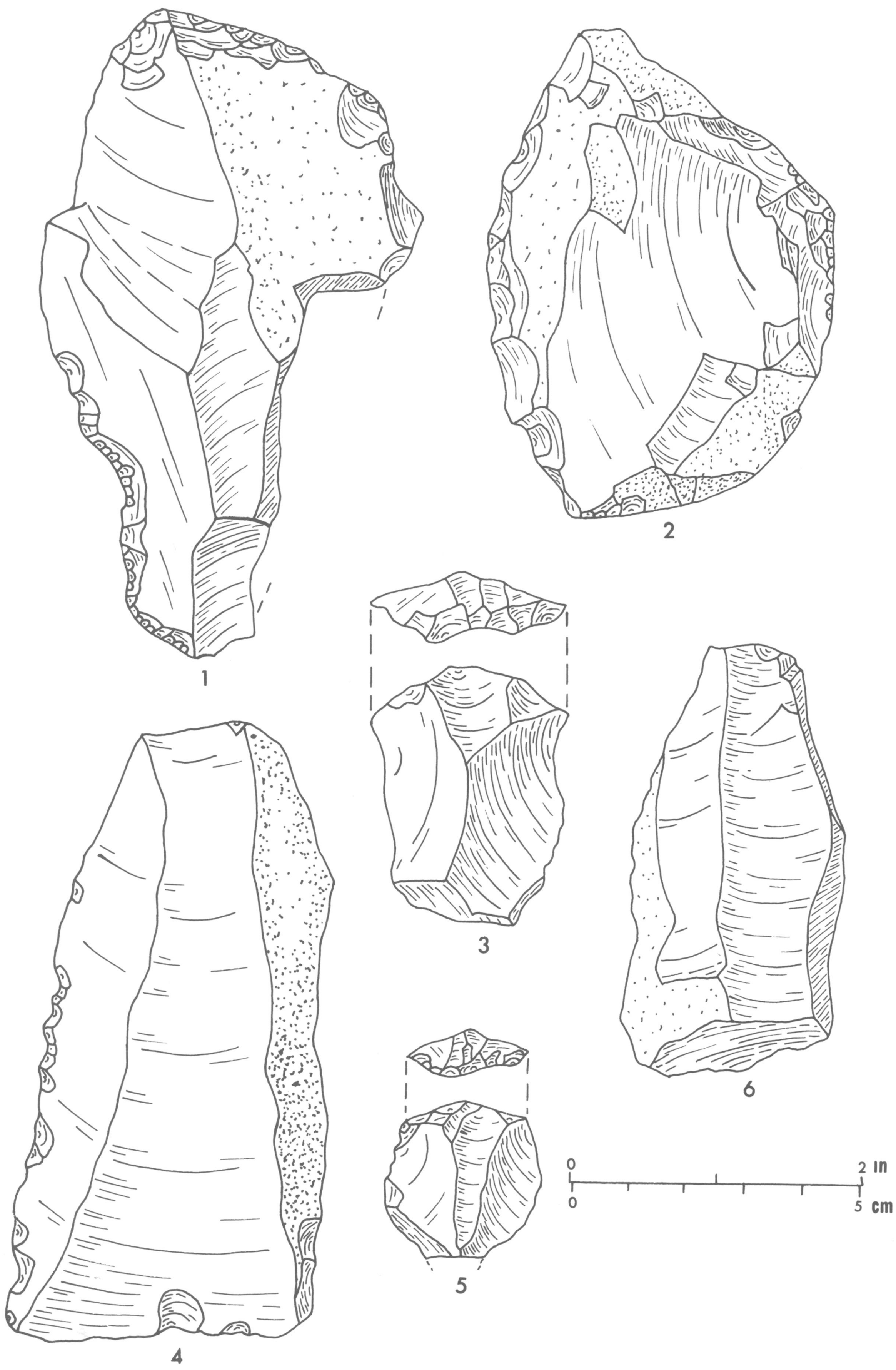


PLATE V

Layer 2

Howieson's Poort

Surface III

1. Core trimming flake. Plain platform. Triangular cross section. One dorsal face has parallel scars, and on adjacent face there is a series of parallel step-flake scars at right angles to those just mentioned. Quartzite. 143 x 51 x 25 mm.
2. Long quadrilateral end-struck flake. Plain platform and irregular dorsal scars. Quartzite. 35 x 43 x 14 mm.
3. Fragment of trimmed flake. End-struck flake with facetted platform and convergent dorsal scars, trimmed on both sides on dorsal face. One edge is irregular blunt; opposite edge is irregular convex shallow. Quartzite. 76 x 35 x 16 mm.
4. Disc core. Made on a flake. Trimmed radially on the dorsal face. Platform of flake removed. Utilized on part of one side. Quartzite. 55 x 45 x 20 mm.
5. Single-platform core. Trimmed convergently on one face from a facetted platform. Opposite face is natural fracture face. Chert. 43 x 35 x 12 mm.
6. Single-platform core. Trimmed on one end from a cortex face. Quartzite. 20 x 23 x 24 mm.
7. Triangular end-struck flake. Facetted platform and convergent dorsal scars. Quartzite. 73 x 32 x 9 mm.
8. Obliquely truncated blade. Facetted platform. Truncated at distal end on the dorsal face. Chert. 31 x 12 x 3 mm.
9. Short quadrilateral end-struck flake. Plain platform and parallel dorsal scars. Quartzite. 48 x 38 x 11 mm.
10. End-struck triangular flake. Plain platform and convergent dorsal scars. Quartzite. 23 x 22 x 5 mm.
11. Scraper. Convex steep edge on one end of crystal chunk. Crystalline quartz. 14 x 10 x 11 mm.

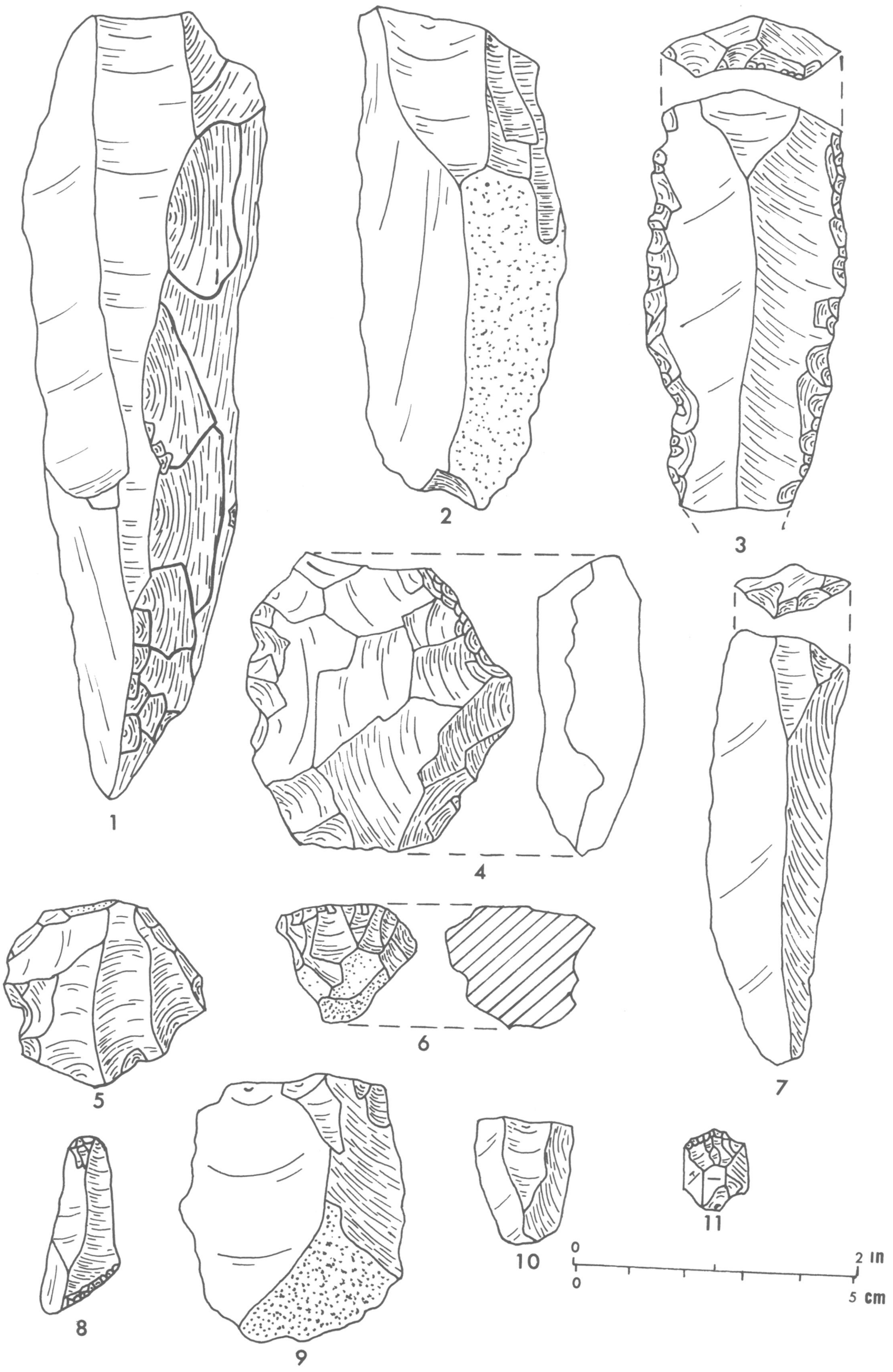


PLATE VI

Layer 2

Howieson's Poort

Surface IV

1. Irregular core. Irregular trimming on both faces. Irregular shape. Quartzite. 72 x 61 x 29 mm.
2. Scraper. Convex, shallow edge on distal end of short quadrilateral flake with plain platform. Trimmed on dorsal face. Parallel dorsal scars. Quartzite. 97 x 62 x 17 mm.
3. Scraper. Irregular convex blunt edge on dorsal face. Made on an irregular end-struck flake with "bulb only" platform. Quartzite. 67 x 52 x 29 mm.
4. Fragment of trimmed flake. End-struck flake with plain platform. Two concave, shallow edges, one on each side on dorsal face. Chert. 31 x 26 x 3 mm.
5. Abraded hematite. Five abraded faces. 47 x 21 x 17 mm.
6. End-struck, long quadrilateral flake. Plain platform. Chert. 44 x 26 x 6 mm.
7. Long quadrilateral end-struck flake. Plain platform. Chert. 27 x 9 x 3 mm.
8. Long quadrilateral end-struck flake. Plain platform. Chert. 19 x 7 x 2 mm.
9. Fragment of trimmed flake. End-struck flake with plain platform. Trimmed on one side to a denticulate shallow edge, and on the opposite side to an irregular shallow edge; both on the dorsal face. Distal end snapped off. Quartzite. 64 x 27 x 9 mm.
10. Triangular end-struck flake. "Bulb only" platform and convergent dorsal scars. Quartzite. 63 x 41 x 13 mm.

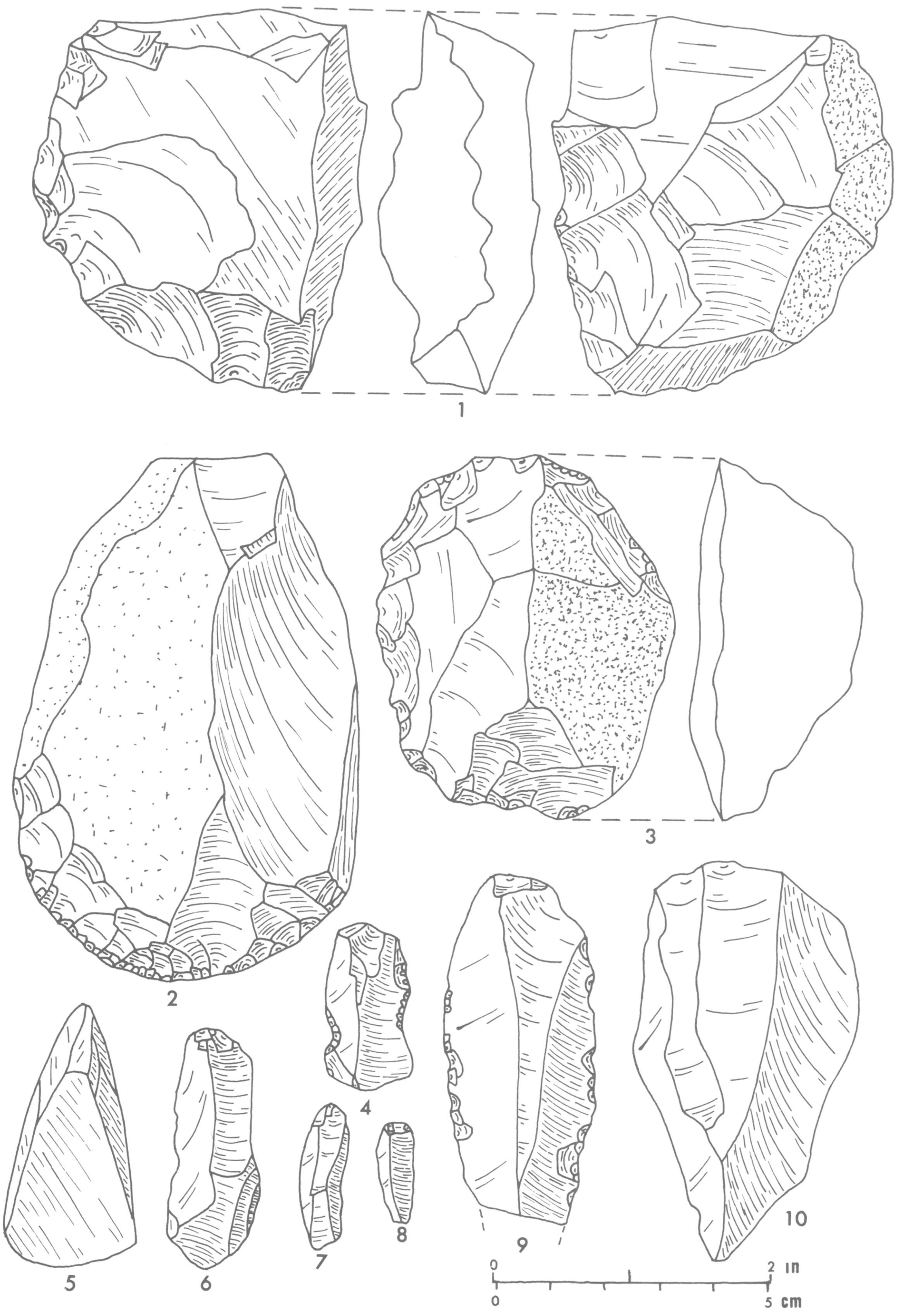


PLATE VII

Layer 2

Howieson's Poort

Surface IV: 1, 2, and 4
Surface V: 3, 5-13

1. End-struck triangular flake. Plain platform and convergent dorsal scars. Trimmed on one side to a convex shallow edge. Quartzite. 110 x 52 x 23 mm.
2. Trimmed flake. Irregular end-struck flake with plain platform. Trimmed on one side to irregular straight, shallow edge; and on distal end to concave, blunt edge. All on dorsal face. Quartzite. 96 x 49 x 13 mm.
3. Irregular end-struck flake. Simple-facetted platform and convergent dorsal scars. Quartzite. 98 x 42 x 10 mm.
4. Single-platform core. Irregular shape. Trimmed on one end from a negative scar platform. Chert. 20 x 21 x 12 mm.
5. Disc core. Trimmed radially over about one-half of both faces. Subcircular shape. Chert. 29 x 26 x 19 mm.
6. Trimmed flake. Long quadrilateral end-struck flake with facetted platform. Trimmed on one side to concave shallow edge, and on opposite side to irregular shallow edge; both on dorsal face. Chert. 72 x 31 x 10 mm.
7. Fragment of trimmed flake. End-struck flake with facetted platform. Irregular dorsal scars. Trimmed on one side to straight shallow edge, on dorsal face. Chert. 58 x 39 x 8 mm.
8. Trimmed chunk. Trimmed on two sides and around one end to irregular, steep-to-blunt edge on one face. Chert. 46 x 21 x 13 mm.
9. Disc core. Trimmed radially on one face. Chert. 21 x 18 x 7 mm.
10. Parti-bifacial point. Made on a chunk. Trimmed bifacially, but most trimming is on one face. Chert. 43 x 37 x 9 mm.
11. Irregular end-struck flake. "Bulb only" platform and irregular dorsal scars. Chert. 38 x 11 x 3 mm.
12. Flake fragment. Plain platform and irregular scars. Distal end snapped off. Chert. 19 x 8 x 2 mm.
13. Single-platform core. Trimmed on one side from a natural fracture surface platform. Chert. 29 x 24 x 17 mm.

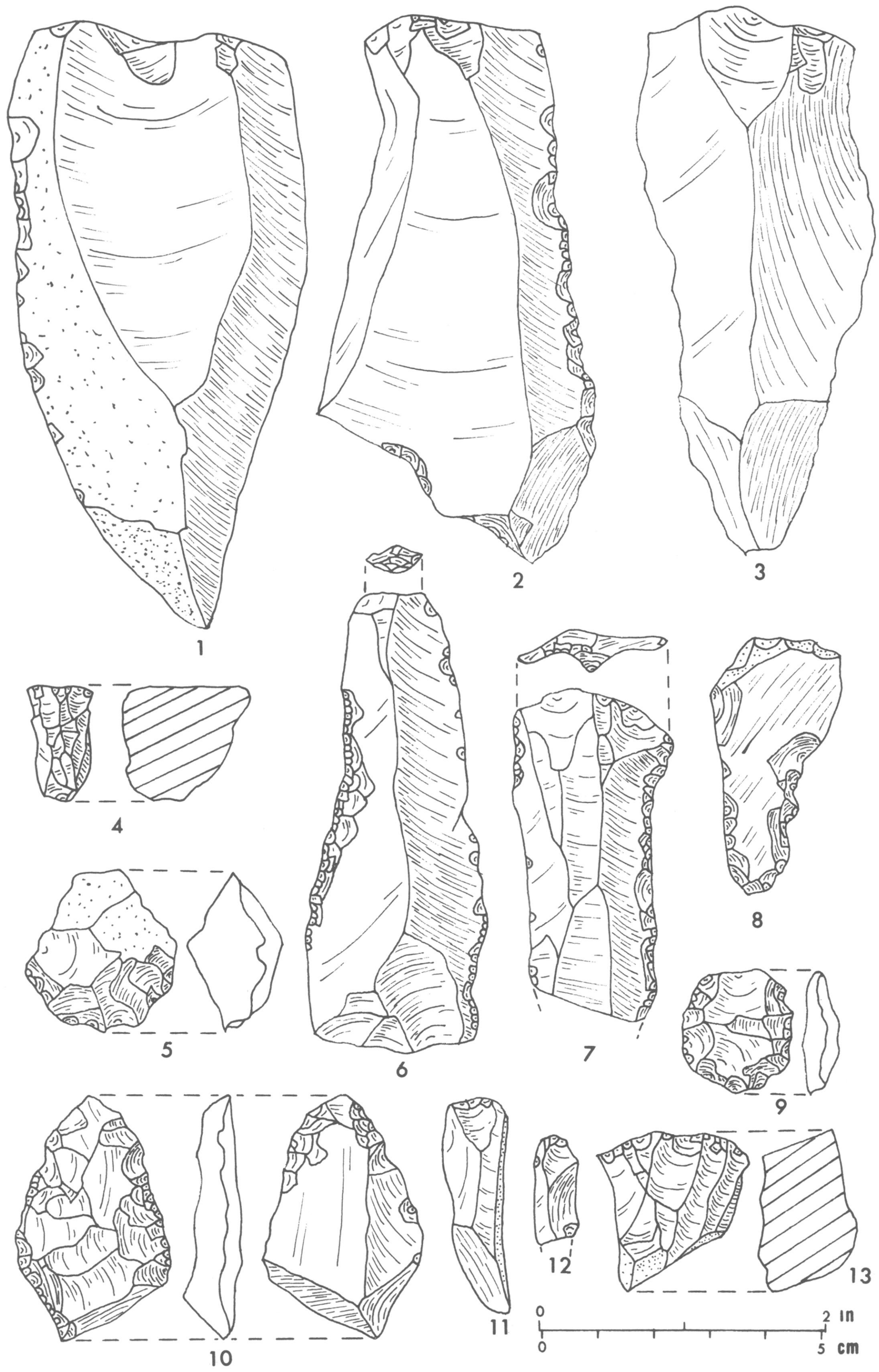


PLATE VIII

Layer 2

Howieson's Poort

Surface V: 1-4
Surface VI: 5-12

1. Struck core. Trimmed radially on flatter face; then one large flake detached from a facetted platform at one end. Quartzite. 62 x 47 x 22 mm.
2. Disc core. Trimmed radially on one face. Quartzite. 63 x 67 x 24 mm.
3. End-struck short quadrilateral flake. Plain platform and cortex dorsal face. Quartzite. 54 x 50 x 14 mm.
4. End-struck triangular flake. Simple-facetted platform and convergent dorsal scars. Quartzite. 52 x 41 x 13 mm.
5. Disc core. Irregular shape and trimmed radially on one face. Quartzite. 54 x 40 x 25 mm.
6. Trimmed flake. Irregular side-struck flake trimmed on the distal side on ventral face to an irregular blunt edge. Quartzite. 60 x 100 x 28 mm.
7. Trimmed chip. Straight blunt edge on one side, and portion of a concave blunt edge on opposite side. Both on dorsal face. Chert. 22 x 26 x 3 mm.
8. End-struck long quadrilateral flake. Plain platform. Notched, blunt edge on one side on dorsal face. Quartzite. 92 x 41 x 20 mm.
9. Irregular end-struck flake. "Bulb only" platform. Used on one side on dorsal face to an irregular denticulate shallow edge. Dorsal scars indicate that it was detached from a double-ended core. Chert. 38 x 13 x 7 mm.
10. Long quadrilateral end-struck flake. "Bulb only" platform and irregular dorsal scars. Chert. 35 x 11 x 6 mm.
11. Long quadrilateral end-struck flake. Plain platform and irregular dorsal scars. Crystalline quartz. 36 x 10 x 6 mm.
12. Double-platform core. Trimmed on one face from a natural fracture plane platform, and on opposite face from a negative scar platform. Chert. 21 x 25 x 13 mm.

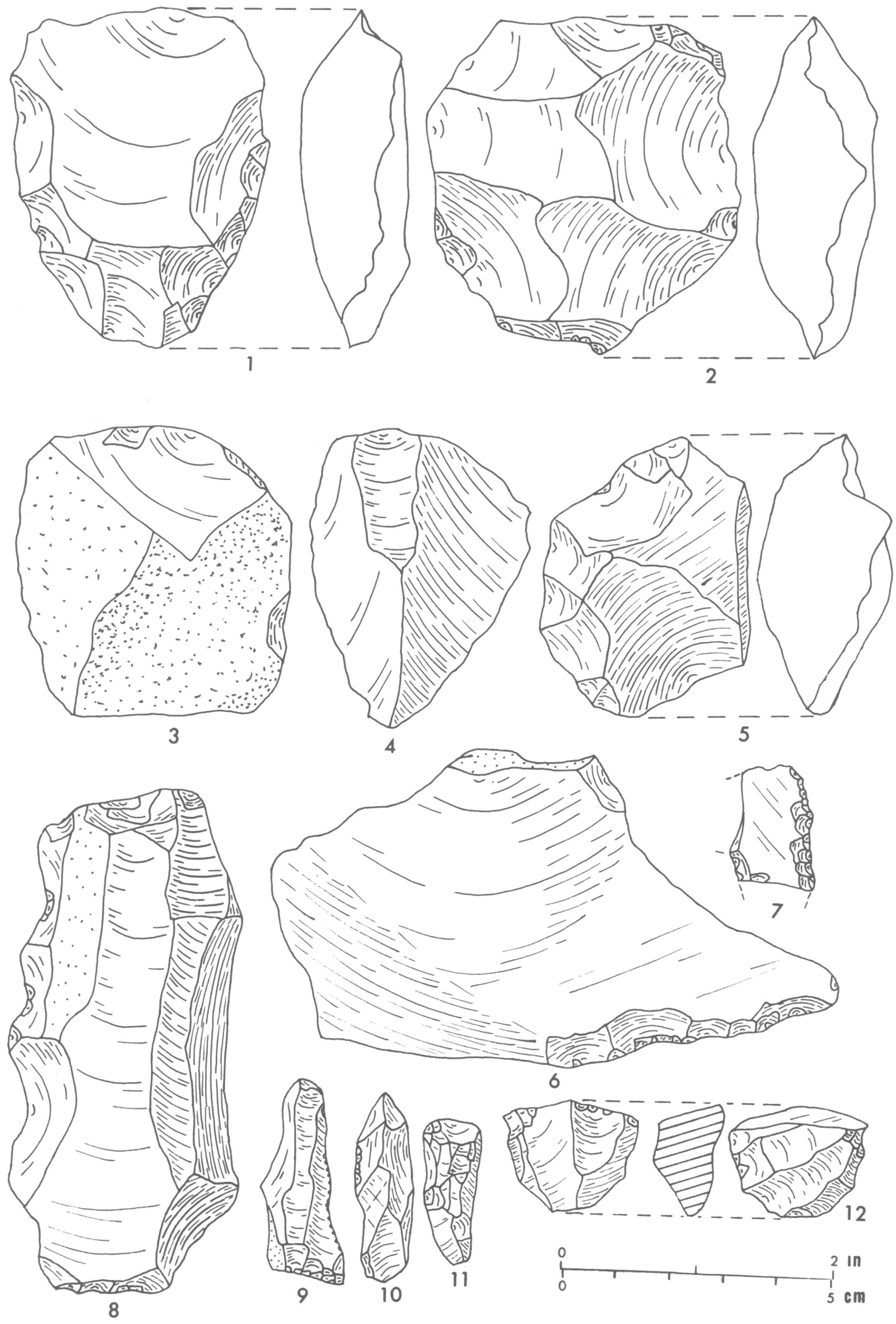


PLATE IX

Layer 2

Howieson's Poort

Surface I: 4

Surface II: 2

Between surfaces III and IV: 3

Between surfaces VI and VII: 1

1. Disc core. Round, trimmed radially and bifacially. Quartzite. 68 x 65 x 27 mm.
2. Single-platform core. Trimmed on one side from a facetted platform. Quartzite. 108 x 72 x 58 mm.
3. Pestle. Elongate cobble with pecking or battering on one end. Quartzite. 139 x 55 x 49 mm.
4. Split-cobble scraper. Irregular blunt edge on split face of a split cobble. Quartzite. 105 x 95 x 70 mm.

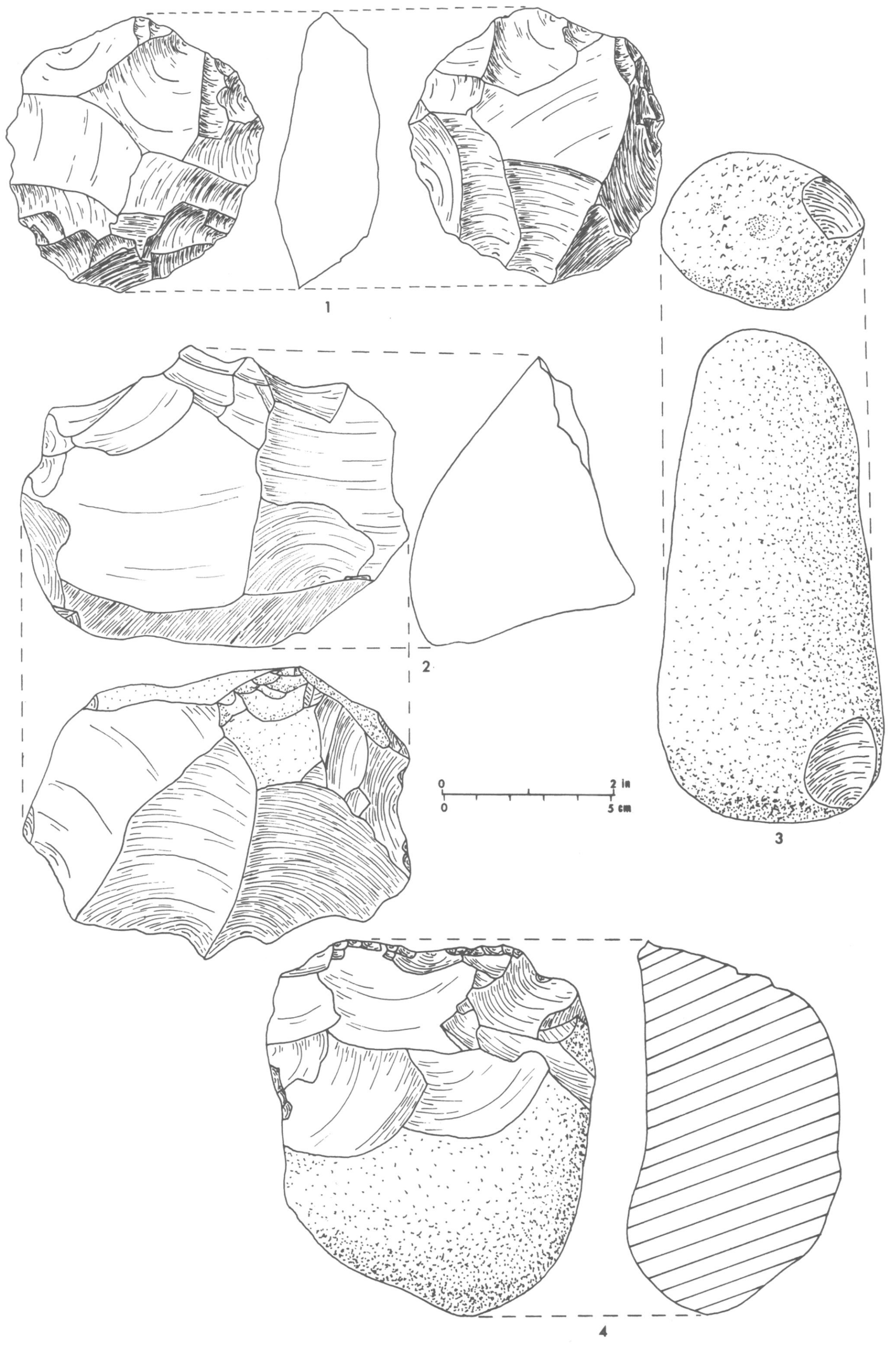


PLATE X

Layer 2

Howieson's Poort

Between surfaces V and VI: 1-10
Between surfaces VI and VII: 11-18

1. Single-platform core. Trimmed from a natural fracture plane. Used as a scraper on one side. Straight, steep edge. Quartzite. 22 x 22 x 14 mm.
2. Single-platform core. Trimmed from distal end on dorsal face. Made on an irregular flake with a "bulb only" platform. 25 x 23 x 12 mm.
3. Single-platform core. Made on a chert chunk. Trimmed from a fracture plane. 22 x 15 x 11 mm.
4. Disc core. Irregular shape and trimmed more or less radially on one face. Chert. 36 x 32 x 12 mm.
5. Disc core. Irregular shape and trimmed radially on both faces. Quartzite. 34 x 36 x 20 mm.
6. Fragment of trimmed flake. Trimmed on one side on dorsal face to an irregular shallow-to-blunt edge. 43 x 24 x 12 mm.
7. Fragment of trimmed flake. Distal end of flake, trimmed on one side on dorsal face to an irregular blunt edge. Flake has plain platform. Chert. 39 x 14 x 5 mm.
8. Obliquely truncated blade. Trimmed on one side to an irregular shallow edge, and used on opposite side to a straight shallow edge; all on dorsal face. Proximal end has snapped off. Truncated at distal end. Chert. 32 x 11 x 3 mm.
9. Single-platform core. A chunk of chert trimmed from a negative scar. 25 x 16 x 11 mm.
10. Trimmed chip. Trimmed to two concave shallow edges and one irregular shallow edge, all on the dorsal face. Chert. 27 x 16 x 2 mm.
11. Short quadrilateral end-struck flake. Plain platform. 29 x 30 x 4 mm.
12. Point. Made on an end-struck flake with a facetted platform. Trimmed on the dorsal face. Chert. 31 x 24 x 8 mm.
13. Irregular end-struck flake. Plain platform. Chert. 24 x 15 x 2 mm.
14. Long quadrilateral end-struck flake. Plain platform. Chert. 22 x 5 x 2 mm.
15. Fragment of trimmed flake. Trimmed on one side on dorsal face to convex shallow edge. Chert. 44 x 11 x 6 mm.
16. Point. End-struck flake with a simple-facetted platform. Trimmed on the dorsal face. Chert. 39 x 26 x 10 mm.
17. Trimmed chip. Two concave shallow edges, one on each side on the dorsal face. Chert.
18. Single-platform core. Trimmed from a facetted crystal face. Quartz. 24 x 22 x 8 mm.

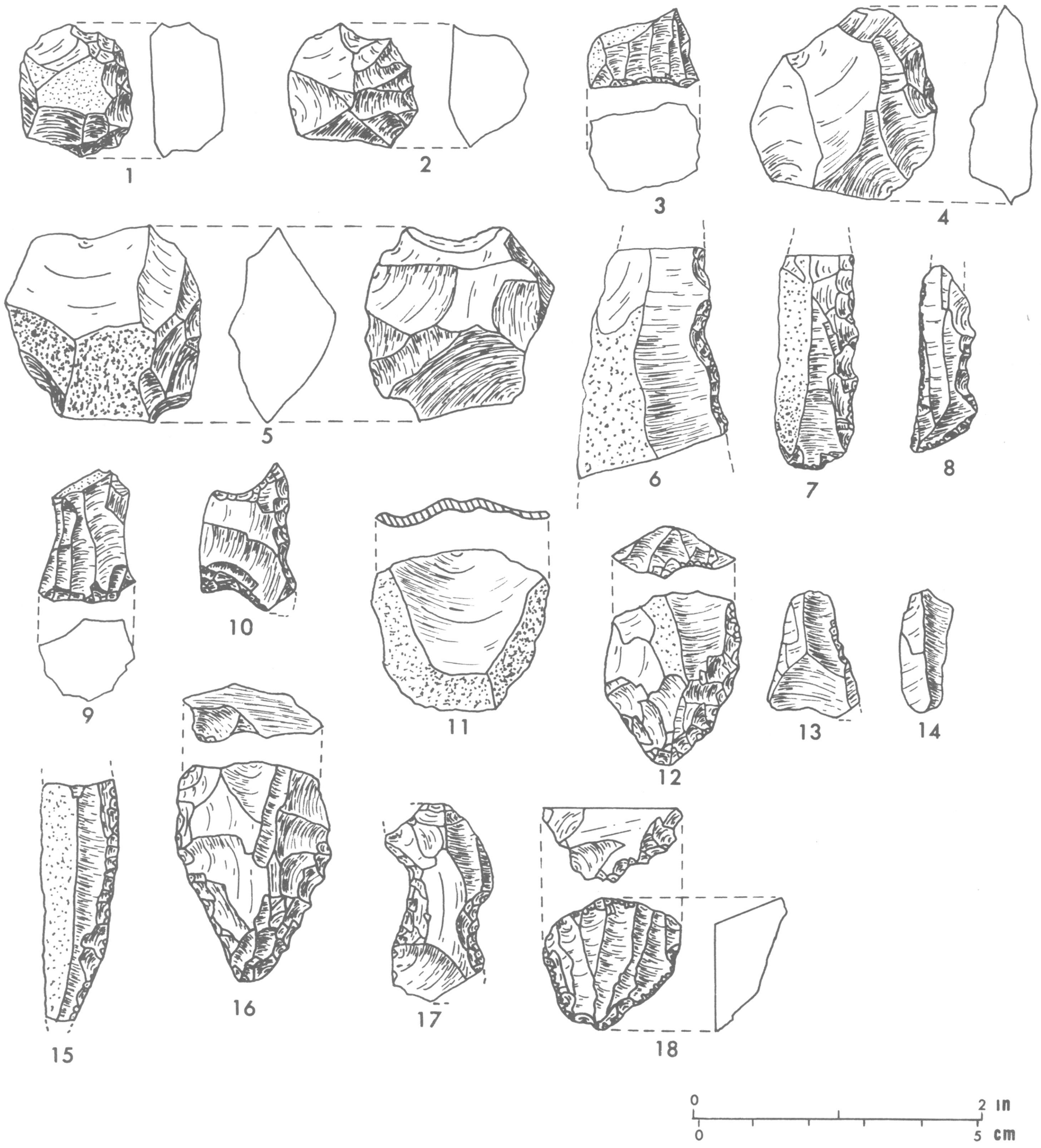


PLATE XI

Layer 2

Howieson's Poort

Surface VI: 1-6, 10

Surface VII: 7-9

Below surface VII: 11-16

1. Core trimming flake. Irregular end-struck flake with simple-facetted platform. Triangular cross section. One of the dorsal faces shows the front edge of the striking platform of the core. Core platform was plain. Quartzite. 98 x 30 x 21 mm.
2. Point. Made on an end-struck flake with a facetted platform. Trimmed on both sides on the dorsal face. Quartzite. 78 x 46 x 20 mm.
3. Irregular end-struck flake. Facetted platform and irregular dorsal scars. Quartzite. 42 x 31 x 11 mm.
4. Triangular end-struck flake. Simple-facetted platform and irregular dorsal scars. Quartzite. 42 x 31 x 8 mm.
5. Single-platform core. Trimmed from a natural fracture plane on one side. Chert. 23 x 27 x 13 mm.
6. Short quadrilateral end-struck flake. Plain platform and irregular dorsal scars. Most of the dorsal face is pebble cortex. Chert. 25 x 15 x 4 mm.
7. Single-platform core/burin. Trimmed from a negative scar platform on one end as a core. Two burin spalls removed from opposite end on same face. Crystalline quartz chunk. 21 x 9 x 7 mm.
8. Double-platform core. Trimmed from opposite ends on opposite faces. Both platforms are negative scars. Chert. 17 x 12 x 8 mm.
9. Irregular end-struck flake. Plain platform. Burin spall struck down one side from the platform. Crystalline quartz. 38 x 13 x 7 mm.
10. Scraper. Sub-triangular plan. Irregular steep edge trimmed on base of triangle on one face, and concave steep edge on one side on opposite face. Chert. 35 x 31 x 26 mm.
11. Crescent. Chert. 44 x 16 x 4 mm.
12. Crescent. One end obliquely truncated on the dorsal face. Opposite end has snapped off so shape may be fortuitous. Chert. 41 x 16 x 6 mm.
13. Point. Made on a small chunk and trimmed on both sides on the dorsal face. Chert. 34 x 23 x 9 mm.
14. Irregular core. Irregular shape. Trimmed irregularly on one face. Chert. 43 x 28 x 9 mm.
15. Trimmed flake. Triangular end-struck flake with simple-facetted platform. Trimmed or used on opposite sides on opposite faces to straight, shallow edges. Chert. 16 x 8 x 2 mm.
16. Double-platform core. Trimmed on one face from a natural fracture plane, and from a negative scar on the opposite face. Irregular shape. Crystalline quartz. 15 x 16 x 9 mm.

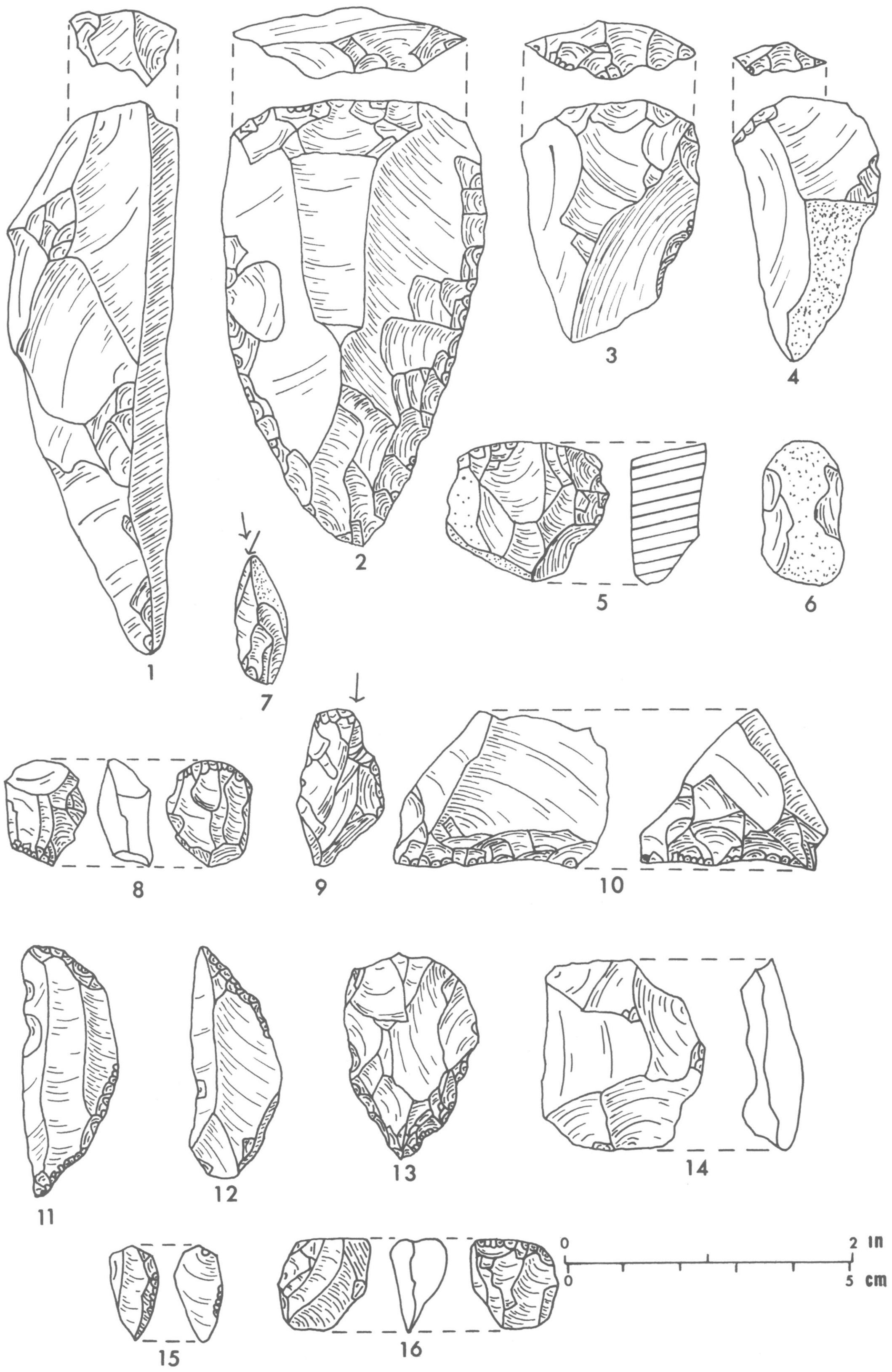


PLATE XII

Layer 2

Howieson's Poort

Between surfaces V and VI: 4-5

Between surfaces VI and VII: 6-18

Surface VII: 1-3

1. Scraper. Irregular notched blunt edges. Irregular chunk trimmed on one side from a natural fracture plane. Quartzite. 47 x 56 x 21 mm.
2. Abraded hematite. Five abraded faces. 47 x 24 x 21.
3. Irregular core. Irregular chunk trimmed in three different directions. Quartzite. 52 x 60 x 39 mm.
4. Trimmed flake. Long quadrilateral end-struck flake with plain platform. Trimmed on both sides and distal end on dorsal face. Edges are straight, denticulate, and shallow. Quartzite. 120 x 52 x 18 mm.
5. Fragment of trimmed flake. End-struck flake with simple-facetted platform. One convex shallow edge, and one irregular shallow edge; both on dorsal face. Quartzite. 91 x 28 x 13 mm.
6. Irregular end-struck flake. Facetted platform and irregular dorsal scars. Quartzite. 136 x 14 x 17 mm.
7. Irregular end-struck flake. Simple-facetted platform and irregular dorsal scars. Quartzite. 126 x 17 x 16 mm.
8. Trimmed flake. End-struck flake with simple-facetted platform trimmed on both sides on dorsal face to straight shallow edges. Parallel dorsal scars. Quartzite. 96 x 63 x 13 mm.
9. Irregular end-struck flake. Simple-facetted platform and convergent dorsal scars. Straight, denticulate, blunt edge. Quartzite. 97 x 68 x 19 mm.
10. Triangular end-struck flake. Facetted platform and parallel flake scars. Quartzite. 88 x 28 x 14 mm.
11. Irregular end-struck flake. Simple-facetted platform and irregular dorsal scars. Chert. 58 x 21 x 7 mm.
12. Long quadrilateral flake. Simple-facetted platform and parallel dorsal scars. Chert. 62 x 18 x 6 mm.
13. Irregular end-struck flake. Plain platform and irregular dorsal scars. 57 x 20 x 8 mm.
14. Disc core. Trimmed radially on both faces. Round. Chert. 42 x 38 x 19 mm.
15. Point. Chip, trimmed on both sides on the dorsal face to the tip. Quartzite. 56 x 25 x 11 mm.
16. End-struck triangular flake. Facetted platform and convergent dorsal scars. Quartzite. 39 x 32 x 8 mm.
17. Trimmed flake. End-struck long quadrilateral flake with facetted platform. Trimmed on both sides on dorsal face to irregular shallow edges. Chert. 69 x 22 x 8 mm.
18. Point. End-struck flake trimmed on both sides on dorsal face. Plain platform and irregular dorsal scars. 53 x 39 x 13 mm.

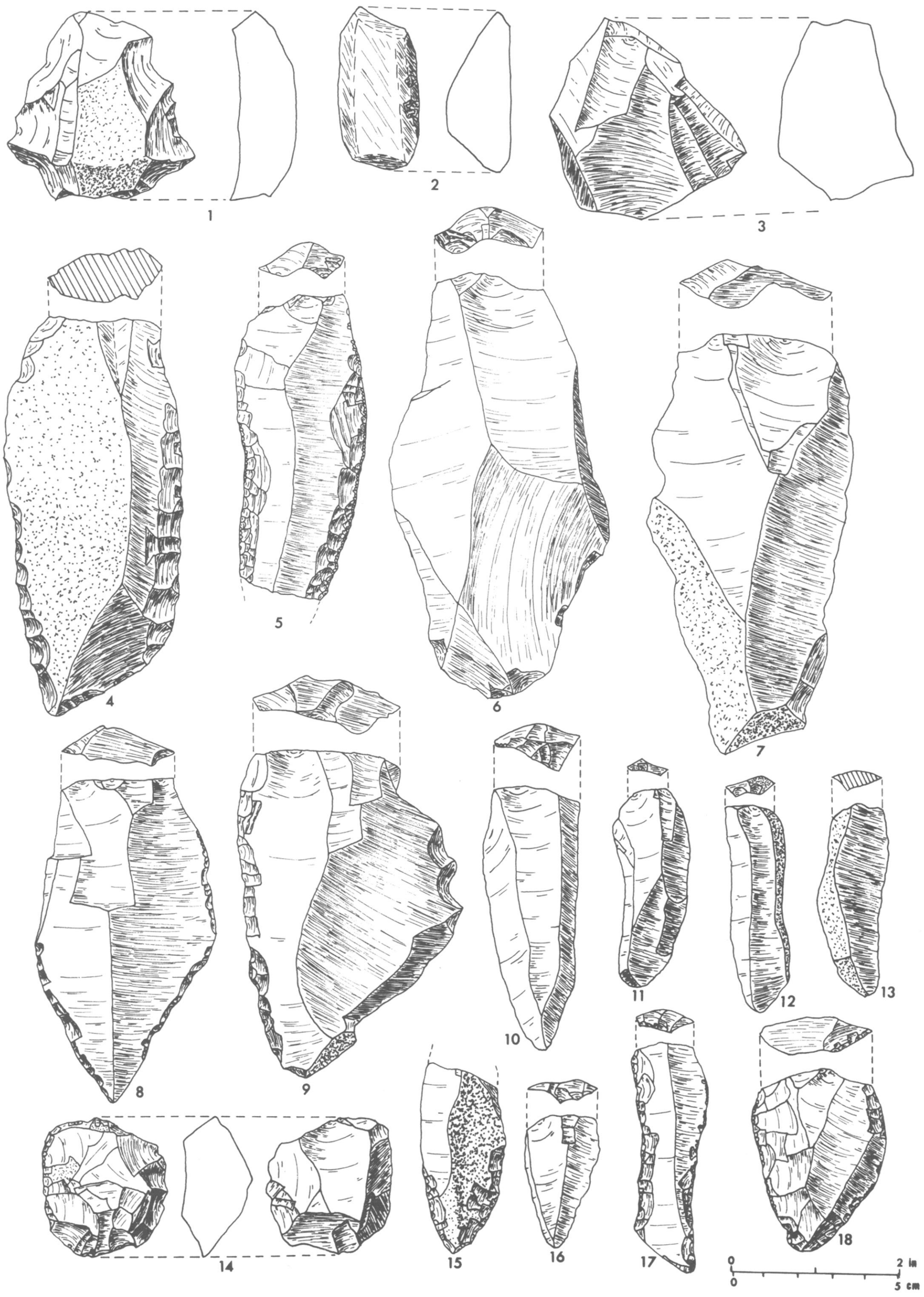


PLATE XIII

Layer 2

Howieson's Poort

Surface VII

1. Irregular end-struck flake. Facetted platform and irregular dorsal scars. Chert. 34 x 19 x 5 mm.
2. Short quadrilateral end-struck flake. Plain platform. Chert. 26 x 14 x 4 mm.
3. Short quadrilateral end-struck flake. Plain platform. Chert. 22 x 11 x 2 mm.
4. Short quadrilateral end-struck flake. Plain platform. Chert. 22 x 11 x 3 mm.
5. Flake fragment. Chert. 20 x 11 x 2 mm.
6. Utilized flake. Irregular end-struck flake with facetted platform. Used on one side on dorsal face. Straight, denticulate, shallow edge. Chert. 26 x 14 x 5 mm.
7. Long quadrilateral end-struck flake. Facetted platform. Chert. 37 x 9 x 2 mm.
8. Trimmed flake. Irregular end-struck flake with facetted platform. Trimmed on one side on dorsal face to irregular shallow edge. Chert. 33 x 17 x 6 mm.
9. Short quadrilateral end-struck flake. Plain platform. Quartzite. 33 x 16 x 6 mm.
10. Single-platform core. Quadrilateral shape and trimmed from a facetted platform on one end. Chert. 33 x 30 x 12 mm.
11. Trimmed flake fragment. Step-flake with facetted platform. Trimmed on both sides on the dorsal face. Irregular shallow edge. Chert. 37 x 32 x 10 mm.
12. Crescent. Backed on the dorsal face. Chert. 31 x 17 x 7 mm.
13. Irregular end-struck flake. Facetted platform and convergent dorsal scars. Quartzite. 55 x 25 x 9 mm.
14. Irregular end-struck flake. Facetted platform and irregular dorsal scars. Quartzite. 38 x 31 x 10 mm.
15. Core trimming flake. Triangular cross section. Plain platform. One face carries the front edge of the core platform. Chert. 60 x 11 x 9 mm.
16. Irregular core. Irregular shape. Irregular bifacial trimming. Chert. 44 x 25 x 11 mm.
17. Double-platform core. Trimmed from opposite ends on opposite faces. Both platforms are simple-facetted. Disc-shaped. Chert. 28 x 25 x 8 mm.
18. Single-platform core. Trimmed on one face from a simple-facetted platform. Trimmed irregularly on opposite face. Chert. 30 x 30 x 11 mm.
19. Irregular core. Irregular shape and trimmed irregularly on one face. Chert. 33 x 30 x 15 mm.
20. Radial core. Irregular shape and trimmed radially on one face. Quartzite. 74 x 56 x 33 mm.

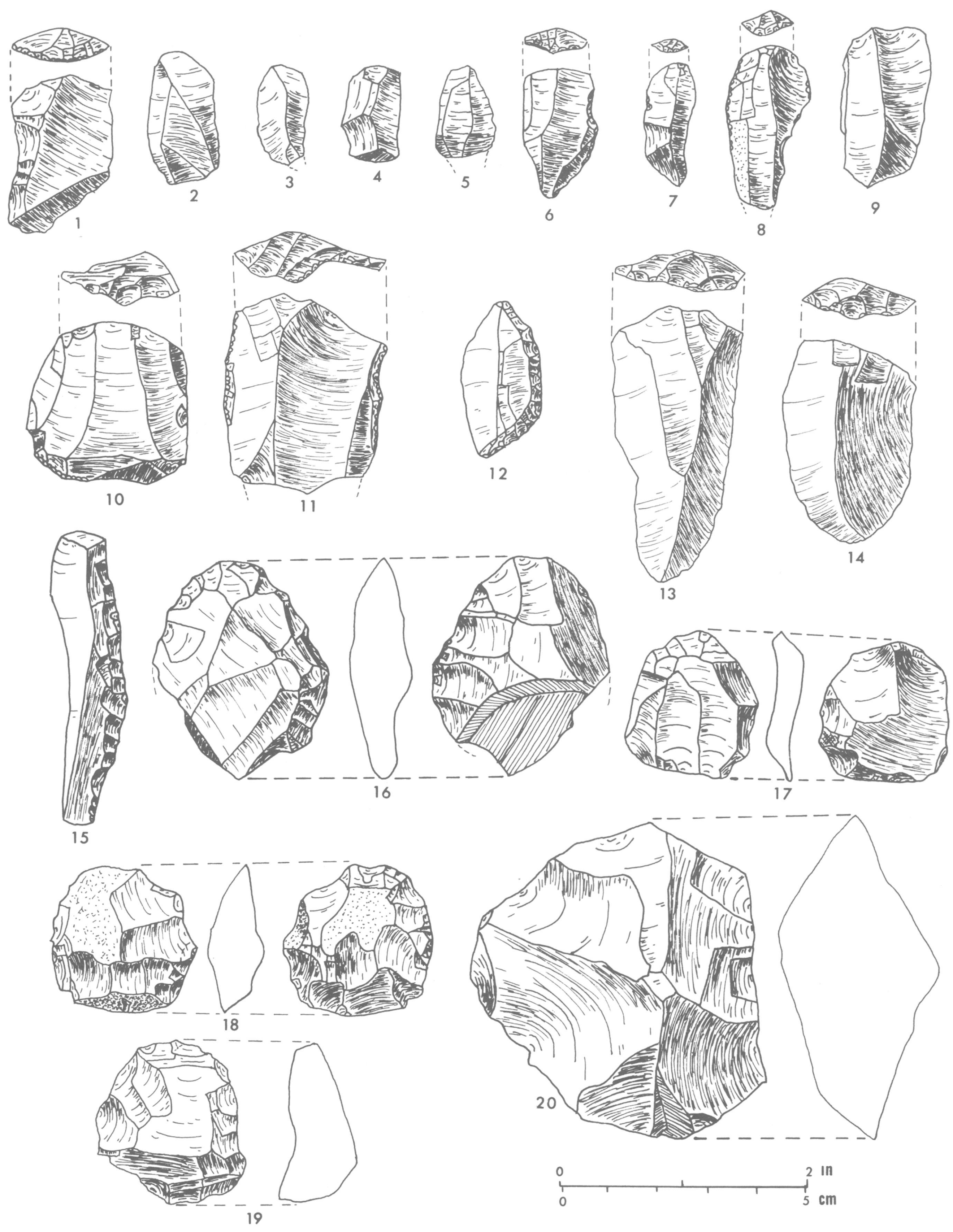


PLATE XIV

Layer 2

Howieson's Poort

Surface VII

1. Single-platform core. Irregular trimming from a facetted platform on one side. Trimmed on one side to an irregular blunt edge. Platform trimming has removed negative bulbs on trimmed face. Quartzite. 69 x 62 x 33 mm.
2. Radial core. Irregular shape and bifacial trimming. Quartzite. 81 x 72 x 42 mm.
3. Irregular end-struck flake. Facetted platform and parallel dorsal scars. Quartzite. 80 x 43 x 16 mm.
4. Trimmed flake. Trimmed on both sides on dorsal face to irregular straight, blunt-to-shallow edges. Edges become blunt as they converge toward the distal end. Made on a triangular end-struck flake with plain platform and irregular dorsal scars. 104 x 46 x 13 mm.
5. End-struck triangular flake. Plain platform and convergent dorsal scars. Quartzite. 72 x 51 x 14 mm.
6. Scraper. Convex blunt edge on one side on dorsal face of chunk. Trimmed from cortex face. Quartzite. 70 x 25 x 18 mm.
7. Irregular end-struck flake. Facetted platform and parallel dorsal scars. Quartzite. 99 x 41 x 14 mm.
8. Irregular end-struck flake. Facetted platform and convergent dorsal scars. Quartzite. 76 x 55 x 16 mm.
9. Triangular end-struck flake. Simple-facetted platform and convergent dorsal scars. Quartzite. 86 x 51 x 19 mm.
10. Irregular end-struck flake. Plain platform and irregular dorsal scars. Quartzite. 79 x 61 x 19 mm.

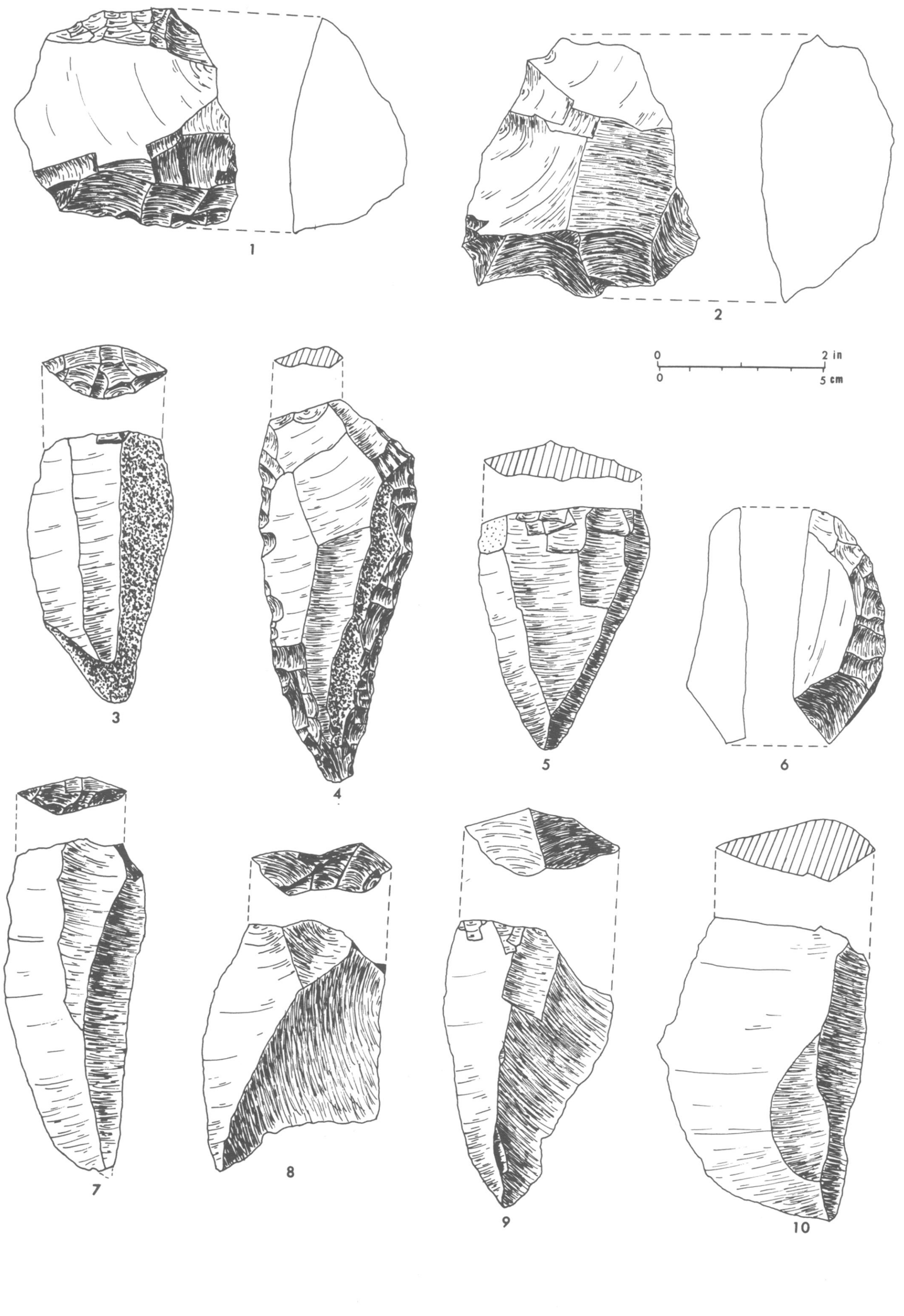


PLATE XV

Layer 2

Howieson's Poort

Below Surface VII

1. Irregular core. Irregular in plan and trimmed irregularly on both faces. Chert. 36 x 27 x 15 mm.
2. Irregular core. Irregular shape and trimmed irregularly on one face. Chert. 22 x 21 x 7 mm.
3. Double-platform core. Trimmed from opposite sides of same face. Both platforms are simple-facetted. Chert. 30 x 31 x 12 mm.
4. Double hollow scraper. Made on a chip. A concave blunt edge on each side, both on the dorsal face. Chert. 37 x 18 x 5 mm.
5. Multiple hollow scraper. Made on a blade with a plain platform. Five concave blunt edges, all on the dorsal face. Chert. 45 x 19 x 7 mm.
6. Hollow scraper. Made on a blade with a plain platform. Concave blunt edge on one side, and irregular blunt-to-shallow edge on opposite side; both on dorsal face. Chert. 49 x 22 x 5 mm.
7. Point. Trimmed over nearly all the dorsal face. Tip and butt broken off. Chert. 61 x 29 x 9 mm.
8. Bifacial point. Trimmed bifacially at the butt and along one side. Quartzite. 53 x 25 x 10 mm.
9. Fragment of bifacial point. Trimmed over both faces. Tip and butt snapped off. Quartzite. 39 x 14 x 7 mm.
10. Burin. End-struck flake with plain platform. Trimmed on one side to convex blunt edge, and on opposite side burin spalls have been removed from the distal end up the long axis of the flake on the dorsal face. Chert. 47 x 20 x 8 mm.
11. Crescent. Trimmed and used along sharp edge. All trimming on the dorsal face. Chert. 42 x 13 x 6 mm.
12. Strangulated scraper. Made on an irregular flake. Three concave blunt edges, all on the dorsal face. "Bulb only" platform. Chert. 40 x 40 x 7 mm.
13. Burin. End-struck flake with plain platform. Trimmed on both sides to irregular blunt edges. Burin spall removed from distal end on one side up the long axis of the flake. Chert. 42 x 28 x 6 mm.
14. Double obliquely truncated blade. Truncated at opposite ends on the same side on the dorsal face. Chert. 31 x 11 x 3 mm.
15. Double hollow scraper. Concave blunt edges, one on each side, both on the dorsal face. Made on a chip of chert. 29 x 16 x 4 mm.

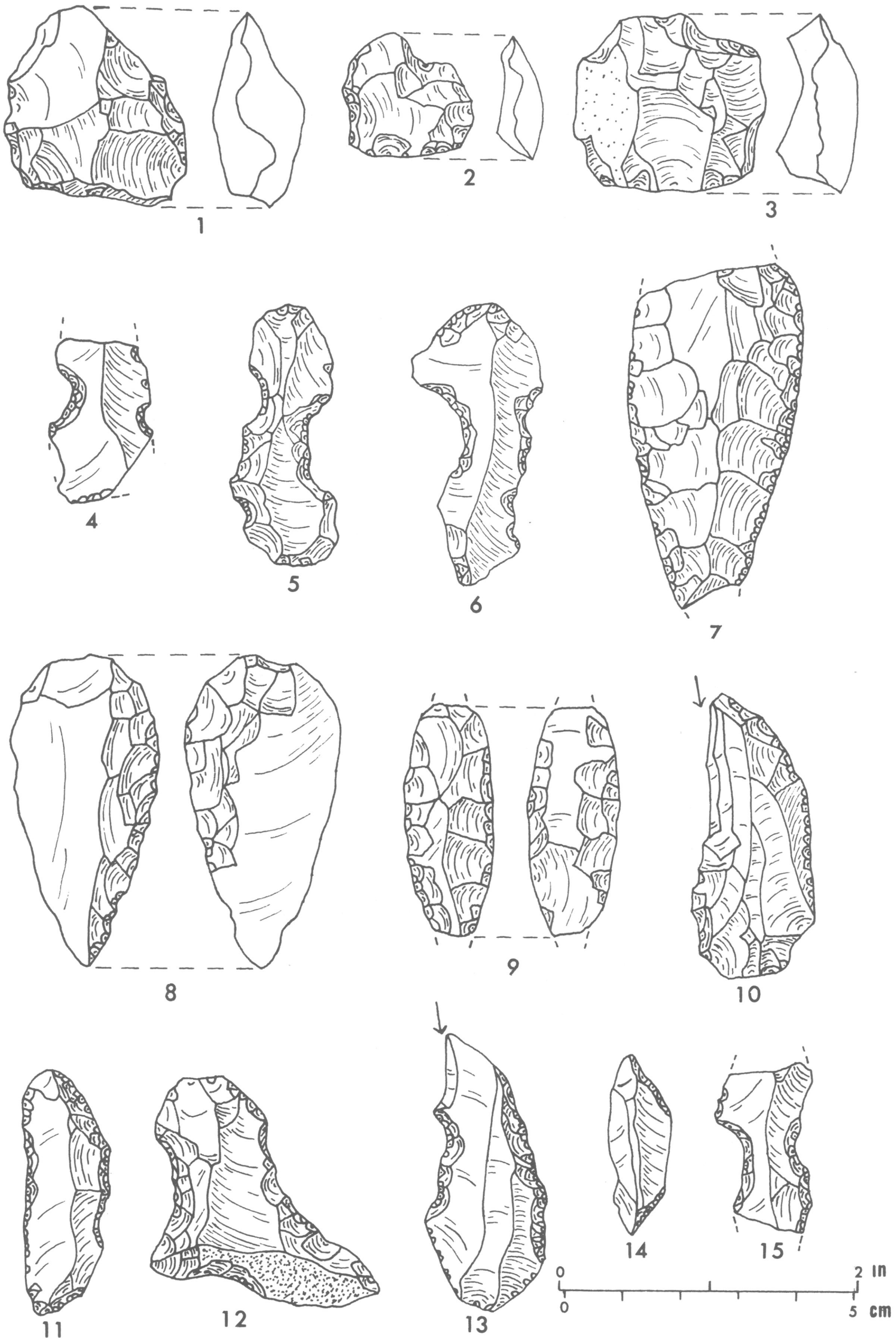


PLATE XVI

Layer 2

Howieson's Poort

Below surface VII: 1, 11

Band at bottom of Layer 2, below surface VII: 2-10, 12-15

1. Fragment of trimmed flake. End-struck triangular flake with plain platform. Trimmed on both sides on the dorsal face to straight blunt edges. Chert. 84 x 36 x 12 mm.
2. Disc core. Trimmed radially on both faces. Ovoid shape. Quartzite. 53 x 33 x 10 mm.
3. Disc core. Trimmed radially on one face. Irregular shape. Chert. 28 x 26 x 10 mm.
4. Crescent. Backed on one side on the dorsal face. Chert. 38 x 22 x 2 mm.
5. Obliquely truncated blade. Truncated at the proximal end on the dorsal face. Trimmed on the opposite side to an irregular shallow edge on the dorsal face. Chert. 38 x 27 x 4 mm.
6. Single-platform core. Trimmed from a facetted platform on one side. Irregular shape. Chert. 25 x 19 x 11 mm.
7. Strangulated scraper. Irregular blunt edges on both sides on the dorsal face. Made on proximal end of a flake with plain platform. Chert. 46 x 26 x 6 mm.
8. Backed flake. Backed along one side and around one end on the dorsal face. Chert. 32 x 25 x 4 mm.
9. Fragment of trimmed flake. End-struck flake with plain platform. Trimmed on one side to an irregular blunt edge on the dorsal face. Distal end snapped off. Chert. 44 x 15 x 5 mm.
10. Double-platform core. Trimmed from opposite ends on opposite faces. Both platforms are facetted. Quartzite. 47 x 40 x 19 mm.
11. Disc core. Trimmed radially on one face. Quartzite. 55 x 52 x 26 mm.
12. Irregular core. Irregular shape and trimmed irregularly over both faces. Quartzite. 32 x 33 x 22 mm.
13. Double obliquely truncated blade. Truncated at opposite ends on same side on dorsal face. Opposite side used to irregular denticulate, shallow edge of dorsal face. Chert. 41 x 34 x 6 mm.
14. Fragment of backed fragment or crescent. Obliquely truncated at one end; backing continues down one side, all on dorsal face. Opposite end is snapped off. Chert. 37 x 26 x 5 mm.
15. Irregular core. Irregular shape and trimmed irregularly over both faces. Irregular blunt edge on one side. Quartzite. 43 x 33 x 24 mm.

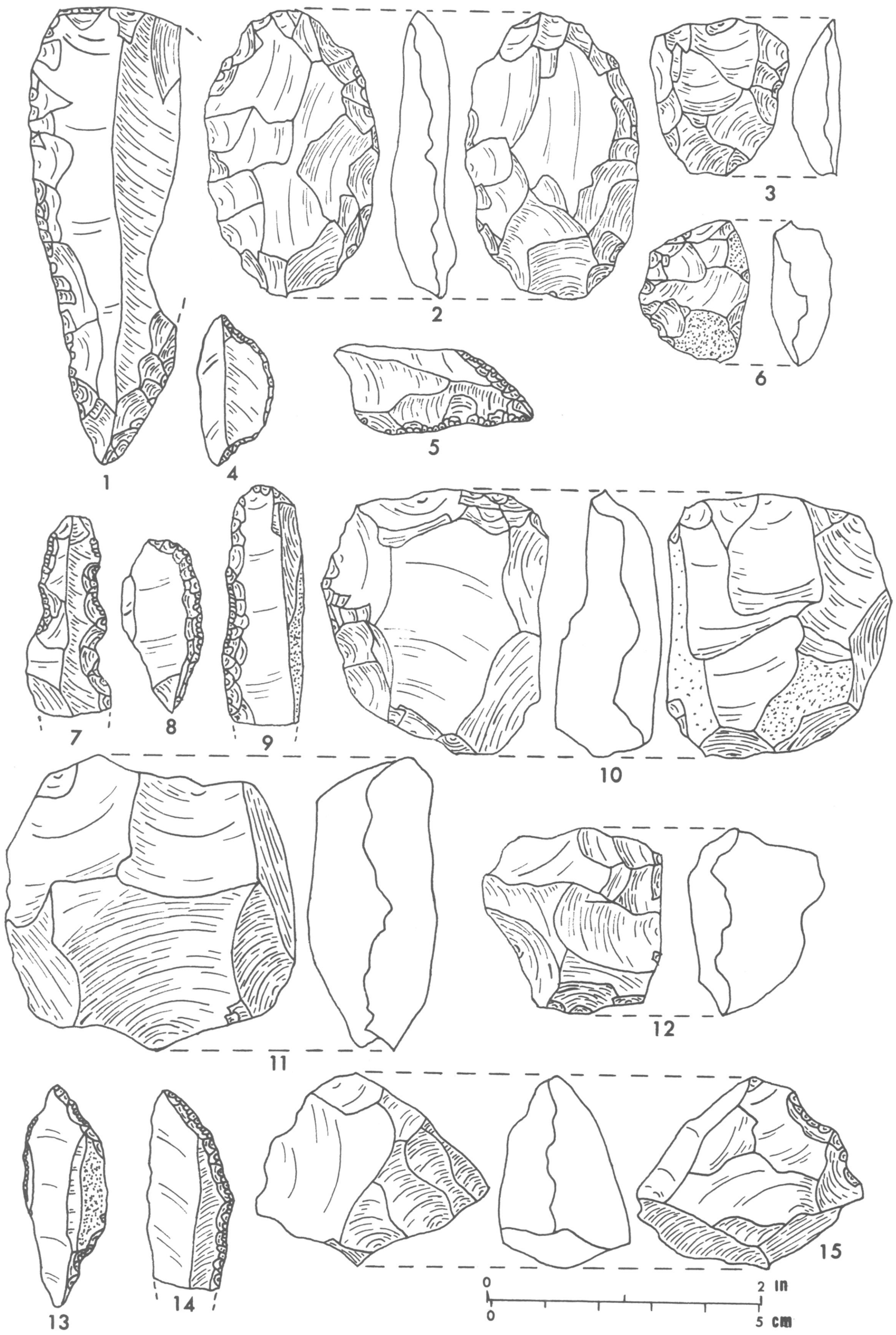


PLATE XVII

Layer 2

Howieson's Poort

Band at bottom of Layer 2, below surface VII

1. Irregular end-struck flake. Plain platform and irregular dorsal scars. Quartzite. 118 x 79 x 19 mm.
2. Short quadrilateral end-struck flake. Plain platform and irregular dorsal scars. Quartzite. 55 x 42 x 19 mm.
3. Long quadrilateral end-struck flake. Plain platform and parallel dorsal scars. Chert. 21 x 6 x 2 mm.
4. Long quadrilateral end-struck flake. "Bulb only" platform and convergent dorsal scars. Crystalline quartz. 12 x 5 x 2 mm.
5. End-struck long quadrilateral flake. Simple-facetted platform and irregular dorsal scars. Three crystal faces on dorsal face. Crystalline quartz. 29 x 10 x 6 mm.
6. End-struck long quadrilateral flake. "Bulb only" platform. Used on both sides to straight, denticulate edges on the dorsal face. Parallel dorsal scars indicate that flake was struck from a double-ended core. Crystalline quartz. 35 x 9 x 5 mm.
7. Irregular end-struck flake. Plain platform and parallel dorsal scars. Chert. 49 x 32 x 7 mm.
8. End-struck long quadrilateral flake. Plain platform and convergent dorsal scars. Quartzite. 33 x 9 x 4 mm.
9. End-struck long quadrilateral flake. Plain platform and parallel dorsal scars. Chert. 27 x 12 x 3 mm.
10. Irregular end-struck flake. Facetted platform and parallel dorsal scars. Quartzite. 46 x 30 x 7 mm.
11. Irregular end-struck flake. Facetted platform and irregular dorsal scars. Chert. 56 x 30 x 8 mm.
12. Triangular end-struck flake. Facetted platform and irregular dorsal scars. Quartzite. 46 x 22 x 8 mm.
13. Irregular end-struck flake. Facetted platform and irregular dorsal scars. Chert. 38 x 18 x 5 mm.

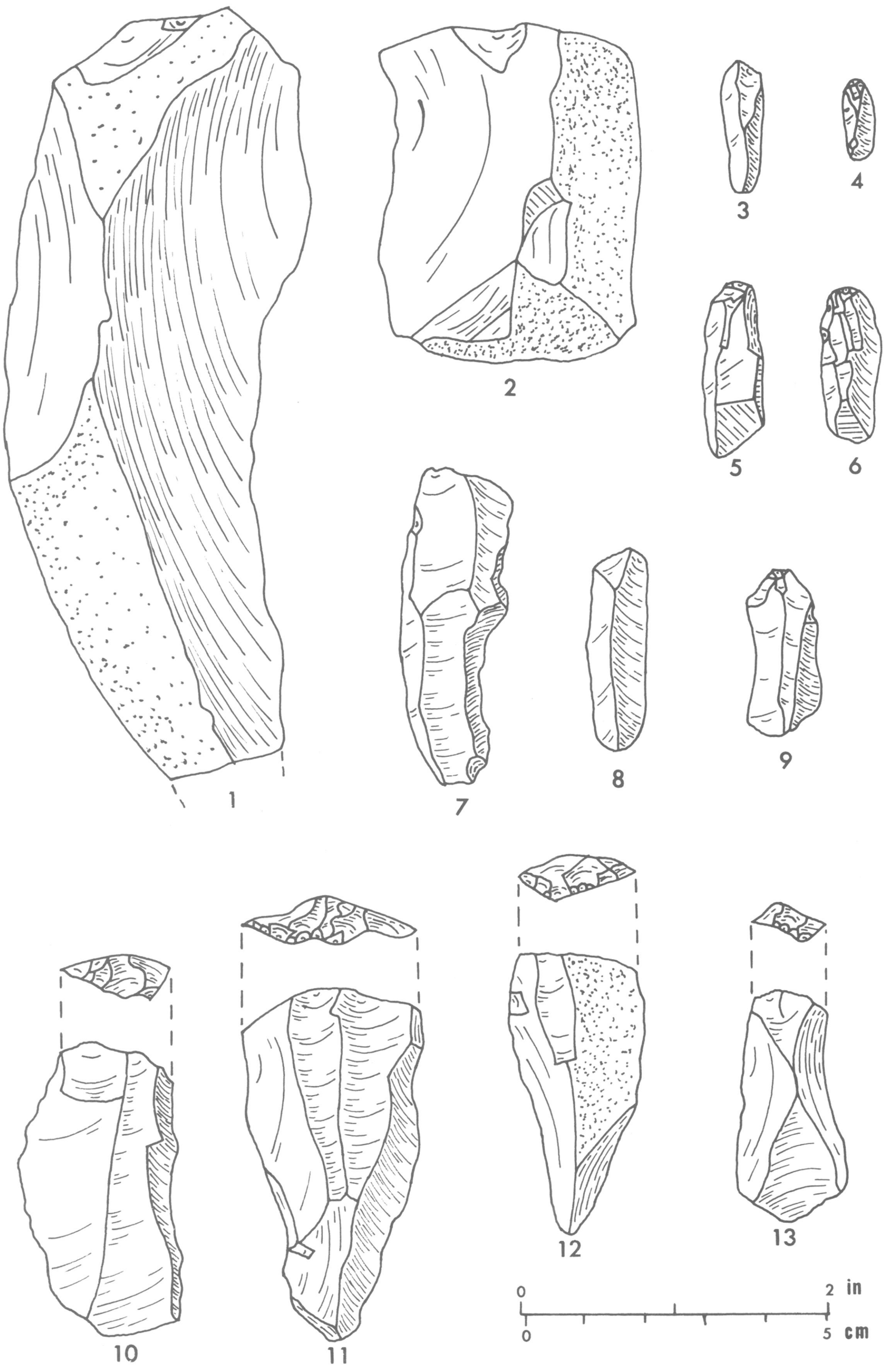


PLATE XVIII

Layer 3

Acheulean

1. Chopper. Trimmed like a flat-backed biconical core. Shows extensive battering on the sides and top. 8 x 7 x 6 cm.
2. Limande hand-axe. Trimmed with a few large flakes on the butt and with smaller flakes around the edges. The tip is trimmed extensively on the face opposite the one illustrated. Made on a cornerstruck flake. The bulb and platform have been reduced with large flakes. Lenticular cross section. 11 x 7 x 2 cm.
3. End and side scraper. Irregular blunt edge trimmed on a chunk. Ventral face is cortex and a negative scar. Three small flakes have been detached from the ventral face, along the side, perhaps as a result of utilization. 8 x 6 x 3 cm.
4. Cleaver. Asymmetrical parallel-sided plan, guillotine bit, and U-butt. Bit shows step-flake damage, primarily on the dorsal face, but some on the ventral face as well. Biconvex cross section. 12 x 8 x 4 cm.
5. Disc core. Round plan and trimmed equally on both faces. 10 x 9 x 6 cm.
6. Biface. Irregular long ovate plan. Butt is unifacially trimmed. This specimen has been roughly trimmed on both faces but does not appear to be finished. Biconvex cross section. 18 x 10 x 7 cm.
7. Disc core. Irregular oval shape; trimmed equally on both faces. 14 x 11 x 7 cm.
8. Limande hand-axe. Butt is pebble cortex, untrimmed. Made on a large side-struck flake. The bulb and platform have been reduced. Most of the trimming is on the dorsal face, which is illustrated. Lenticular cross section. 19 x 10 x 4 cm.

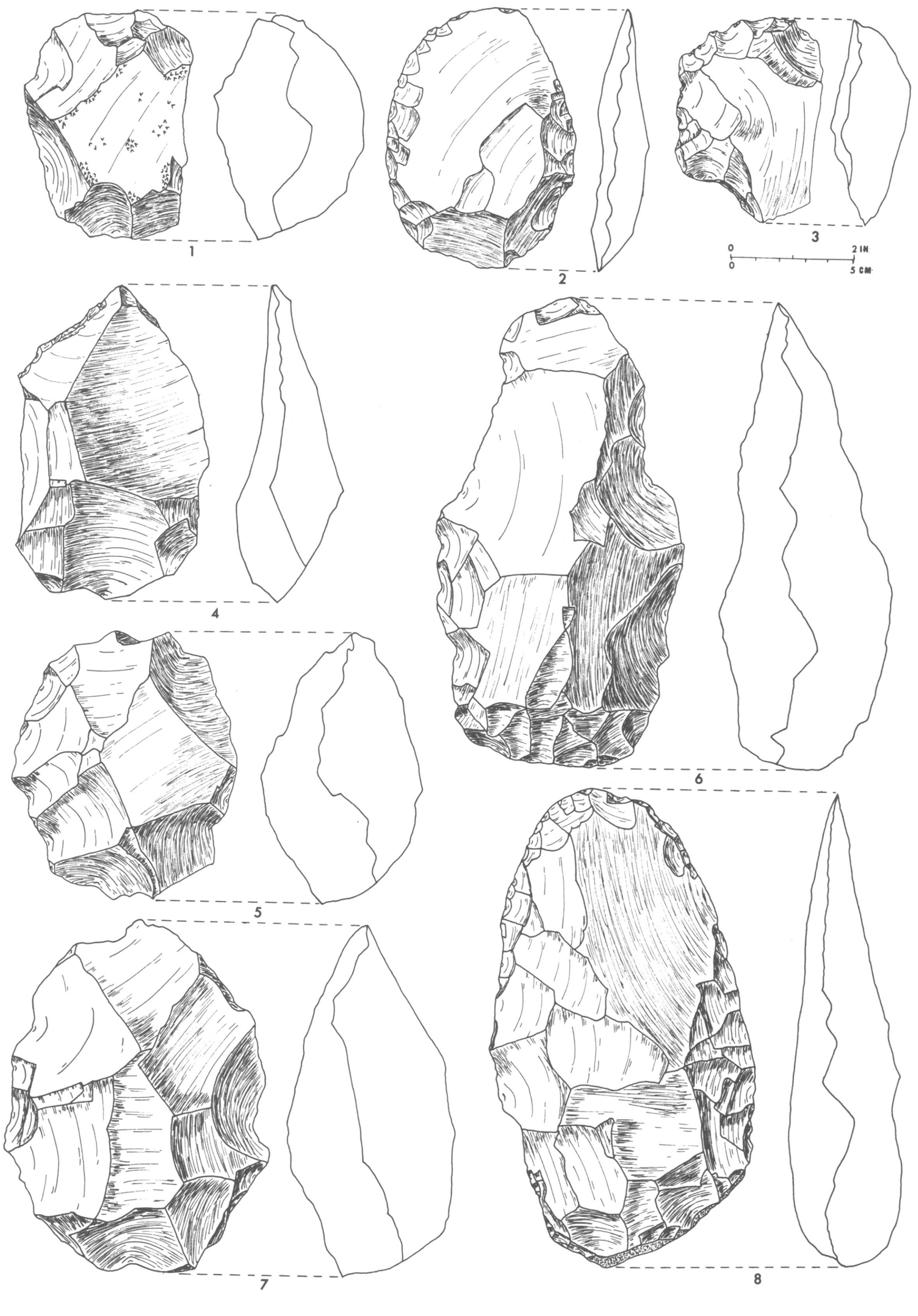


PLATE XIX

Layer 3

Acheulean

1. Ultra-convergent cleaver. Guillotine bit and U-butt. Trimmed equally on both faces. High-backed, biconvex cross section. 25 x 12 x 7 cm.
2. Asymmetrical lanceolate hand-axe. Butt trimmed on both faces. Biconvex cross section. 20 x 9 x 5 cm.
3. Lanceolate hand-axe. Butt trimmed on both faces. Biconvex cross section. 21 x 8 x 4 cm.
4. Asymmetrical long ovate hand-axe. Butt partially trimmed on one face; the remainder is pebble cortex. Biconvex cross section. 18 x 11 x 5 cm.

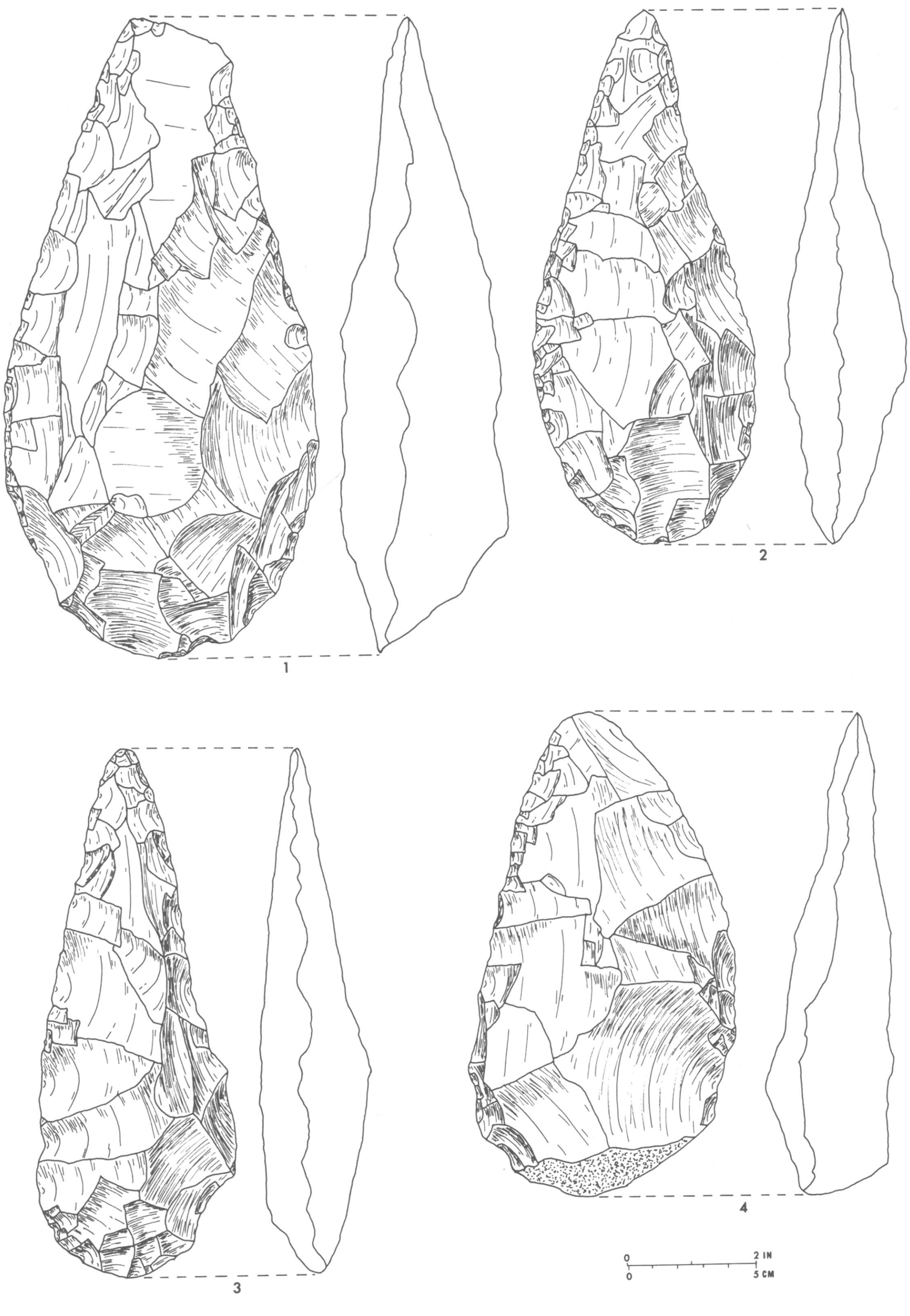


PLATE XX

Layer 3

Acheulean

1. Discoid. No battering or visible utilization. The trimming is much finer than is found on the cores. Lenticular cross section. 15 x 13 x 5 cm.
2. Ovate hand-axe. Butt trimmed more on the dorsal face than on the ventral. Bulb and platform have been removed. Most trimming is on the dorsal face. Plano-convex cross section. 15 x 9 x 4 cm.
3. Ovate hand-axe. A rolled hand-axe that was retrimmed. The rear one-third on both faces is heavily rolled, and the forward two-thirds has been re-trimmed. Lenticular cross section. 15 x 10 x 4 cm.
4. Ovate-acuminate hand-axe. Butt is trimmed bifacially. Tip is only partially trimmed and may be unfinished. The opposite face is trimmed less than the one illustrated. Biconvex cross section. 27 x 12 x 6 cm.
5. Ovate hand-axe. Butt is untrimmed. Made on a cornerstruck flake. Platform has been removed and bulb partially reduced. All fine trimming is on the dorsal surface. Trimming on the ventral surface is done with large flakes. Biconvex cross section. 13 x 9 x 5 cm.

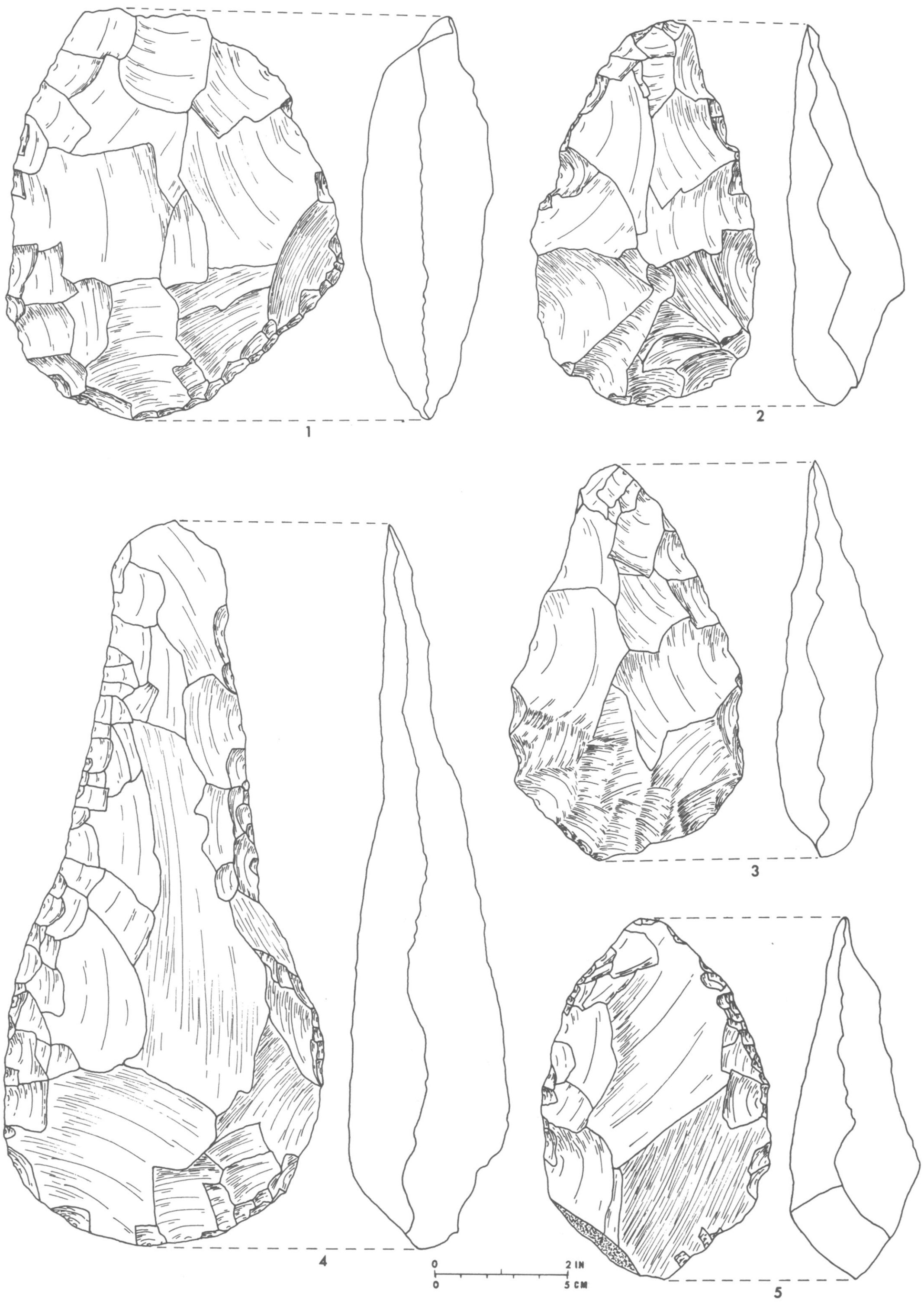


PLATE XXI

Layer 3

Acheulean

1. Bifacially trimmed chunk. Trimmed with very large flakes over both faces. No obvious working end or working edge. No remnant of bulb or platform remains. 23 x 15 x 7 cm.
2. Subtriangular hand-axe. Biconvex cross section. Butt untrimmed. Minimally trimmed with large flakes on both faces. 10 x 7 x 4 cm.
3. Disc core. Trimmed equally on both faces. 7 x 6 x 3 cm.
4. Disc core. Trimmed more on one face than on the other. 8 x 8 x 3 cm.
5. Struck core. One large flake has been removed from one face. Opposite face has had two flakes removed, and the rest is made up of three fracture planes. 5 x 4 x 3 cm.
6. Gouge-ended biface. Made on a thick flake with bulb and platform partially reduced. At one end on the dorsal face, a gougelike edge has been trimmed. On the opposite end, on the ventral face, a straight blunt scraping edge has been trimmed. Biconvex cross section. 11 x 8 x 4 cm.
7. Push plane. Butt trimmed on the dorsal face, and bit trimmed on both dorsal and ventral faces. An irregular, steep core scraper edge is trimmed on the dorsal face at the corner of the butt. The bit shows heavy damage. Plano-convex cross section. 11 x 7 x 5 cm.

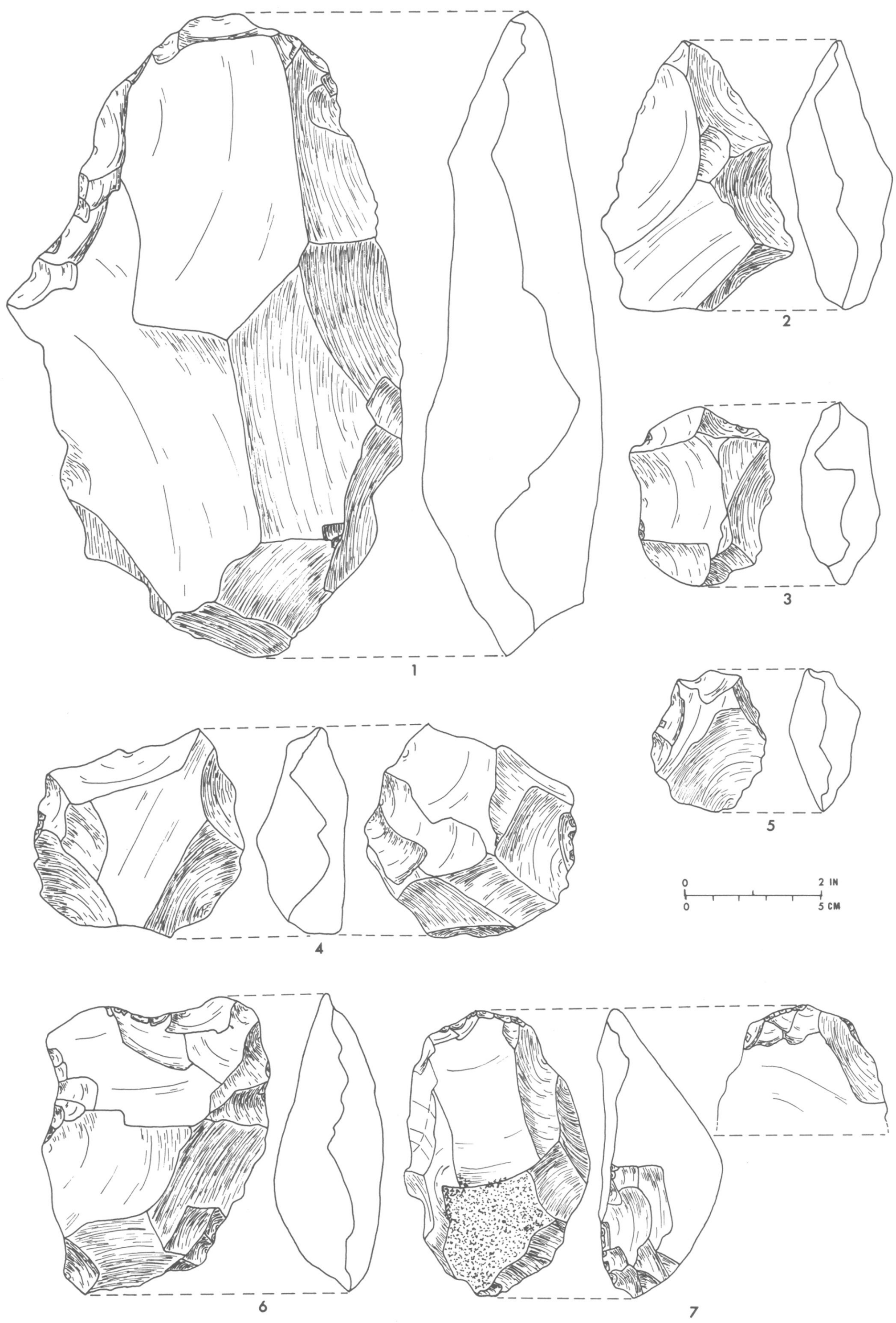


PLATE XXII

Layer 3

Acheulean

1. Subtriangular hand-axe. Untrimmed butt and lenticular cross section. Made on a corner-struck flake, with the platform removed. Trimmed along the sides on the dorsal face and along one side on the ventral face. 11 x 9 x 3 cm.
2. Scraper. Notched, blunt edge trimmed on the dorsal face opposite the platform. Made on an irregular side-struck flake with a plain platform. 7 x 12 x 3 cm.
3. Beaked biface. Trimmed over both faces with large flakes. Point is twisted about 45 degrees to the minor axis and is thick; point is formed by two fairly large flakes removed at an angle up into the body of the tool. This results in a keel running down to the tip of the point. Tip shows what may be damage from heavy use; the tool is weathered. Butt is trimmed on both faces. Lenticular cross section and elongate plan. 11 x 6 x 3 cm.
4. Twisted bit biface. Elongate plan and made on a chunk. Ventral face is pebble cortex from which only three flakes have been removed. Dorsal face is trimmed all over with large flakes. Butt is trimmed only on the dorsal face. Bit is formed by two flakes on the dorsal face, one struck along the minor axis from the side, the other struck along the major axis from the end; and by one semi-burin flake on the ventral face struck along the major axis from the end of the tool. This causes the tip to be twisted. Some evidence of heavy use at the tip. Biconvex cross section. 10 x 6 x 3 cm.
5. Twisted bit biface. Elongate plan. Butt is trimmed bifacially. Forward part of the ventral face is formed by two fracture planes. The working end is formed by one large semi-burin flake struck from the end at an angle to the long axis of the tool on the dorsal face. There are also some smaller flakes that have been struck parallel to the large one. The working end is twisted to the minor axis of the tool. Some evidence of heavy use at the tip. Diamond-shaped cross section. 9 x 6 x 5 cm.
6. Beaked biface. Elongate plan. Butt trimmed bifacially. Trimmed all over both faces with large flakes, but with some fine trimming along one side and at the tip. Tip is thick and round and shows evidence of heavy use. High-backed cross section. Tip formed by flaking on the dorsal face, which causes it to be keeled. Flakes on the ventral face at the tip are much smaller than those on the dorsal face. 13 x 6 x 4 cm.
7. End and side knife. Trimmed over both faces. Backed on one side by a patch of pebble cortex. 12 x 8 x 5 cm.
8. Triangular hand-axe. Butt untrimmed. Lenticular cross section. Trimmed all over both faces. 11 x 7 x 3 cm.

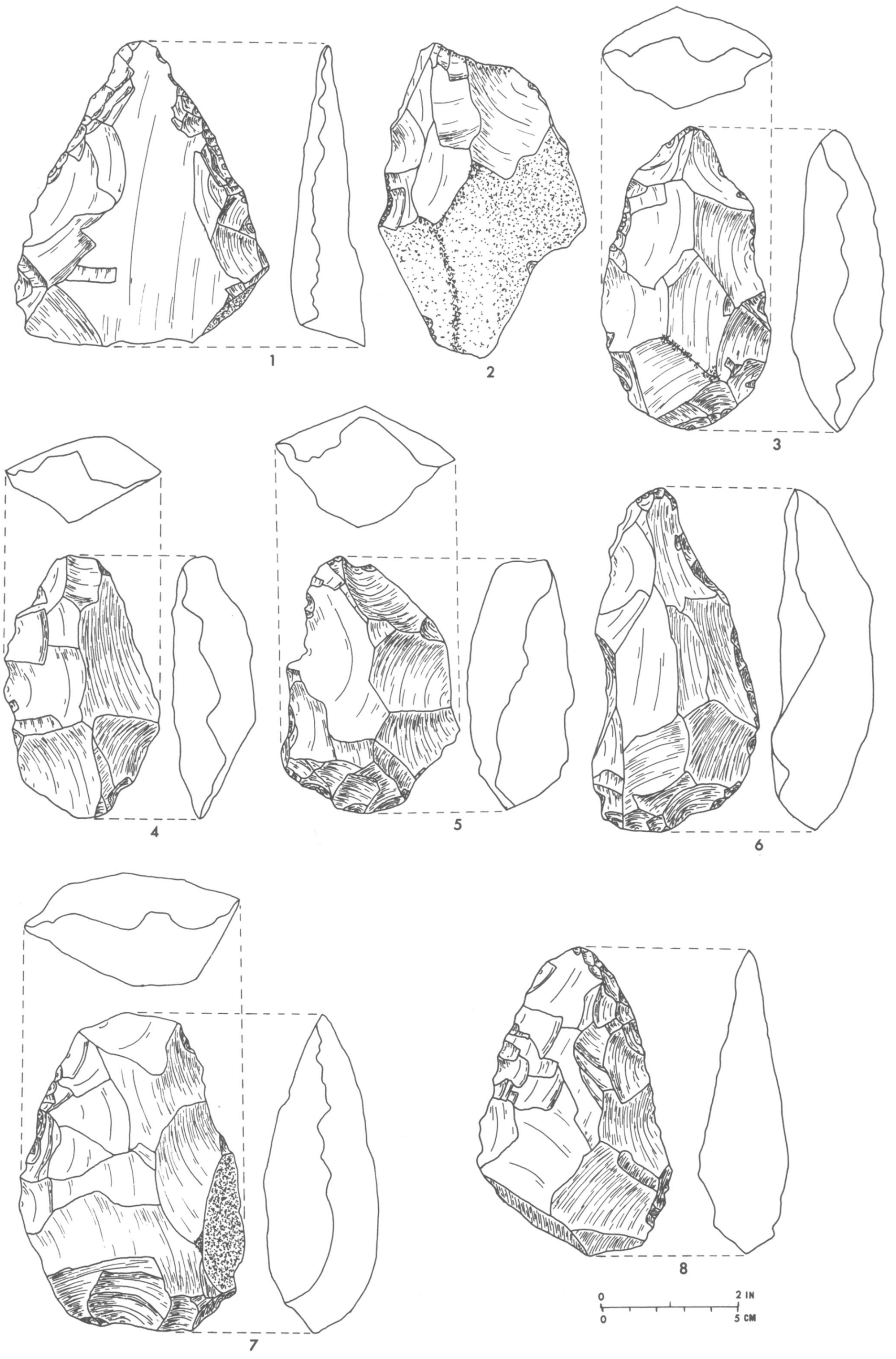


PLATE XXIII

Layer 3

Acheulean

1. Ovate chisel. Straight bit and untrimmed butt. Plano-convex cross section. Trimmed on both faces with large flakes. Bit is thick and has had a long flake struck up the long axis of the tool, and another from the corner of the bit. Ventral face of bit has one negative scar and one partial scar. Keeled on ventral face. Shows heavy use at the tip. 11 x 8 x 5 cm.
2. Broad ovate chisel. Thick tip and butt trimmed unifacially. Biconvex cross section. Tip trimmed with two small flakes up the long axis of the tool; opposite face has a negative scar and a partial scar, which form a keel on the tip. 10 x 7 x 5 cm.
3. Parallel-sided cleaver flake. Guillotine bit to the right, and trimmed V-butt. Trapezoid cross section. Made on a corner-struck flake, with the bulb and platform unmodified. 12 x 8 x 4 cm.
4. Parallel-sided cleaver. Straight bit and butt trimmed unifacially. Biconvex cross section. Bit is thicker than is usual on a cleaver but is untrimmed on either face. 13 x 7 x 3 cm.
5. Trimmed flake. Platform removed with large flakes. Large flakes struck off radially on the dorsal face. 19 x 13 x 7 cm.

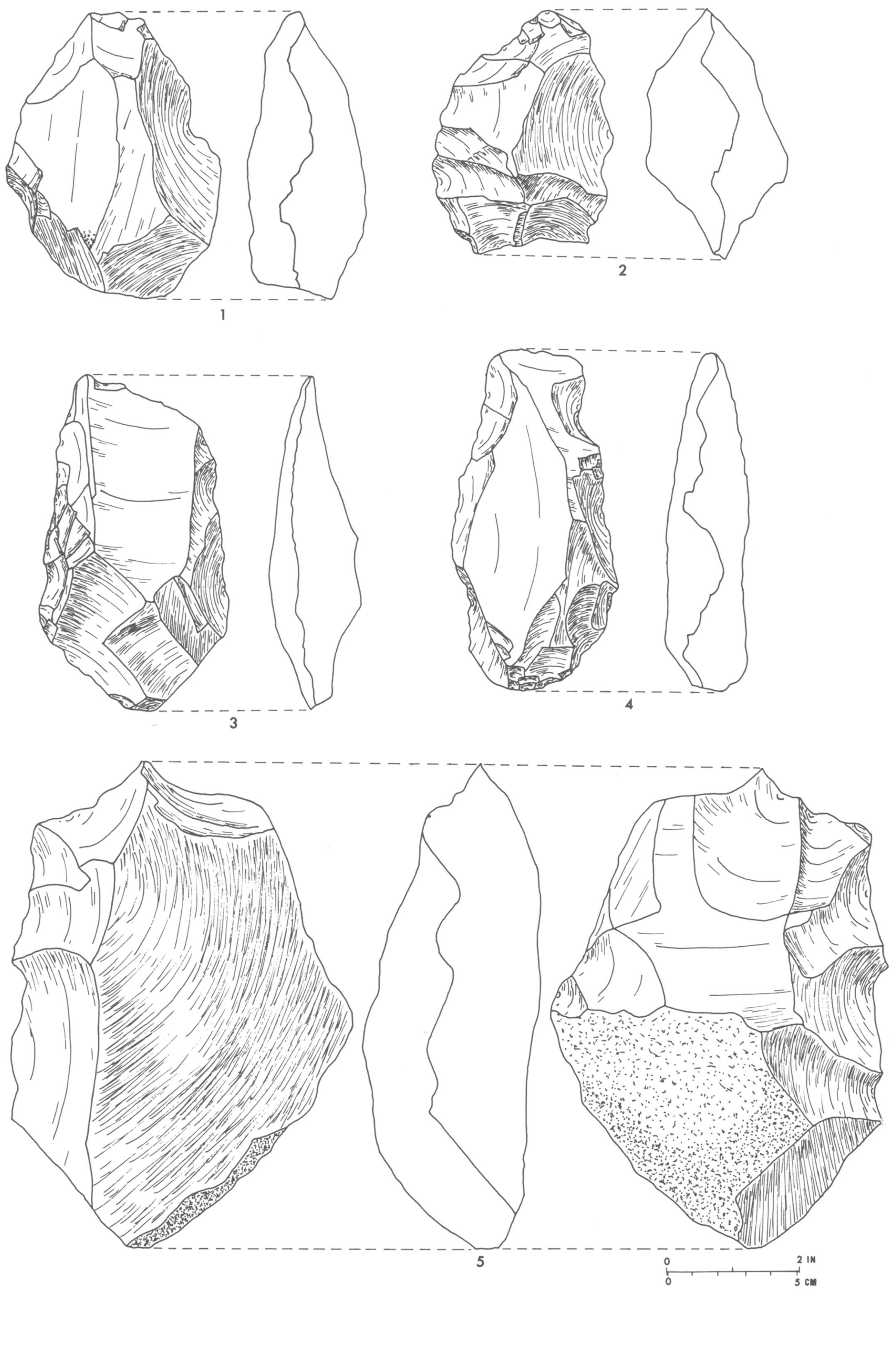


PLATE XXIV

Layer 3

Acheulean

1. Parallel-sided cleaver. Guillotine bit to the right and untrimmed U-butt. Made on a side-struck flake, with the platform removed and the bulb partially reduced. There is no other trimming on the ventral face. Lenticular cross section. 21 x 13 x 5 cm.
2. Ultra-convergent cleaver. Guillotine bit to the right and partially trimmed U-butt. Made on a side-struck flake, with the platform removed and the bulb partially reduced. Parallelogram cross section. 15 x 7 x 4 cm.
3. Parallel-sided cleaver. Concave guillotine bit to the left. Trimmed square butt. Plano-convex cross section. Bulb and platform reduced. 16 x 10 x 4 cm.
4. Convergent cleaver. Guillotine bit to the right and unworked U-butt. Lenticular cross section. Made on a side-struck flake with the bulb and platform reduced. Most trimming is on the dorsal face. 22 x 11 x 4 cm.
5. Parallel-sided cleaver flake. Guillotine bit to the left. Square butt trimmed on the ventral face. Made on a corner-struck flake, with the bulb and platform unmodified. Trapezoid cross section. 12 x 8 x 4 cm.

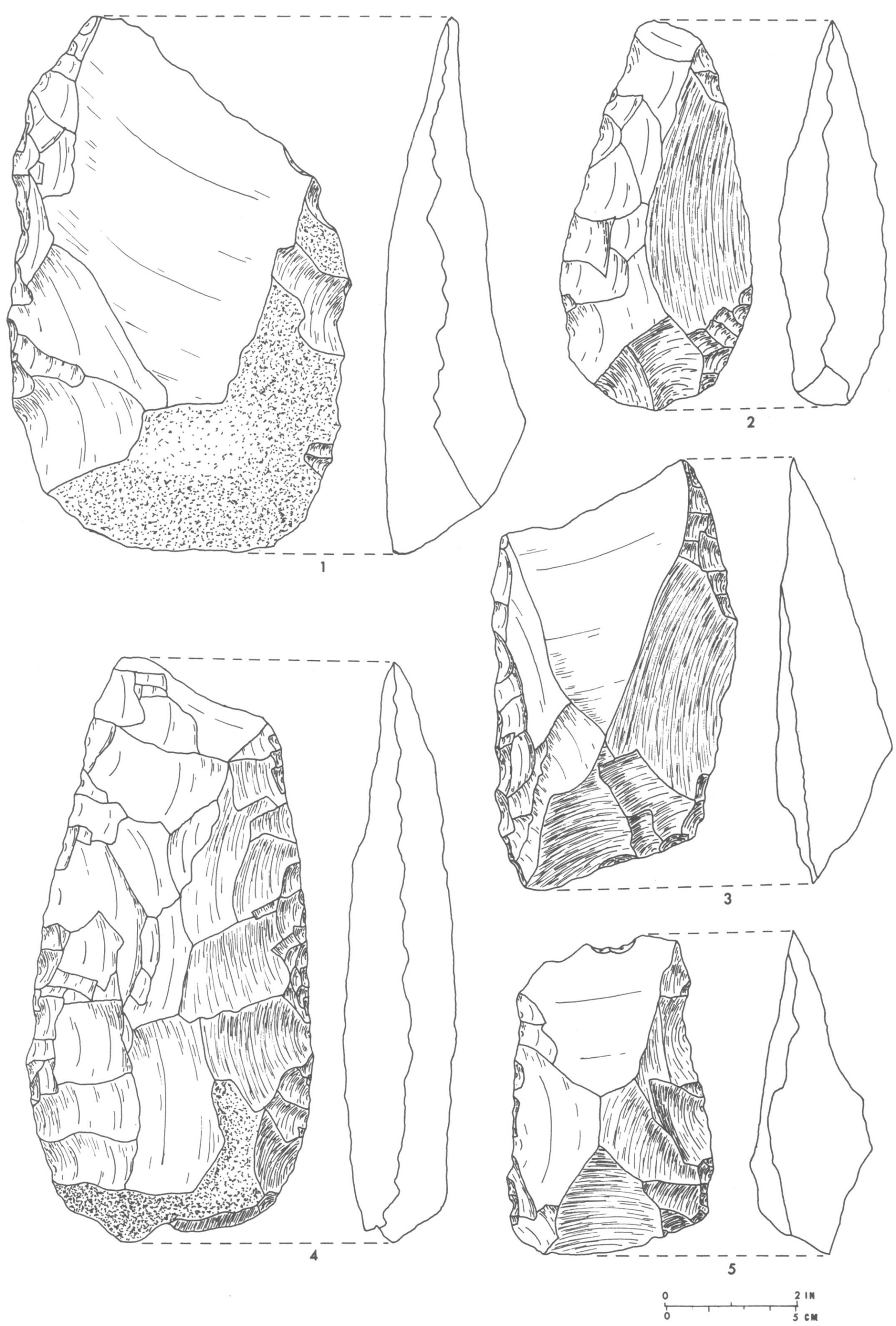


PLATE XXV

Layer 3

Acheulean

1. Scraper. Notched shallow edge on the dorsal face of a flake opposite the platform. At one end an edge is trimmed on the ventral face. Made on an irregular side-struck flake with a plain platform. 7 x 11 x 3 cm.
2. Burin/scraper. Notched blunt edge trimmed on the side of a chunk. Opposite face is a positive flake scar. A burin flake has been detached from the side opposite the scraping edge. 8 x 4 x 2 cm.
3. Scraper. Irregular blunt edge trimmed on the side opposite the platform on the dorsal face. Made on an irregular side-struck flake with pseudo-facetted platform. 4 x 8 x 3 cm.
4. Scraper. Irregular shallow edge trimmed on the dorsal face of a split flake fragment opposite the platform. Platform is plain. 8 x 7 x 3 cm.
5. Burin. Two burin flakes have been struck from one end of a chunk. Opposite face is a fracture plane. 10 x 5 x 3 cm.
6. Point. Bifacially trimmed flake with platform and bulb partially reduced. Trimmed with large flakes. 5 x 5 x 2 cm.
7. Scraper. Irregular convex blunt edge on the end of a long quadrilateral flake with a pseudo-facetted platform. Trimmed on the ventral face. 10 x 7 x 2 cm.
8. Scraper. Made on an irregular end-struck flake with a plain platform trimmed on the end and both sides on the ventral face. The edge on one side is concave and steep. The end is denticulate. The edge on the other side is irregular and blunt. On the dorsal face adjacent to the irregular blunt edge, some small flakes have been removed—perhaps by use. 8 x 7 x 2 cm.
9. Scraper. Notched, steep core scraper edge trimmed on a high-backed chunk. Face opposite the edge is pebble cortex. 7 x 4 x 3 cm.
10. Scraper. Irregular, shallow edge trimmed on the dorsal face of an irregular side-struck flake with a pseudo-facetted platform. Scraping edge is adjacent to the platform. 5 x 8 x 1 cm.
11. Nosed scraper. A nosed, steep scraping edge is trimmed on the side of a chunk. Face opposite the scraping edge is a pebble cortex concavity. 8 x 4 x 5 cm.

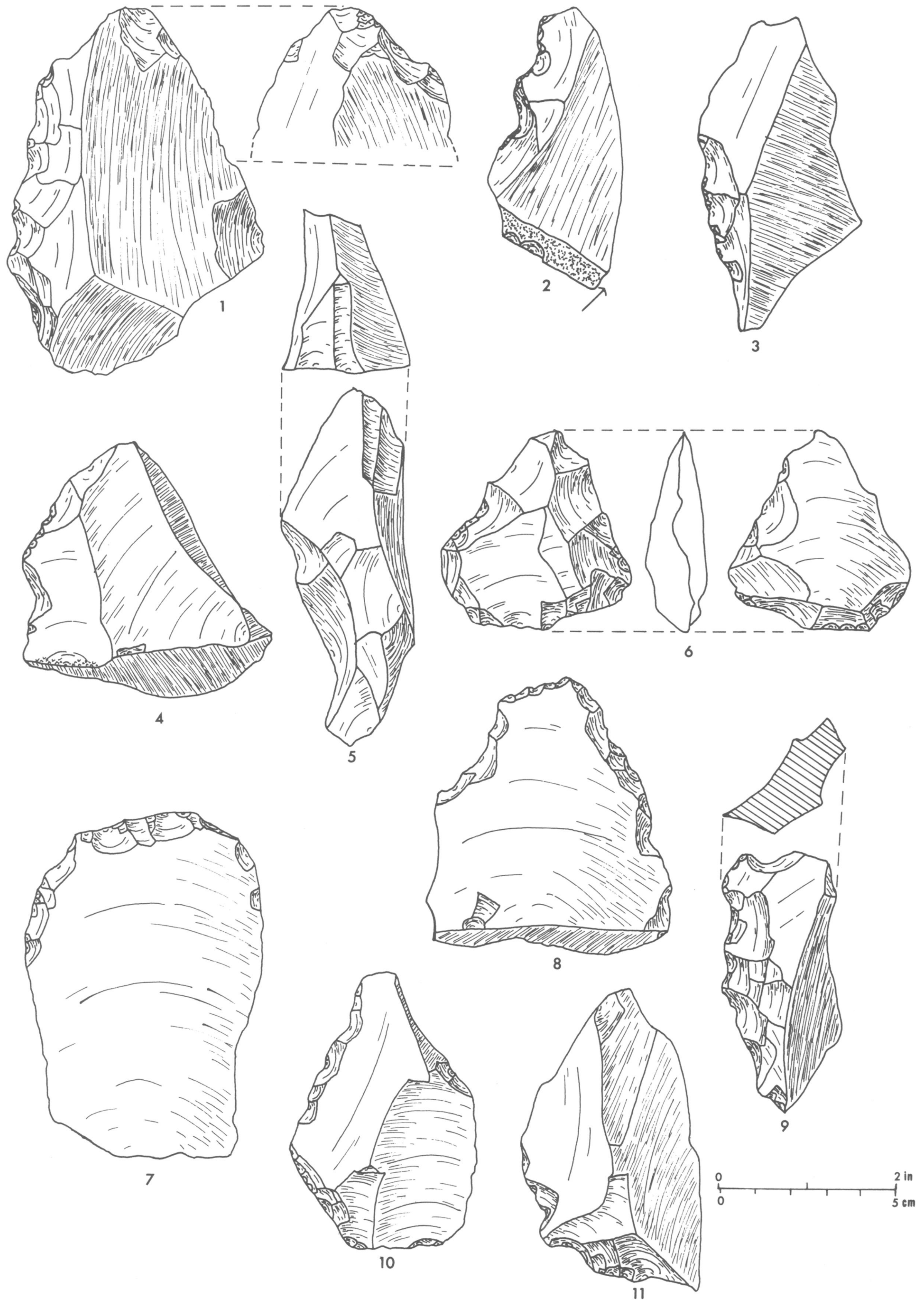


PLATE XXVI

Layer 3

Acheulean

1. Chisel. Straight, bifacially trimmed working edge which shows some heavy damage. Trimmed over both faces. Plano-convex cross section. 14 x 10 x 5 cm.
2. Parallel-sided cleaver. Guillotine bit to the right. Butt square, trimmed on the ventral face. Plano-convex cross section. 16 x 9 x 4 cm.
3. Pointed knife. Minimally trimmed. Backed by vertical trimming along one side. Made on a corner-struck flake with plain platform. 11 x 7 x 4 cm.
4. Triangular hand-axe. Butt untrimmed. Biconvex cross section. Most trimming is on the illustrated face. 11 x 7 x 3 cm.
5. Scraper. Convex, shallow edge trimmed opposite the platform on the ventral face of an irregular side-struck flake with plain platform. 8 x 12 x 2 cm.

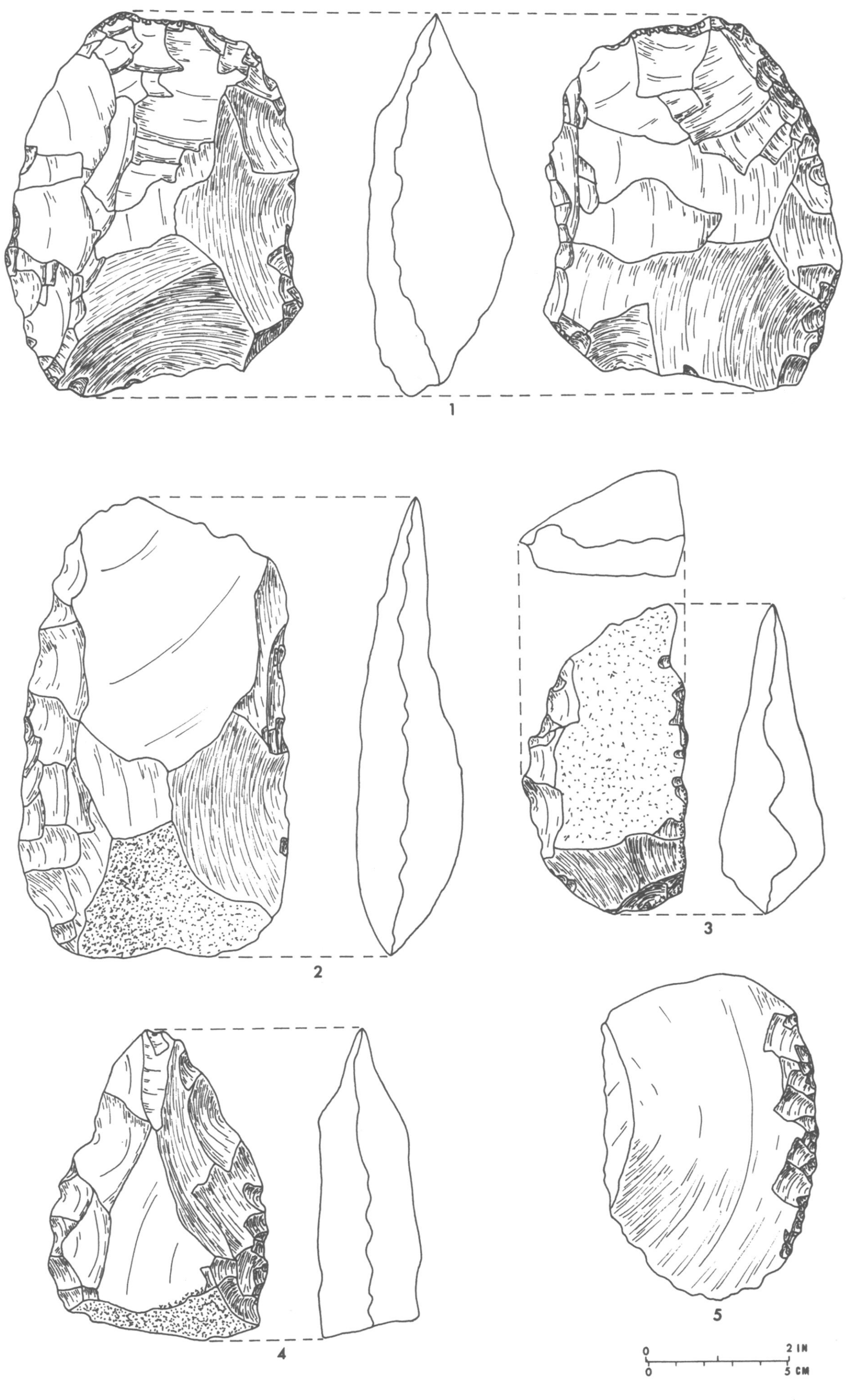


PLATE XXVII

Layer 3

Acheulean

1. Scraper. Made on an irregular side-struck flake with a plain platform. Convex, blunt edge on the dorsal face on one corner opposite the platform. 13 x 18 x 5 cm.
2. Convergent cleaver. Guillotine bit. Untrimmed square butt. Biconvex cross section. Bit is trimmed bifacially with very small flakes. 15 x 7 x 5 cm.
3. Asymmetrical long ovate hand-axe. Butt trimmed unifacially. Biconvex cross section. 15 x 8 x 4 cm.
4. Long ovate hand-axe. Butt untrimmed. Biconvex cross section. Made on a flat pebble. Only the forward two-thirds of the tool is trimmed; the remainder retains the pebble cortex. 15 x 9 x 4 cm.
5. Twisted bit biface. Ovate plan. Biconvex cross section. Butt trimmed unifacially. Tip is round and thick. Tip is formed by a flake on one face that has been struck up the long axis of the tool and by a flake on the opposite face struck from the tip at an angle to the long axis. This results in a twisted bit. Trimmed over most of both faces with fairly large flakes. 10 x 7 x 3 cm.
6. Broad ovate biface. Square untrimmed butt. Round, thick tip. Biconvex cross section. Trimmed bifacially with large flakes. Tip is straight. Some evidence of heavy use on the tip. 9 x 7 x 5 cm.

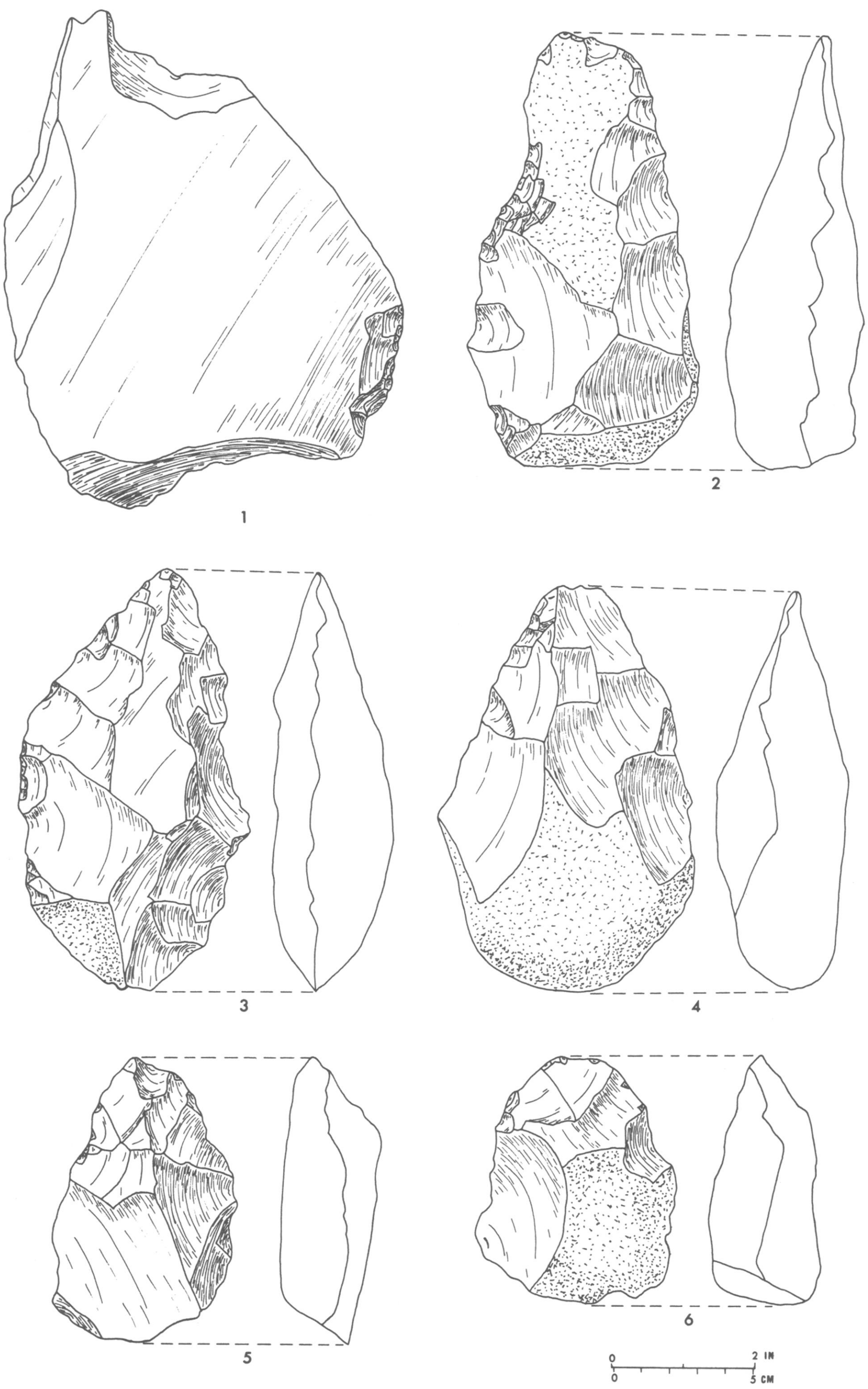


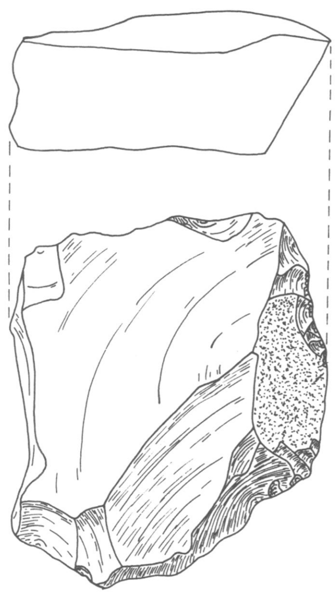
PLATE XXVIII

Layer 3

Acheulean

1. Irregular lanceolate hand-axe. Diamond cross section. Butt bifacially trimmed. 20 x 11 x 6 cm.
2. Scraper. Irregular steep edge trimmed on one side of a chunk. Face opposite the scraping edge is a negative flake scar. 10 x 12 x 4 cm.
3. Trimmed flake. Irregular side-struck flake which has had the platform removed and the bulb partially reduced. On the dorsal face, opposite the platform, large flakes have been removed. The other flake scars on the dorsal face were present prior to the detachment of the flake. 13 x 22 x 4 cm.

1



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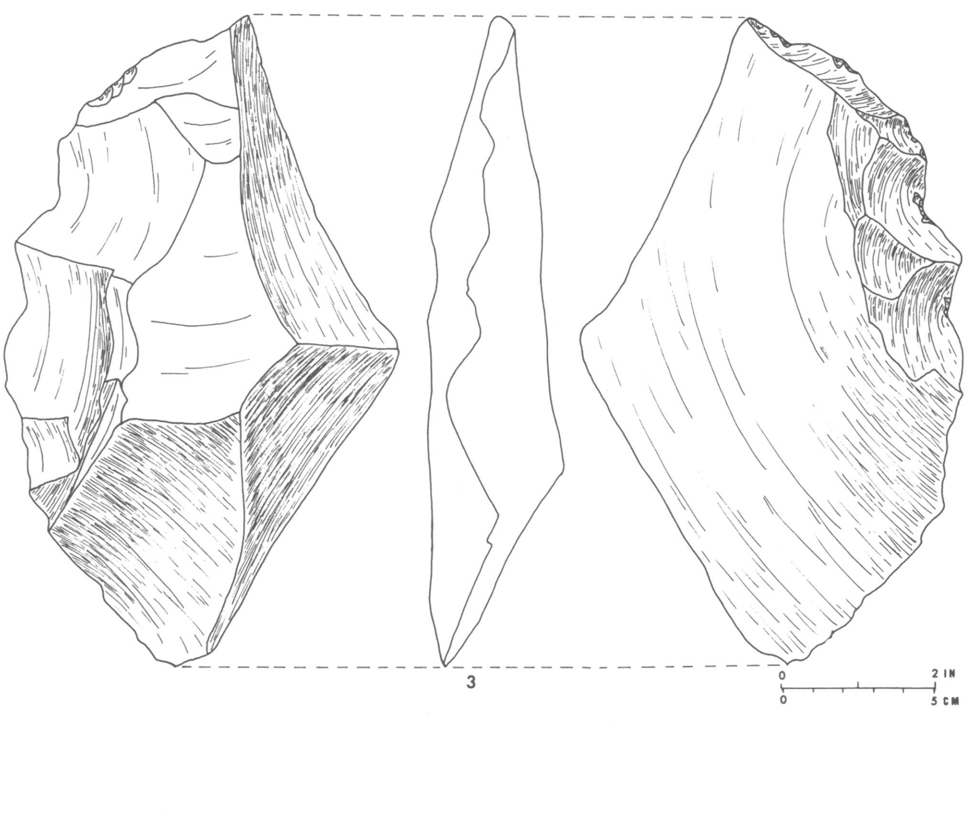

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PLATE XXIX

Layer 5

Acheulean

Surface VIII

1. Ovate-acuminate hand-axe. Biconvex cross section. Butt trimmed unifacially. Trimmed with fine flakes near the tip. There is more trimming on the face illustrated than on the other. 21 x 11 x 6 cm.
2. Disc core. Concave blunt scraping edge on one face. 8 x 8 x 4 cm.
3. Scraper. Straight, steep scraping edge trimmed on one end of a small chunk. Trimmed from a fracture plane. 6 x 5 x 3 cm.
4. Core scraper. Convex notched steep edge trimmed on one end of a chunk. Trimmed from a fracture plane. 5 x 5 x 5 cm.
5. Parallel-sided cleaver. Straight bit and V-butt. Parallelogram cross section. Coarsely trimmed; there is a little trimming along one side on the ventral face. Made on a side-struck flake with a plain platform; bulb and platform present. 21 x 13 x 6 cm.
6. Burin. Triangular chunk from which two burin-like flakes have been removed. 10 x 8 x 4 cm.

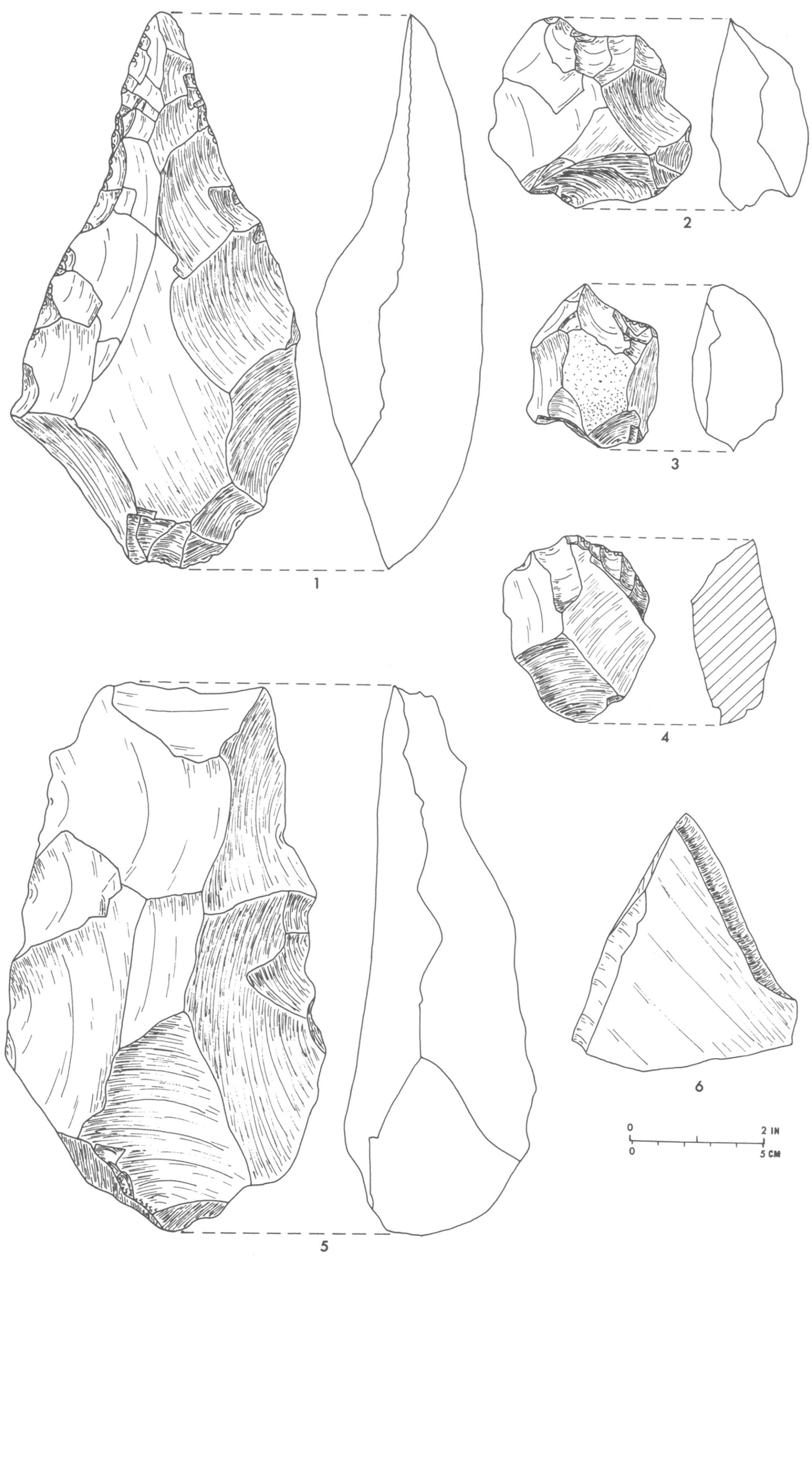


PLATE XXX

Layer 5

Acheulean

Surface VIII: 1-2, 6

Surface IX: 3-5, 7

1. Cleaver. Asymmetrical parallel plan, with a concave guillotine bit to the left. Butt is square and untrimmed. Truncated biconvex cross section. 10 x 10 x 4 cm.
2. Chopper. Trimmed bifacially. Shows heavy battering on both sides. 14 x 10 x 6 cm.
3. Formless core. A chunk trimmed in three directions. 7 x 7 x 6 cm.
4. Hand-axe/chopper. Plano-convex cross section. Trimmed with large flakes on both faces. Tip is round, thick, and slightly keeled. 18 x 10 x 6 cm.
5. Biconical core. 7 x 6 x 5 cm.
6. Twisted bit biface. Elongate plan. Biconvex cross section. Trimmed bifacially with fairly coarse flakes. Tip is thick and has a semi-burin flake up the tip. 10 x 11 x 9 cm.
7. Biconical core. Elongate plan. More trimming on illustrated face than on the other. 11 x 8 x 6 cm.

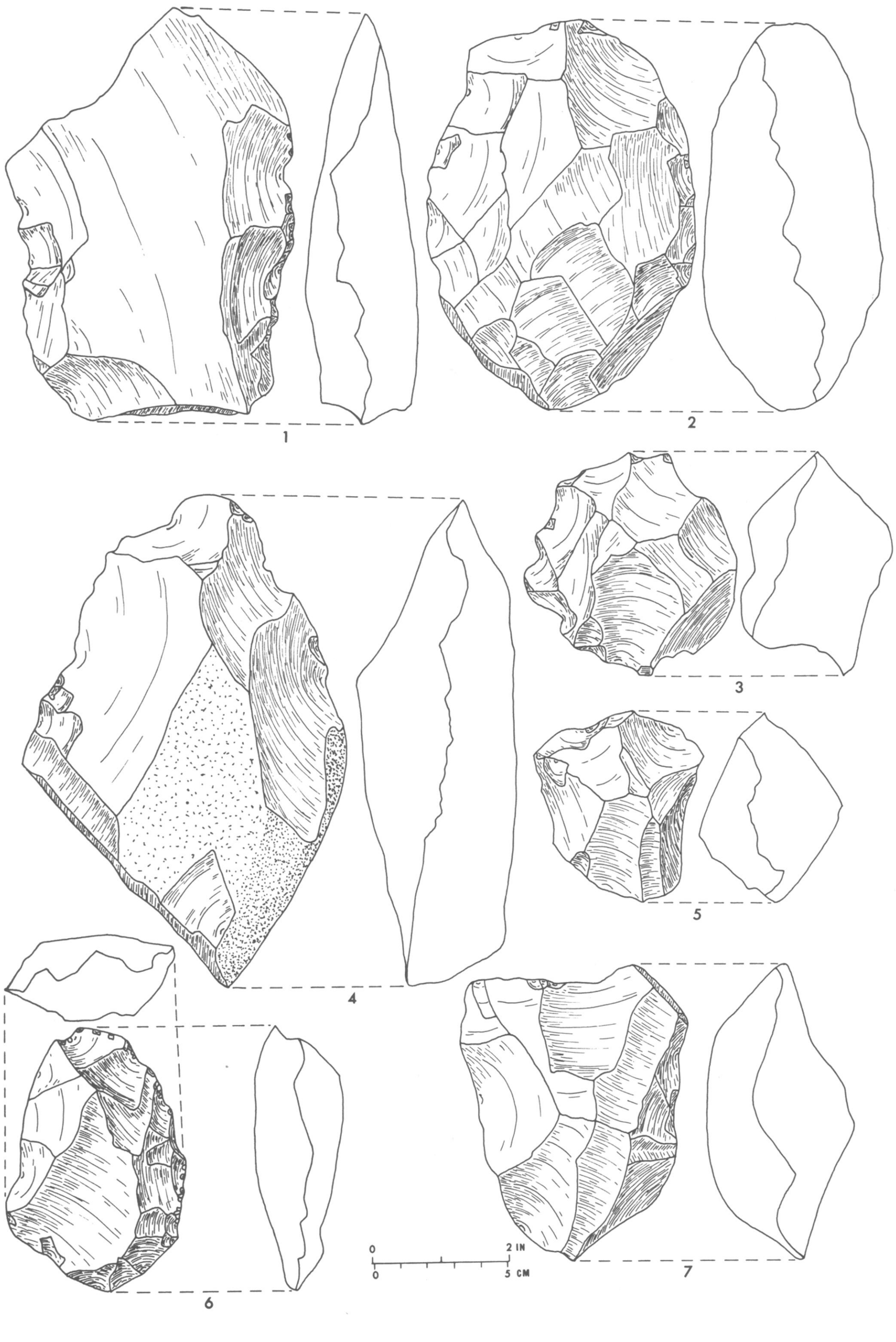


PLATE XXXI

Layer 5

Acheulean

Surface IX

1. Ultra-convergent biface. Straight bit. Untrimmed U-butt and biconvex cross section. Trimmed with very large flakes over both faces; may, in fact, be a roughout. Made on a cobble; butt on both faces is pebble cortex. 21 x 12 x 8 cm.
2. Scraper. Made on a step-flake fragment trimmed on one side to a denticulate blunt edge on the ventral face. 8 x 17 x 5 cm.
3. Scraper. A chunk which has been trimmed unifacially to a convex blunt edge. In some respects this resembles a small knife, but the edge has been blunted rather than sharpened by the trimming. 11 x 16 x 4 cm.
4. Scraper. Irregular side-struck flake with the platform partially removed. Trimmed to a notched blunt edge on the dorsal face opposite the platform. 12 x 23 x 5 cm.
5. Disc core. Trimmed equally on both faces. 9 x 9 x 4 cm.

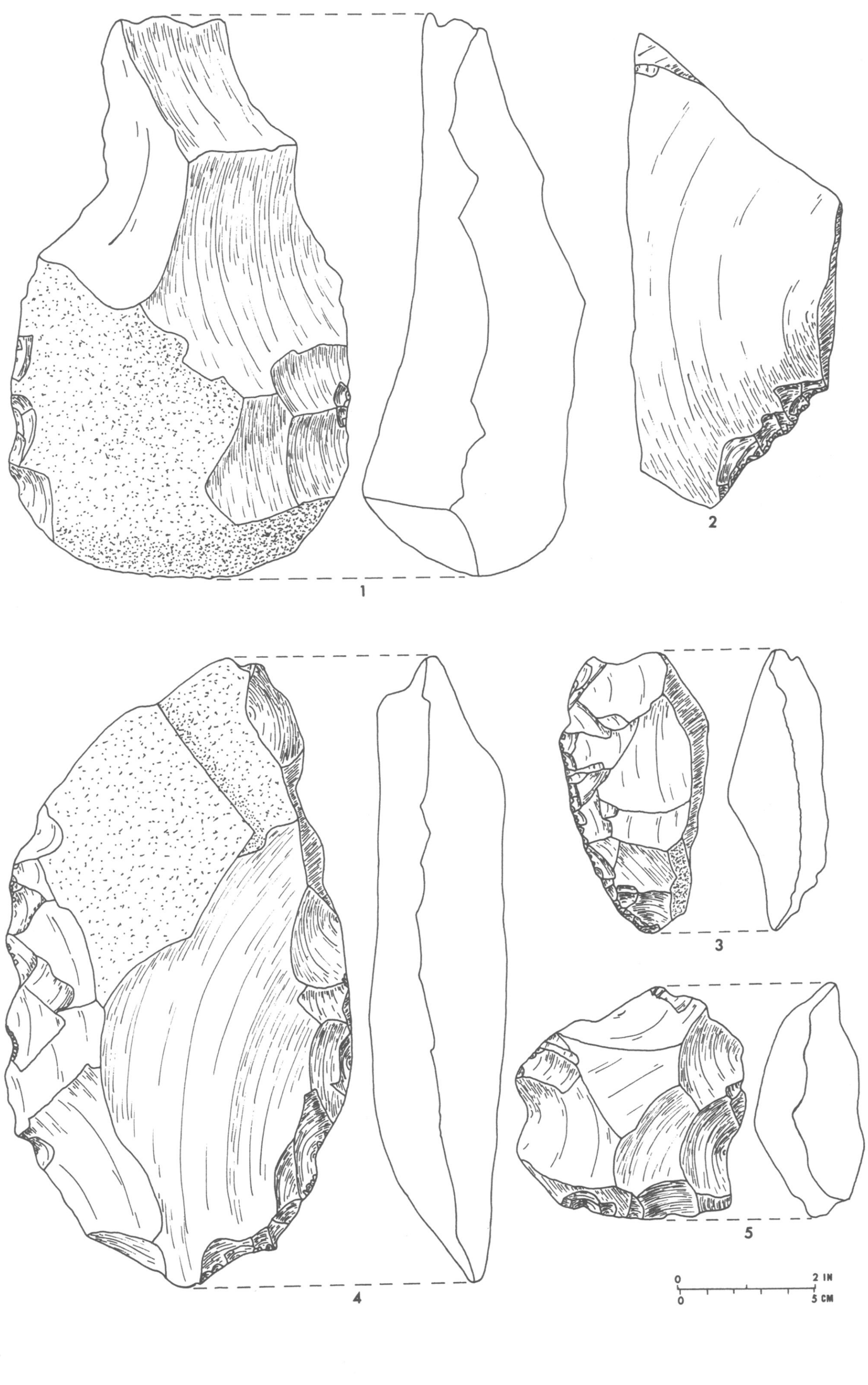


PLATE XXXII

Layer 5

Acheulean

Surface IX: 1, 3-4

Surface X: 2

1. Cleaver. Parallel-sided, with a guillotine bit to the right. Trimmed U-butt and plano-convex cross section. Trimmed on both faces with large flakes. On the ventral face, the platform has been removed, but the bulb is unreduced. 18 x 12 x 5 cm.
2. Narrow lanceolate hand-axe. Plano-convex cross section. Butt is trimmed. Made on a side-struck flake with the platform trimmed away. There is no other trimming on the ventral face; most trimming is on the dorsal face. 16 x 7 x 3 cm.
3. Hand-axe. Amorphous shape and irregular biconvex cross section. Butt is untrimmed; finest trimming around the tip. Trimmed more on face opposite to illustrated one. 22 x 11 x 5 cm.
4. Ultra-convergent cleaver. Straight bit and partially trimmed U-butt. Biconvex cross section. Made on a flat pebble. 20 x 10 x 5 cm.

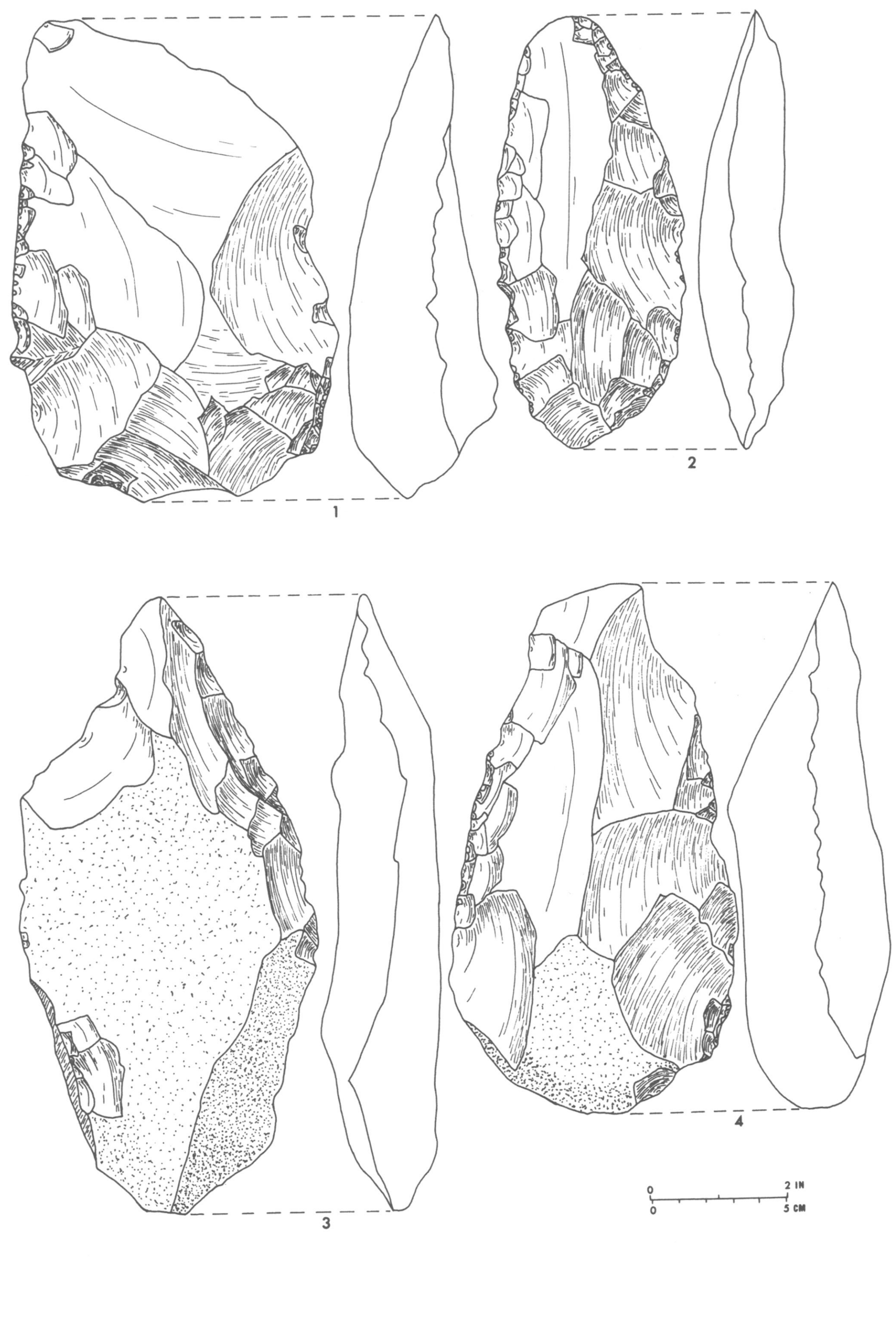


PLATE XXXIII

Layer 5

Acheulean

Surface X

1. Cleaver. Asymmetrical ultra-convergent plan. Straight bit and trimmed U-butt. Diamond cross section. Trimmed over both faces with coarse flakes, but there is some fine trimming near the bit. 20 x 10 x 7 cm.
2. Asymmetrical lanceolate hand-axe. Biconvex cross section and trimmed butt. Trimmed on both faces with fine flakes. 16 x 8 x 5 cm.
3. Sub-triangular hand-axe. Lenticular cross section. Butt is trimmed. Trimmed over both faces with fairly fine flakes. Lower right hand corner may have snapped off. 16 x 11 x 5 cm.
4. Lanceolate hand-axe. Biconvex cross section. Butt is untrimmed. Trimmed with large flakes, but with some fine flakes on the edges on the forward part. 23 x 10 x 7 cm.

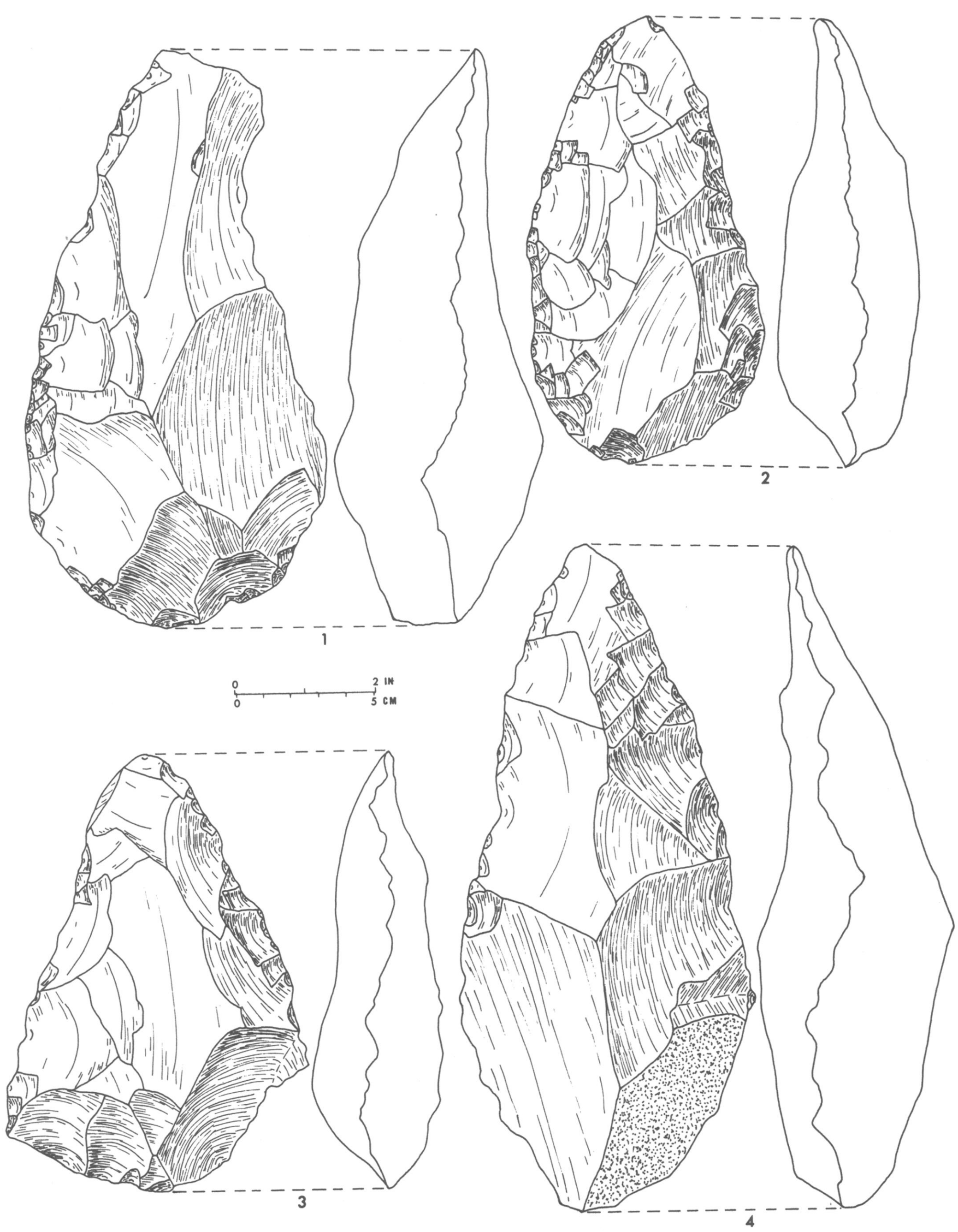


PLATE XXXIV

Layer 5

Acheulean

Surface X

1. Lanceolate hand-axe. Biconvex cross section. Trimmed butt. Trimmed over both faces with large flakes. 31 x 15 x 9 cm.
2. Scraper. Irregular blunt edge trimmed on dorsal face opposite platform on an irregular side-struck flake. 10 x 18 x 5 cm.
3. Disc core. Ovoid plan. Trimmed bifacially and radially. On one end there is a straight, steep core scraper edge. 13 x 10 x 6 cm.

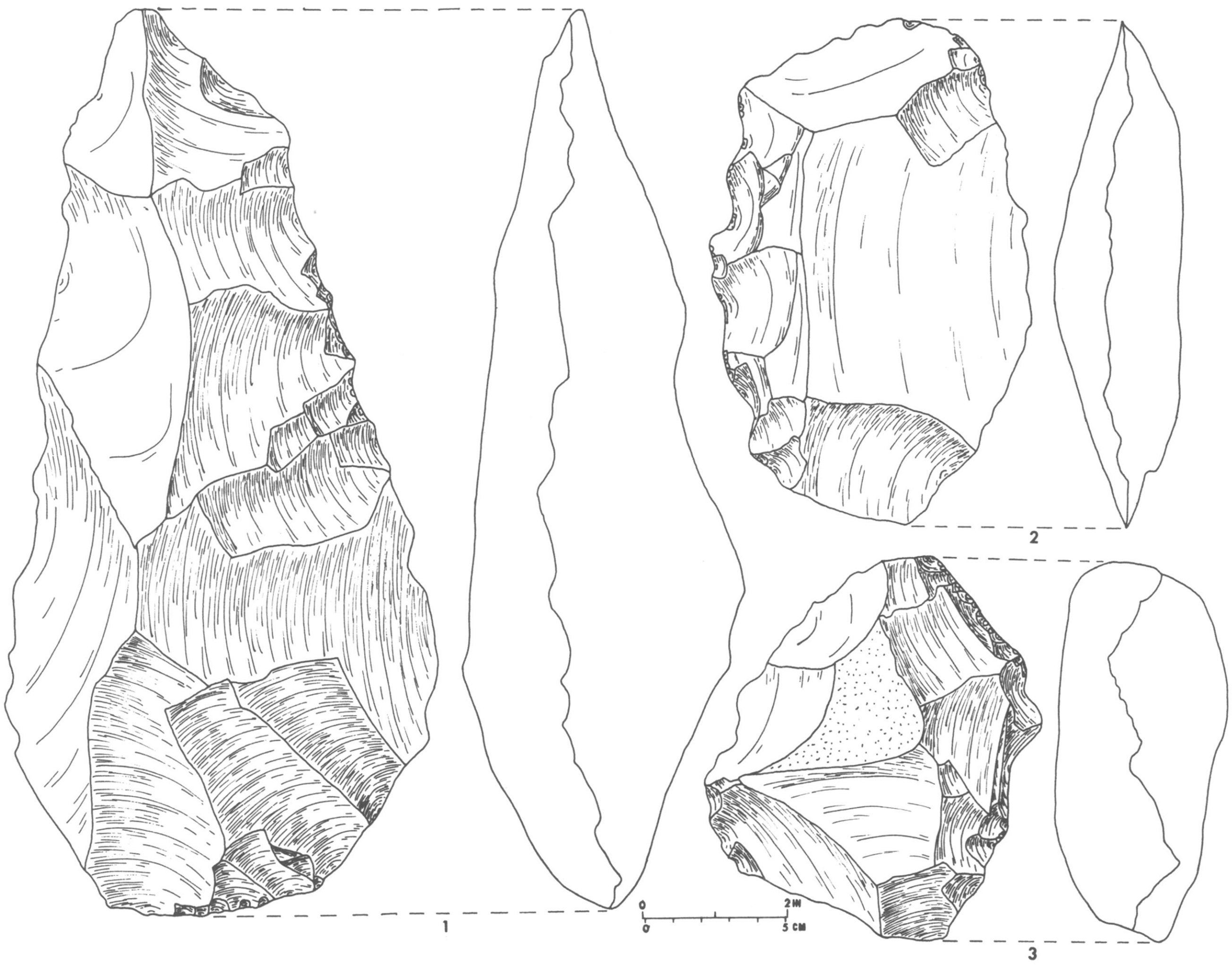


PLATE XXXV

Layer 5

Acheulean

Surface X

1. Disc. Round plan and trimmed mainly on the ventral face. 14 x 12 x 5 cm.
2. Chisel. Asymmetrical convergent plan and guillotine bit. Trimmed butt, and biconvex cross section. Bit is trimmed bifacially up the long axis of tool from the edge. Patches of pebble cortex remain on both faces. 16 x 10 x 6 cm.
3. Pointed knife. Trimmed over both faces. Backed by a fracture plane. Wedge-shaped cross section. 17 x 8 x 6 cm.
4. Push plane. Convergent plan and straight steep bit. Biconvex cross section. Working edge has a plano-convex cross section and shows signs of battering as if by heavy use. 10 x 8 x 7 cm.
5. Biconical core. Trimmed equally on both faces. 7 x 6 x 5 cm.

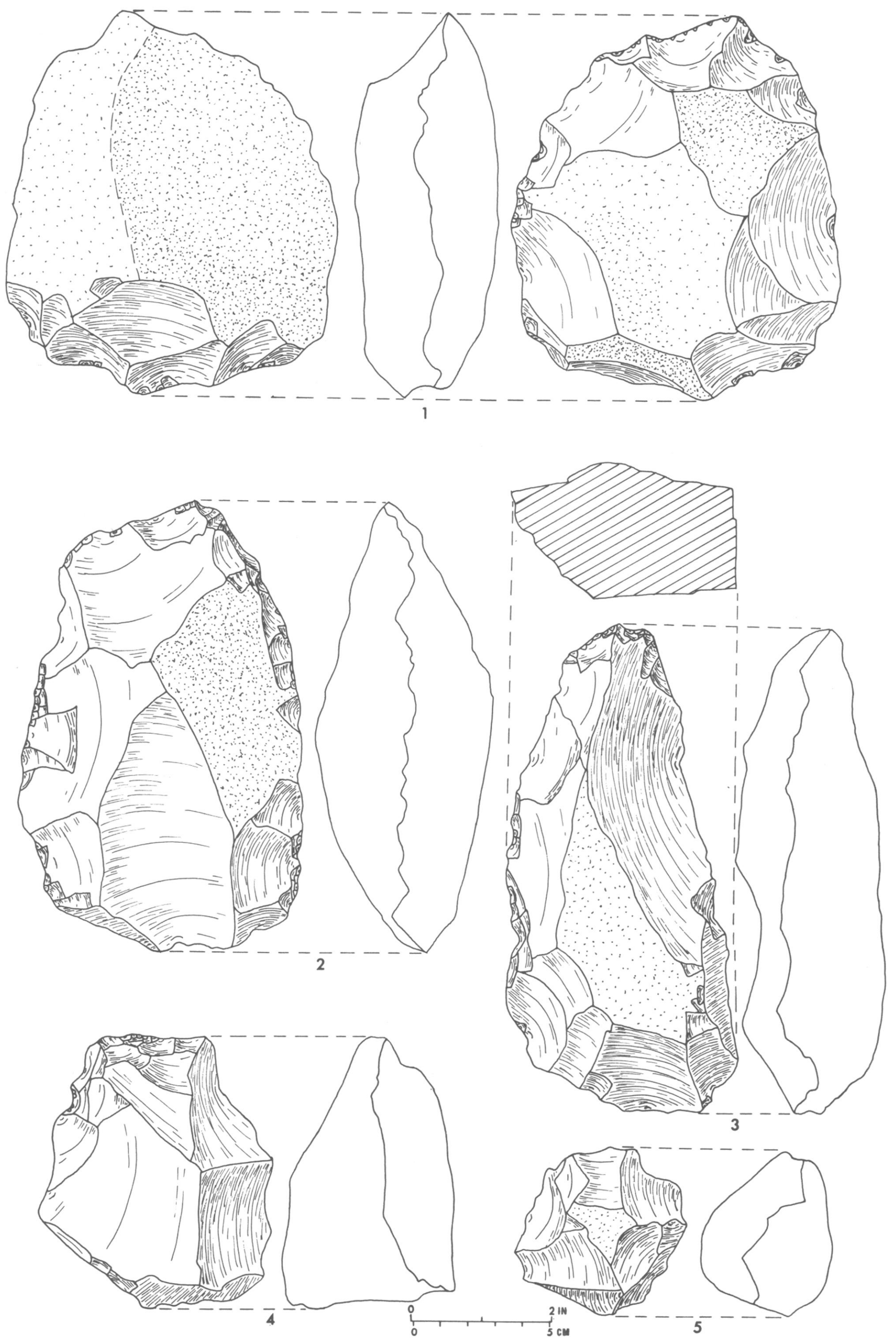


PLATE XXXVI

Layer 5

Acheulean

Surface X

1. Convergent cleaver. Straight bit. Trimmed U-butt and plano-convex cross section. Made on a side-struck flake with the bulb and platform partially reduced. Minimal trimming with large flakes; trimmed on dorsal face only along one side. 27 x 13 x 6 cm.
2. Plano-convex core. Elongate plan. No working end or edge. Trimmed radially on both faces, but slightly more trimming on the plano face. 16 x 9 x 6 cm.
3. Beaked biface. A chunk which has been trimmed to a point. Overall cross section is biconvex, but cross section of the point is plano-convex. Point is thick and keeled. 12 x 10 x 6 cm.

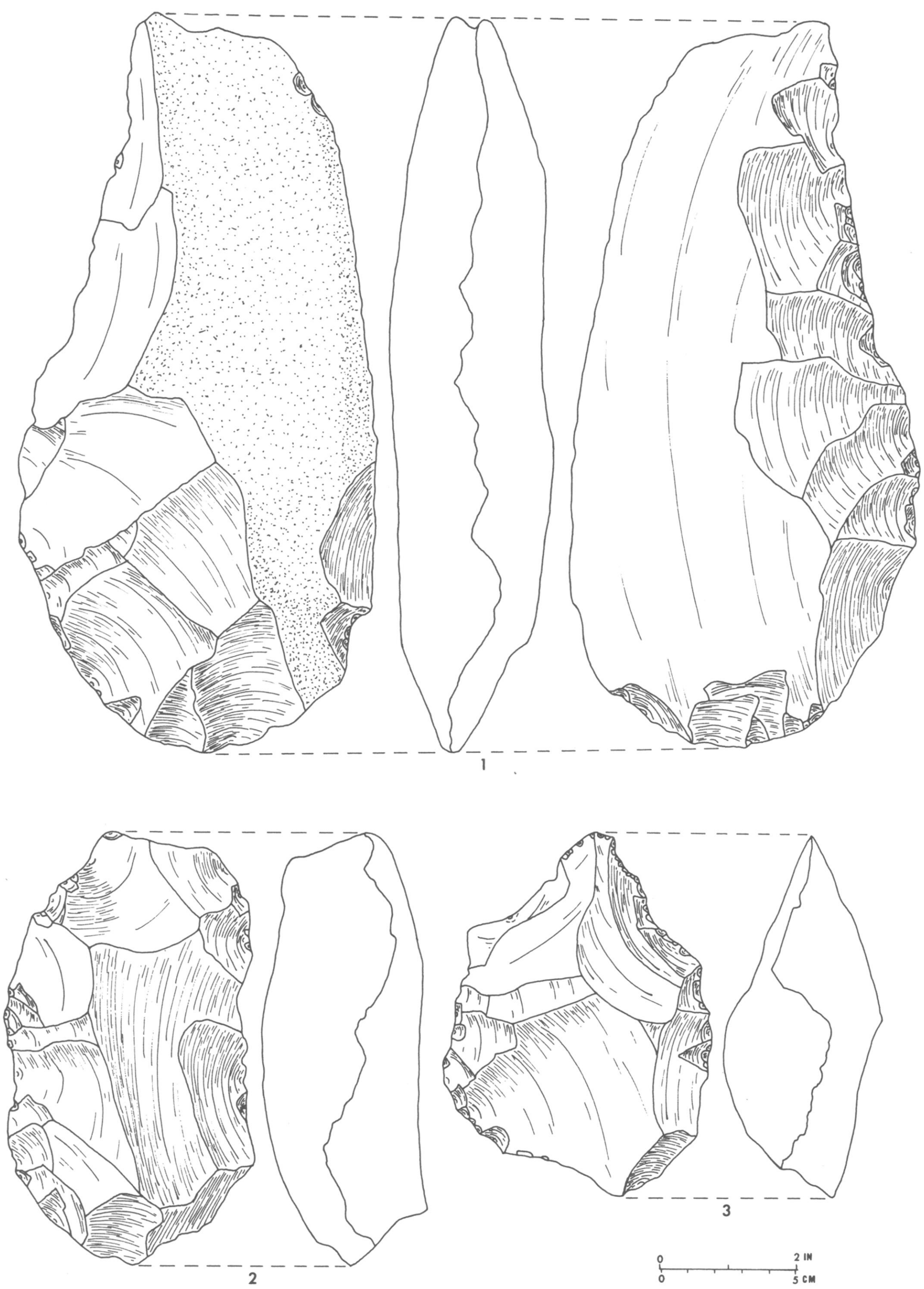


PLATE XXXVII

Layer 5

Acheulean

Surface X

1. Lanceolate hand-axe. Diamond cross section. Butt trimmed on one face. 24 x 11 x 8 cm.
2. Ovate hand-axe. Biconvex cross section and untrimmed butt. Made on a cobble, with cortex remaining on both faces on the butt. Tip is somewhat like a core-axe with flakes struck up the long axis of the tool from the tip. 16 x 11 x 7 cm.
3. Disc core. Sub-rectangular plan. Trimmed more on the illustrated face. 8 x 6 x 4 cm.
4. Chopper. Trimmed over both faces, and battered on both sides and one end. Biconvex cross section. 15 x 10 x 6 cm.

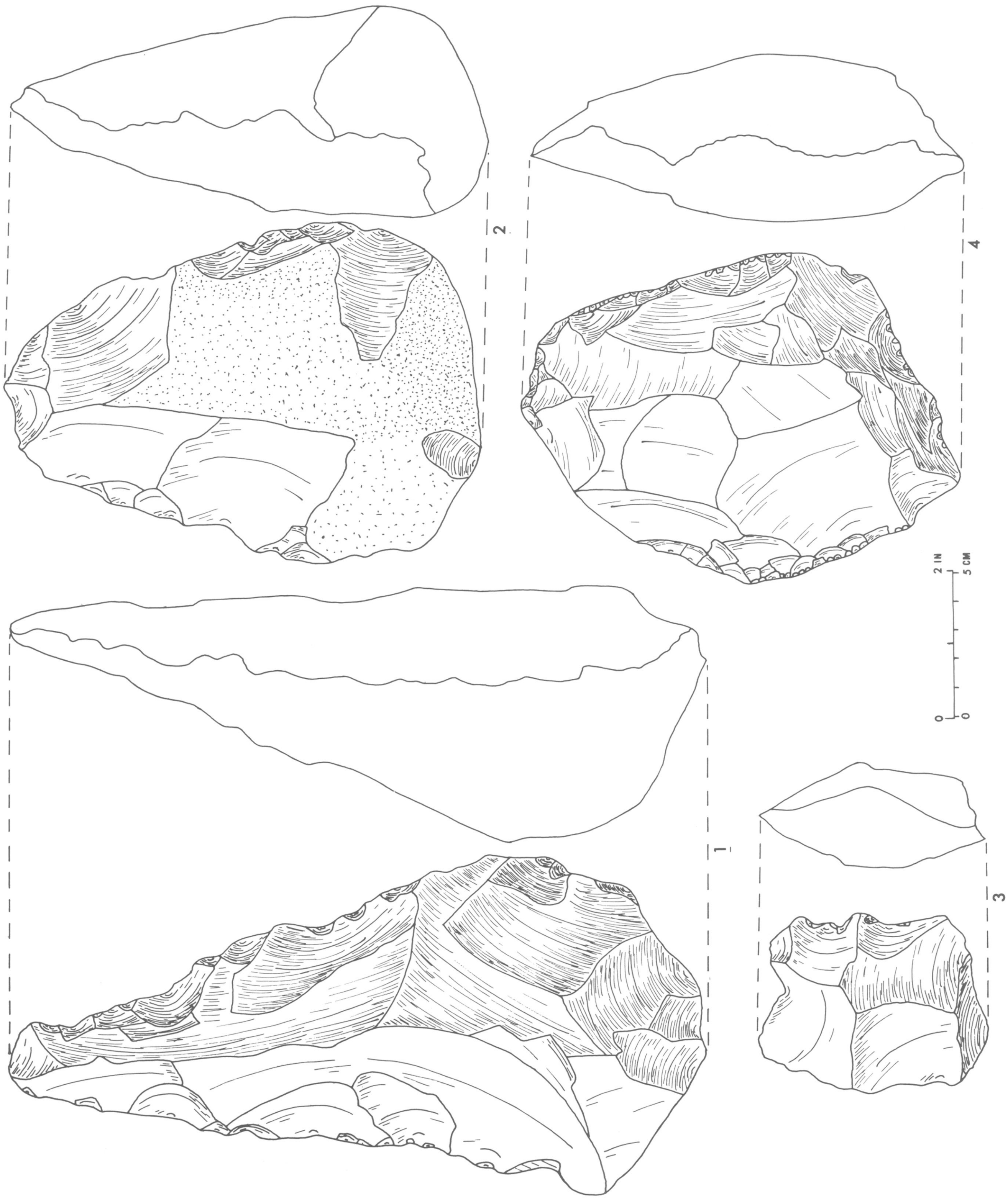


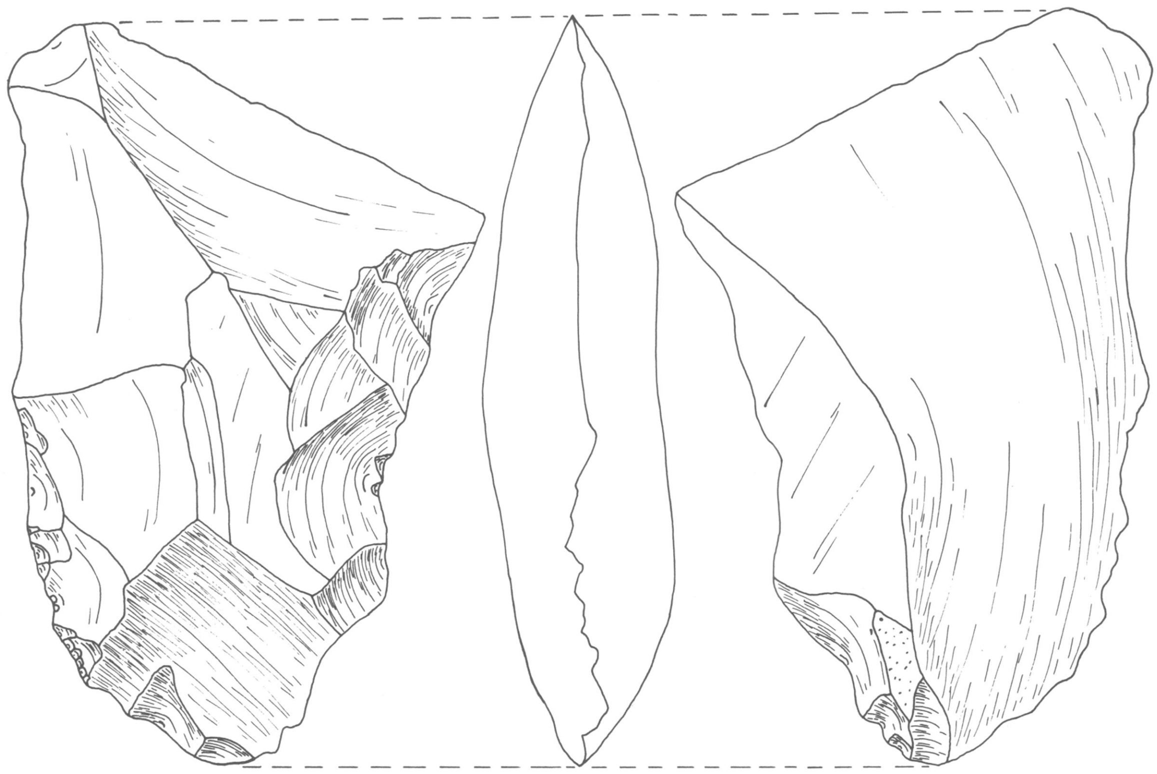
PLATE XXXVIII

Layer 5

Acheulean

Surface X

1. Cleaver flake. Asymmetrical divergent plan. Straight bit and trimmed V-butt. Truncated diamond cross section. Made on a side-struck flake with a plain platform. 19 x 13 x 4 cm.
2. Parallel-sided cleaver. Irregular straight bit and square untrimmed butt. Parallelogram cross section. Made on a side-struck flake. Minimal trimming with small flakes on the ventral face; most of the trimming was to remove the platform. 20 x 12 x 5 cm.
3. Narrow lanceolate hand-axe. Biconvex cross section. Trimmed butt. Trimmed over both faces with coarse flakes. 18 x 9 x 11 cm.



1

2

3

PLATE XXXIX

Layer 5

Acheulean

Surface X

1. Asymmetrical lanceolate hand-axe. Biconvex cross section. Butt is unworked. Coarsely trimmed over both faces. 21 x 11 x 7 cm.
2. Scraper. A chunk with a small, blunt nose on one face on one end, and a convex steep edge on the opposite face and opposite end. 11 x 9 x 3 cm.
3. Ultra-convergent cleaver. Straight bit, and plano-convex cross section. U-butt is untrimmed. Made on an end-struck flake with a plain platform; the bulb and platform have been partly removed by trimming on the ventral face. The dorsal face is trimmed only along the sides. 12 x 7 x 4 cm.
4. Asymmetrical long ovate hand-axe. Biconvex cross section. Butt trimmed unifacially. Some fine trimming near the tip on both faces. 19 x 11 x 6 cm.
5. Convergent cleaver. Guillotine bit to the left. Square trimmed butt. Most trimming on the ventral (illustrated) face; dorsal face is trimmed only at the butt. 16 x 9 x 4 cm.

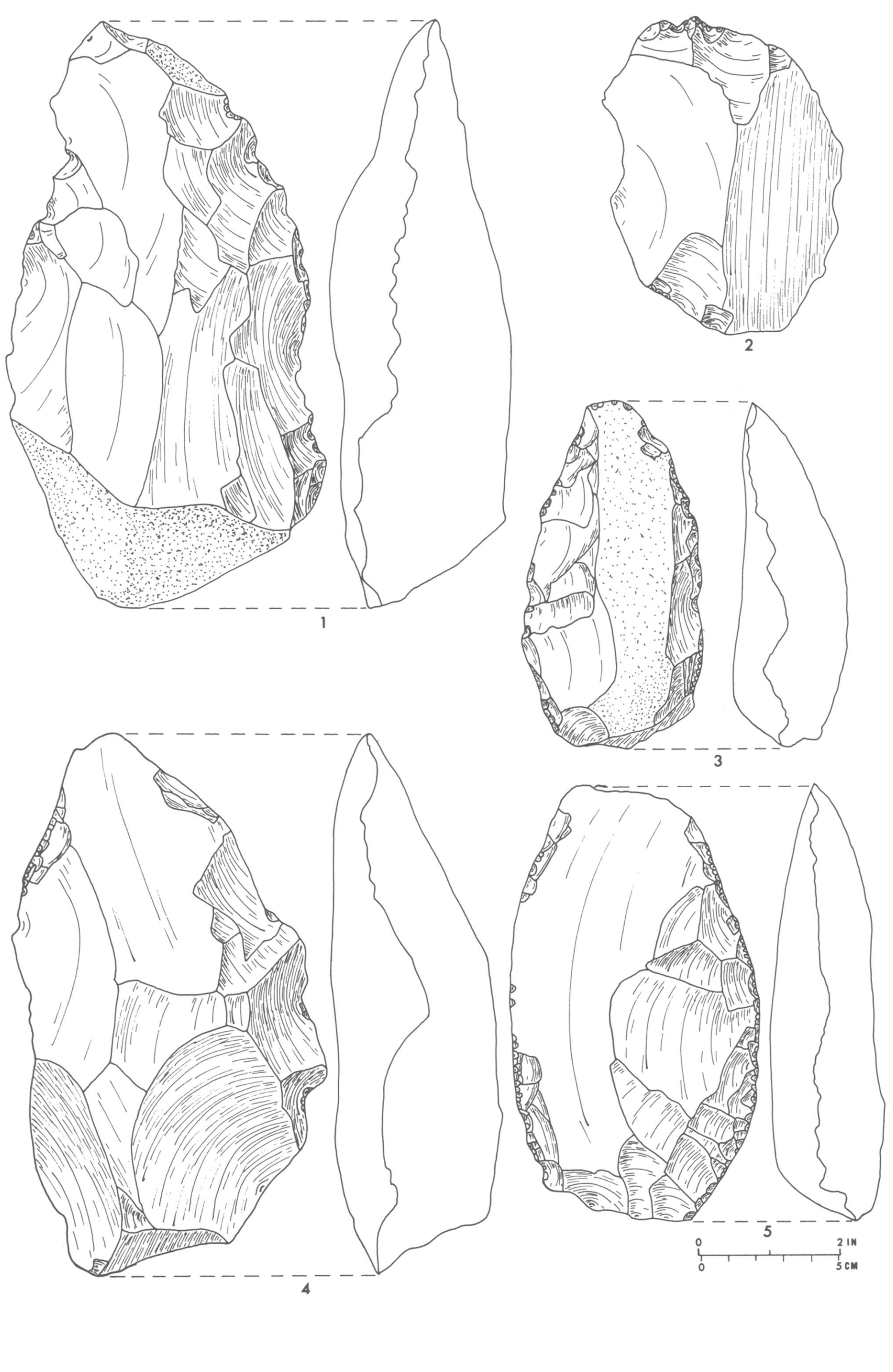


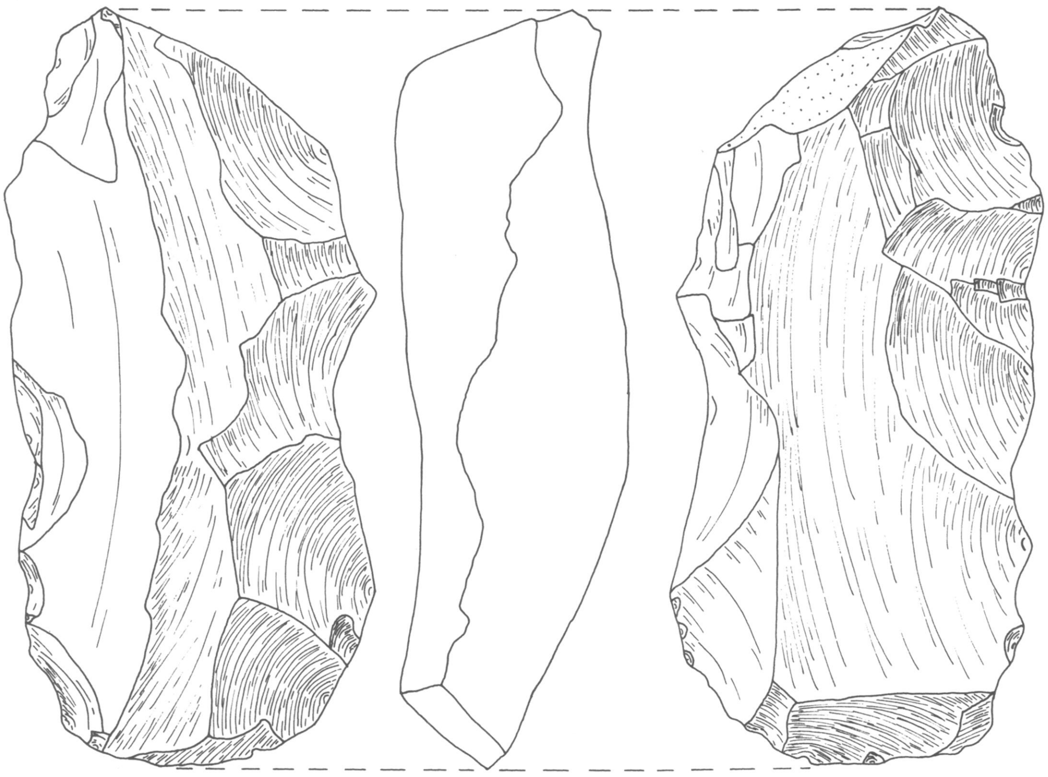
PLATE XL

Layer 5

Acheulean

Surface X

1. Trimmed chunk. Elongate plan and biconvex cross section. Trimmed radially along the sides on both faces. No working edge. 20 x 10 x 8 cm.
2. Plano-convex core. Large portion of a boulder trimmed radially on the plano face. Convex face is mostly cortex, but three flakes have been detached from it. 22 x 17 x 10 cm.



1

2

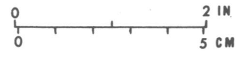


PLATE XLI

Layer 5

Acheulean

Surface X: 1-2, 4

Below surface X: 3

1. Hand-axe/chopper. Untrimmed butt. Plano-convex cross section. More trimming on dorsal than on ventral face. Trimmed with large flakes. 19 x 13 x 9 cm.

2. Push plane. Asymmetrical ovate plan and concave blunt working edge. Butt is partially trimmed on the dorsal face. Made on a side-struck flake with a plain platform. Platform is the untrimmed portion of the butt. 13 x 9 x 10 cm.

3. Scraper. Made on an irregular side-struck flake with a plain platform. Irregular blunt edge trimmed adjacent to the platform on the ventral face. Adjacent to the platform, but on the dorsal face, there is a concave blunt edge. 7 x 10 x 2 cm.

4. Hand-axe/chopper. Pointed shape and biconvex cross section. Tip is round and not keeled. Trimmed with large flakes on both faces. Butt is pebble cortex. Some battering from heavy use at the tip. 20 x 14 x 7 cm.

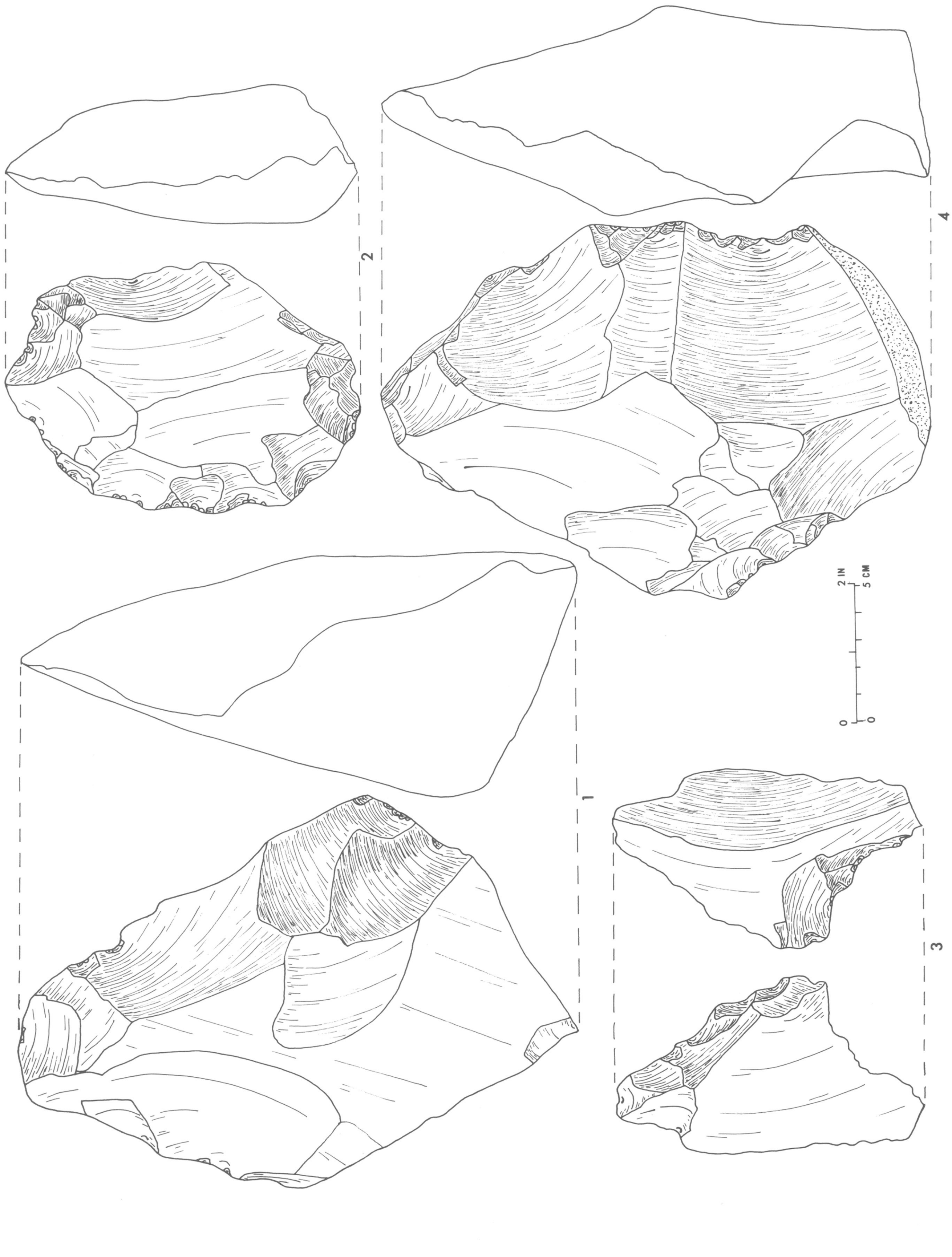


PLATE XLII

Layer 5

Acheulean

Surface X: 1-2, 5

Below surface X: 3-4, 6

1. Cleaver. Divergent plan and straight, convex bit. U-butt trimmed unifacially. Truncated diamond cross section. Trimmed more on face opposite to the one illustrated. 23 x 16 x 6 cm.
2. Plano-convex core. Trimmed radially on the plano face. Convex face has four scars at one end, and the remainder is covered with cortex or large, partial flake scars. 18 x 12 x 7 cm.
3. Scraper. Made on an irregular, side-struck flake. Platform partially removed by the trimming of the scraping edge. Edge is notched and steep. 11 x 5 x 3 cm.
4. Scraper. Denticulate blunt edge trimmed on one end of a small chip. 4 x 3 x 1 cm.
5. Biconical core. Round plan and trimmed equally on both faces. 10 x 7 x 6 cm.
6. Scraper. Irregular shape. Made on a side-struck flake fragment. Irregular blunt edge trimmed on the ventral (illustrated) face; on the dorsal face a concave shallow edge is trimmed. 10 x 9 x 3 cm.

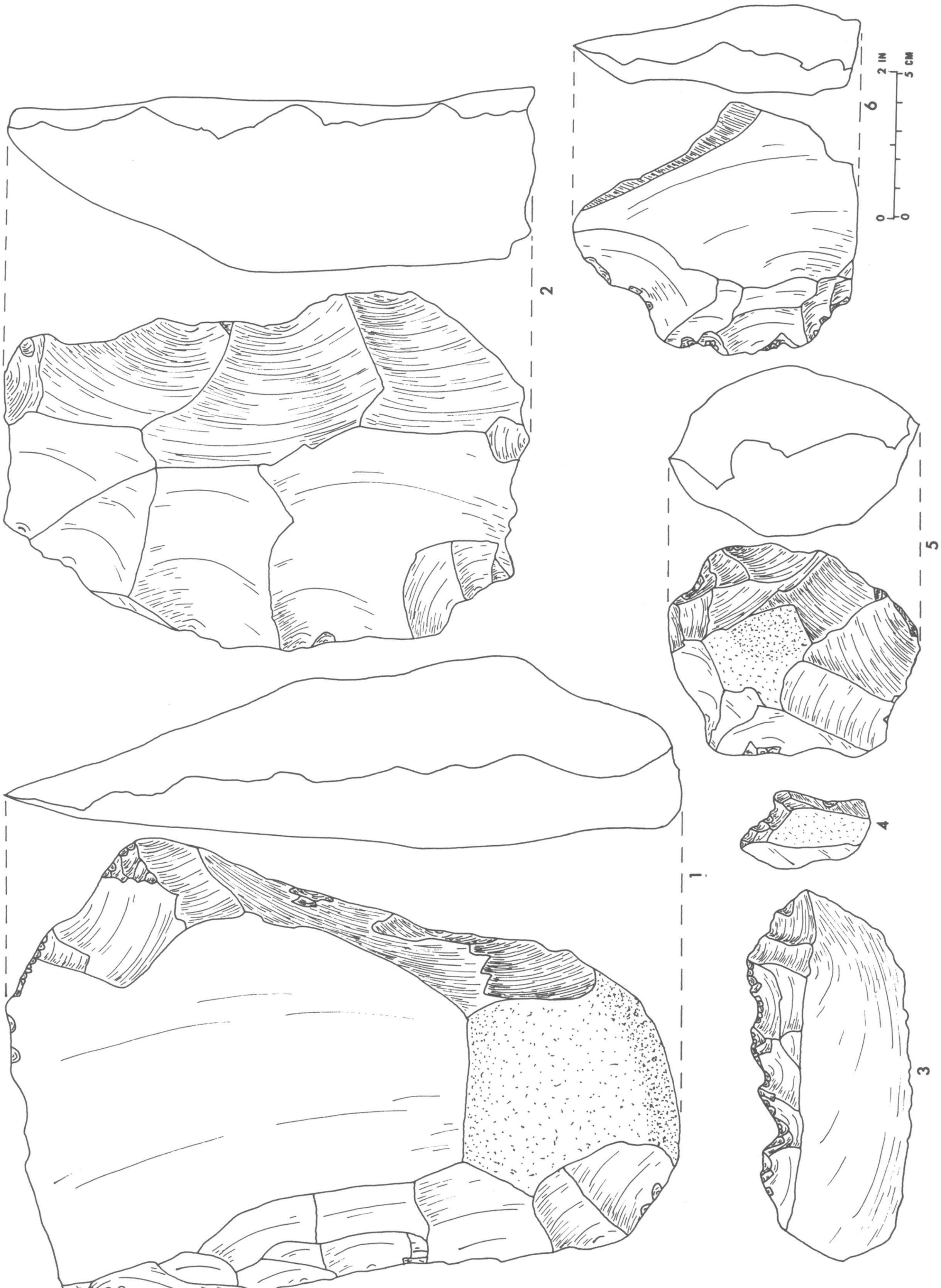


PLATE XLIII

Layer 5

Acheulean

Surface X: 4

Below surface X: 1-3

Surface XI: 5

1. Lanceolate hand-axe. Plano-convex cross section and butt partially trimmed on both faces. Made on a triangular end-struck flake with a plain platform. Very fine trimming on both faces near the butt. 26 x 13 x 5 cm.
2. Ovate chisel. Straight, bifacially trimmed bit. Butt is trimmed. Lenticular cross section. Trimmed over both faces with fairly fine flakes. Bit shows heavy use. 10 x 8 x 4 cm.
3. Cleaver. Irregular parallel plan and straight bit. Trimmed U-butt and biconvex cross section. Made on a side-struck flake with the bulb and platform trimmed away. 10 x 6 x 5 cm.
4. Convergent cleaver. Guillotine bit and trimmed U-butt. Biconvex cross section. Trimmed with large flakes on both faces. 14 x 9 x 5 cm.
5. Parallel-sided cleaver. Guillotine bit to the left. Butt trimmed on dorsal face. Asymmetrical biconvex cross section. Made on a side-struck flake with the platform removed and the bulb partially reduced. Trimmed with large flakes. 19 x 8 x 4 cm.

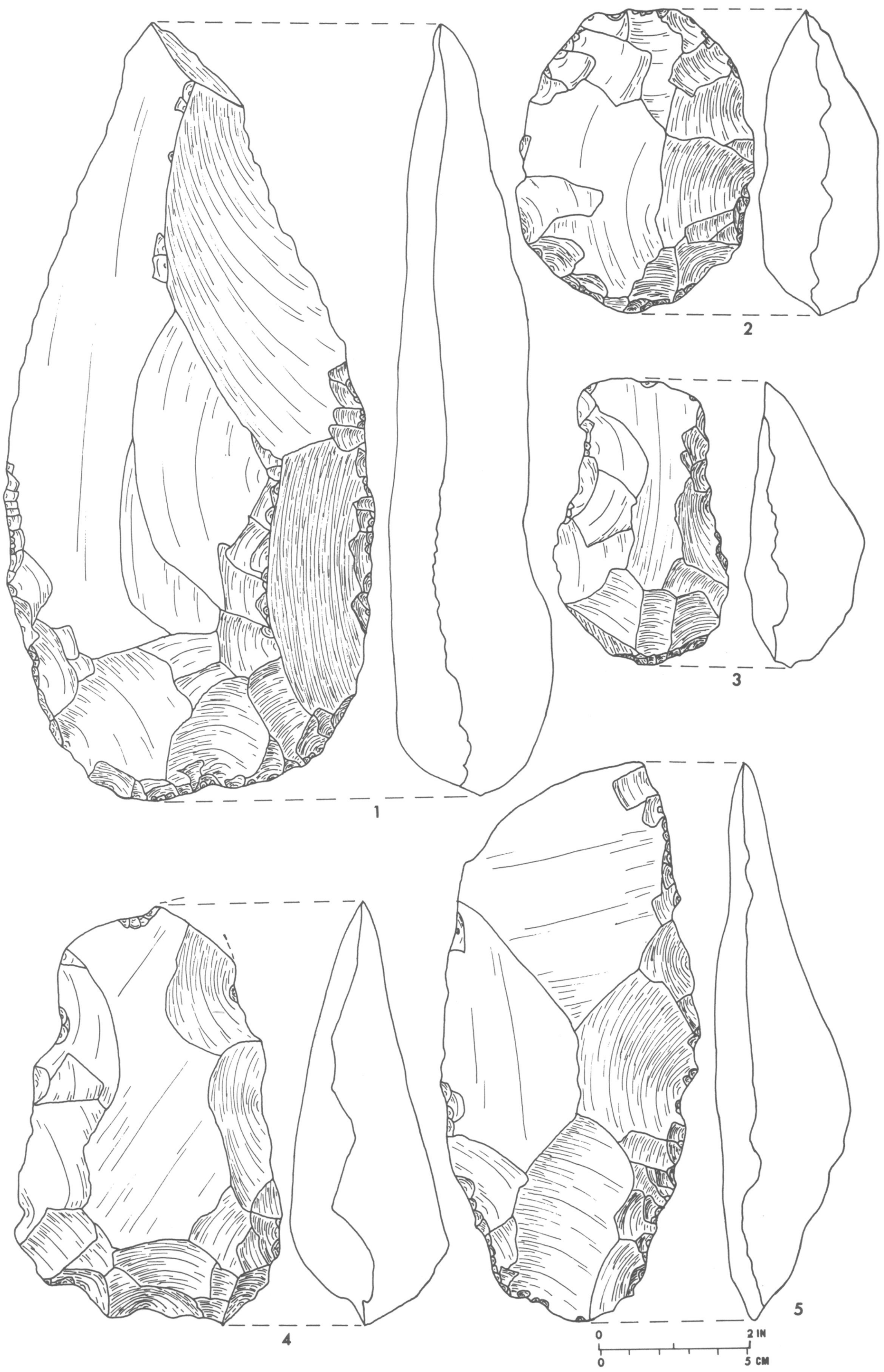


PLATE XLIV

Layer 5

Acheulean

Below surface X: 5

Surface XI: 1-4

1. Asymmetrical long ovate hand-axe. Biconvex cross section and trimmed butt. Trimmed over both faces with fairly fine flakes. 15 x 7 x 5 cm.
2. Beaked biface. Untrimmed butt and plano-convex cross section. Trimmed most on the dorsal face, but trimmed near the tip on the ventral face. Tip is thick and keeled. 15 x 8 x 6 cm.
3. Core scraper. A notched steep edge trimmed on one end of an irregular chunk, from a cortex face. 10 x 7 x 9 cm.
4. Disc core. Round plan. Used as a scraper on one edge. 10 x 10 x 4 cm.
5. Pointed knife. Trimmed butt. Trimmed with large flakes. Backed by a cortex face. 20 x 9 x 5 cm.

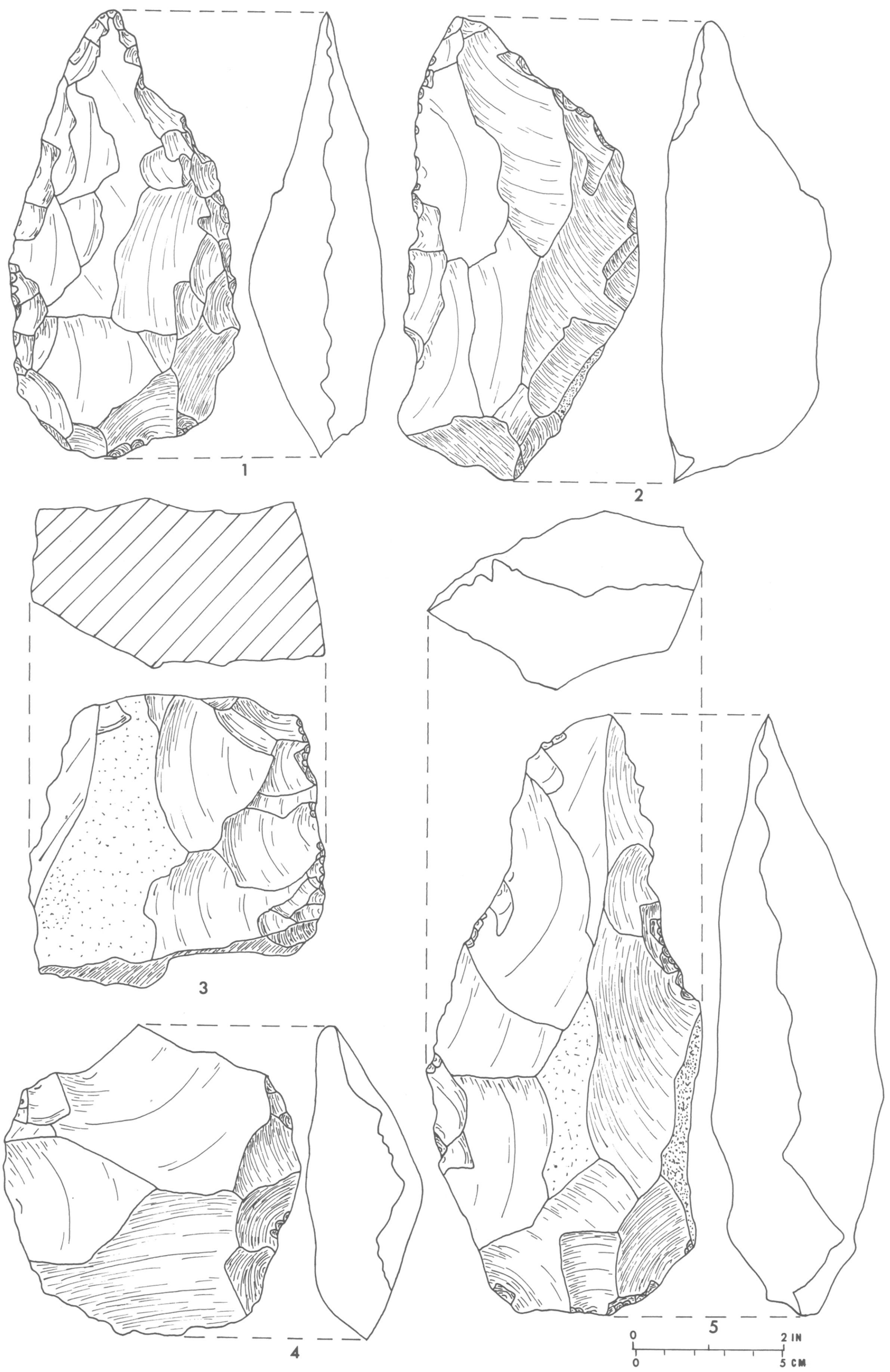


PLATE XLV

Layer 5

Acheulean

Surface XI

1. Divergent cleaver. Straight bit. Square butt, trimmed unifacially. Trimmed along the sides on both faces. Biconvex cross section. 19 x 13 x 7 cm.
2. Lanceolate hand-axe. Biconvex cross section. Trimmed butt and round tip. Trimmed finely over both faces. 14 x 6 x 4 cm.
3. Scraper. Made on a sub-quadrilateral chunk. Denticulate blunt edge trimmed on one side from a fracture plane. 7 x 6 x 4 cm.
4. Asymmetrical ultra-convergent cleaver. Straight bit. Square untrimmed butt and parallelogram cross section. Trimmed over most of both faces. 14 x 6 x 3 cm.
5. Parallel-sided cleaver. Straight bit. Square untrimmed butt and plano-convex cross section. Trimmed on both faces with large flakes. 19 x 12 x 7 cm.
6. Scraper. Irregular, bifacially trimmed chip with a concave blunt edge on one side. 6 x 6 x 2 cm.

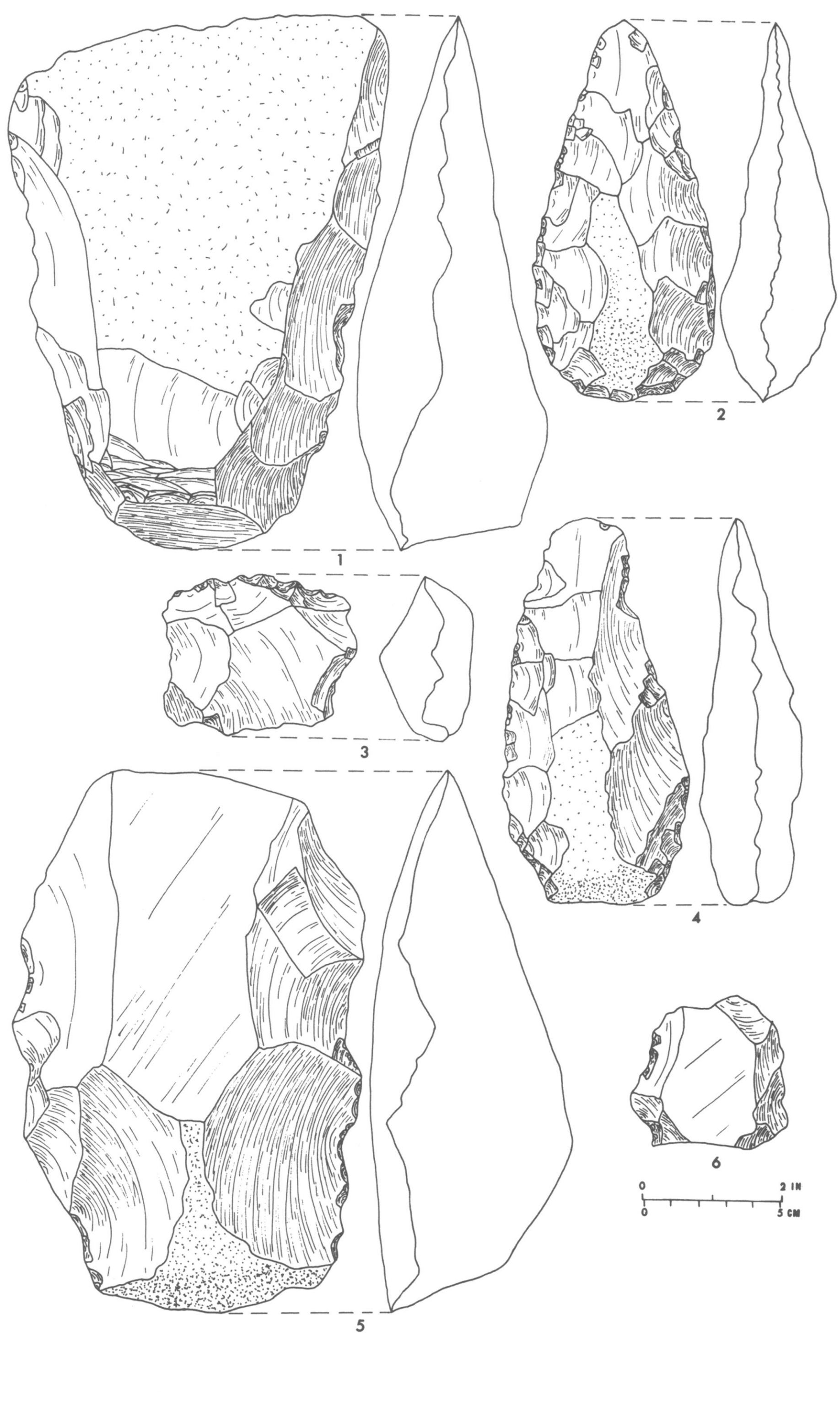


PLATE XLVI

Layer 5

Acheulean

Surface XI

1. Lanceolate hand-axe. Biconvex cross section. Trimmed butt and round tip. Trimmed over both faces. 29 x 12 x 8 cm.
2. Biconical core. Round plan and trimmed equally on both faces. 12 x 10 x 7 cm.
3. Beaked biface. Elongate plan. Biconvex cross section. Trimmed butt and steep, pointed tip. Trimmed over both faces with large flakes; tip shows fine trimming. 13 x 9 x 5 cm.

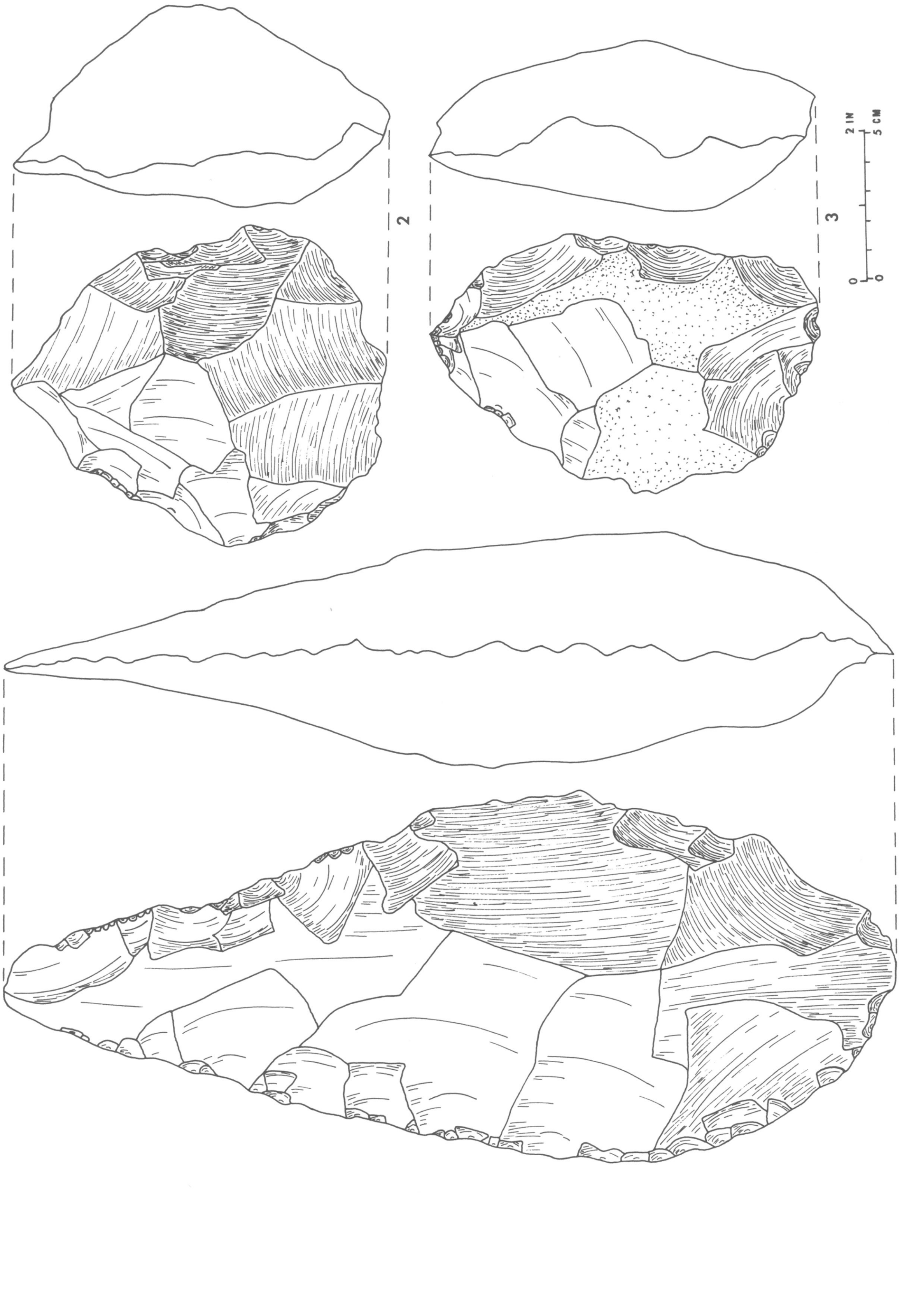


PLATE XLVII

Layer 5

Acheulean

Surface XI: 4

Below surface XI: 1-3, 5-6

1. Irregular lanceolate hand-axe. Plano-convex cross section and trimmed butt. Trimmed more on the convex face. 19 x 9 x 5 cm.
2. Scraper. Made on an irregular, side-struck flake with a plain platform. A straight, blunt-to-shallow edge trimmed on the dorsal face opposite the platform. 11 x 15 x 3 cm.
3. Cleaver flake. Convergent-sided and straight bit. Untrimmed U-butt and flake cross section. Made on a corner-struck flake with a plain platform; trimmed only on one side on the dorsal face. 15 x 9 x 5 cm.
4. Biface. Unifacially trimmed, straight tip. Convergent plan and trimmed butt. Biconvex cross section. Bit has a straight, steep edge. 9 x 6 x 4 cm.
5. Disc core. Round plan. Trimmed more on face opposite to illustrated one. Flat spot apparent in profile is cortex. The face is trimmed only around the sides. 7 x 7 x 4 cm.
6. Irregular ovate-acuminate hand-axe. Irregular biconvex cross section. Butt trimmed unifacially. Coarsely trimmed on both faces. 13 x 7 x 4 cm.

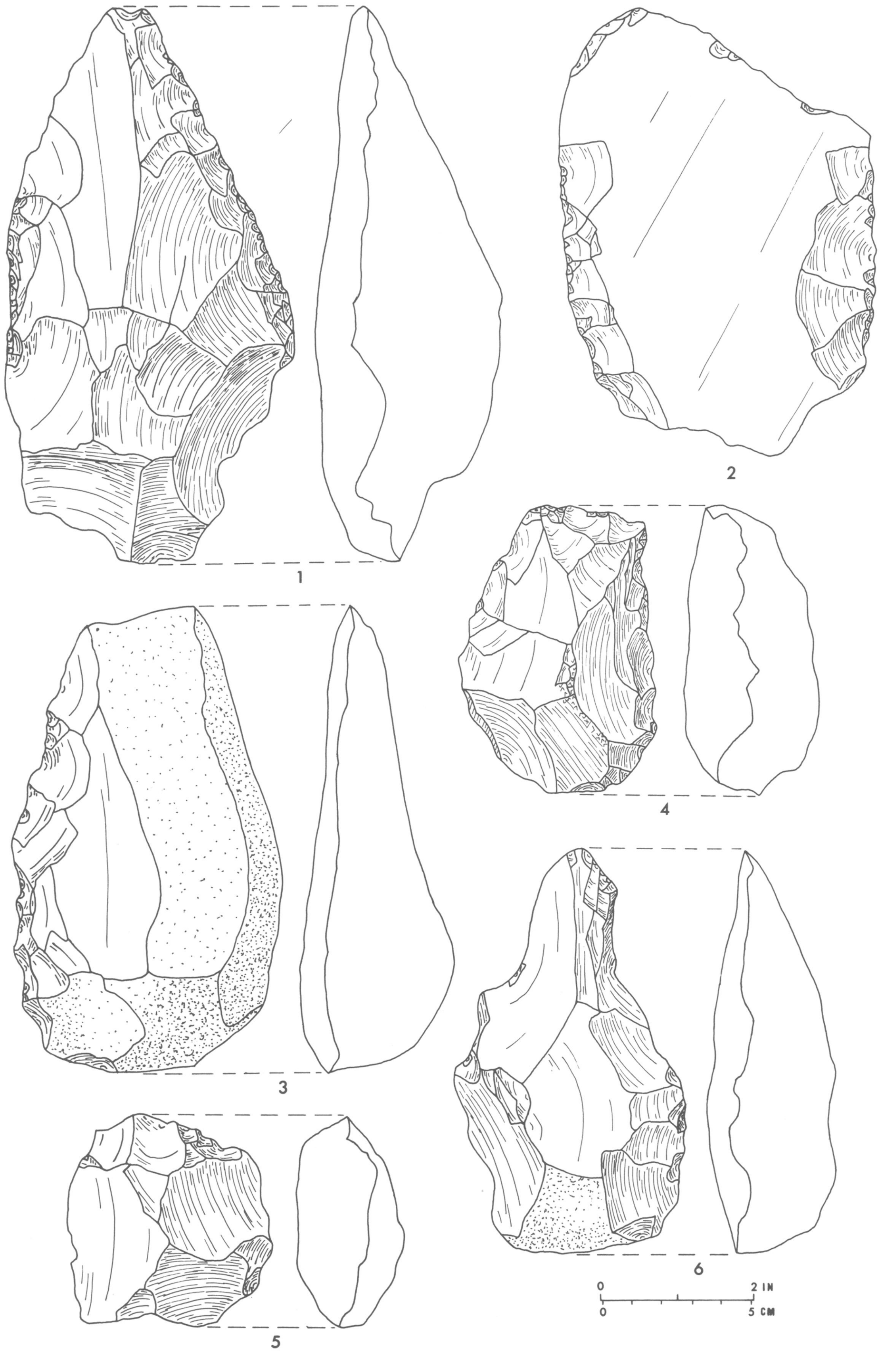


PLATE XLVIII

Layer 5

Acheulean

Below surface XI

1. Divergent cleaver. Guillotine bit to the right. Square, untrimmed butt. Trimmed only along the sides on the face opposite to the one illustrated. Plano-convex cross section. 21 x 15 x 6 cm.
2. Parallel-sided cleaver. Straight bit and trimmed V-butt. Biconvex cross section. Trimmed more on the illustrated face. 10 x 6 x 3 cm.
3. Scraper. Made on a quadrilateral chunk. An irregular blunt edge trimmed on one side of the chunk, and three burin-like flakes on one end. 7 x 8 x 4 cm.
4. Scraper. A large chip trimmed along one side to an irregular blunt edge. 14 x 6 x 4 cm.
5. Hand-axe/chopper. Asymmetrical block shape. Untrimmed butt and thick round tip showing heavy use. Bifacially trimmed, but more on the dorsal face. 15 x 15 x 7 cm.

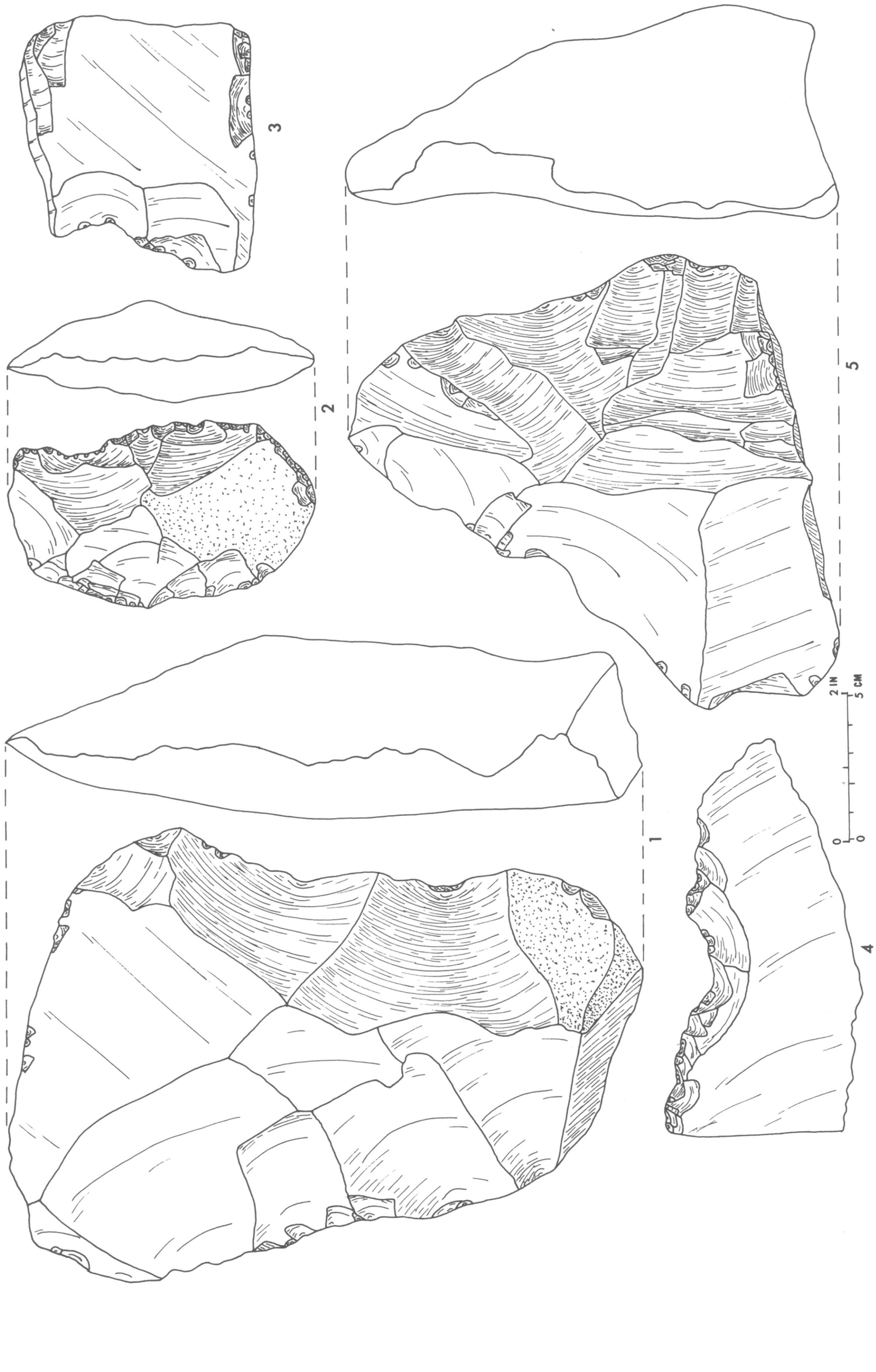


PLATE XLIX

Layer 5

Acheulean

Below surface XI

1. Biface. Irregular, triangular plan. Notched unifacial tip and trimmed butt. Triangular cross section. Coarsely trimmed on the dorsal face; majority of the trimming is on this face. Trimming on the ventral face has removed the bulb and platform of the flake on which the tool was made. 14 x 9 x 7 cm.
2. Pointed knife. Round tip and trimmed butt. Backed by a patch of pebble cortex. 15 x 8 x 4 cm.
3. Biface. Diamond cross section. Round, thick tip and trimmed butt. Fine trimming at the tip; otherwise coarse trimming. Battered on top. 10 x 6 x 5 cm.
4. Lanceolate hand-axe. Diamond cross section. Trimmed butt and square tip. Flaked over both faces. 22 x 11 x 8 cm.
5. Scraper. Made on a chip, trimmed on both sides and end. The end is an irregular shallow edge, and the sides are irregular steep edges. 11 x 9 x 3 cm.

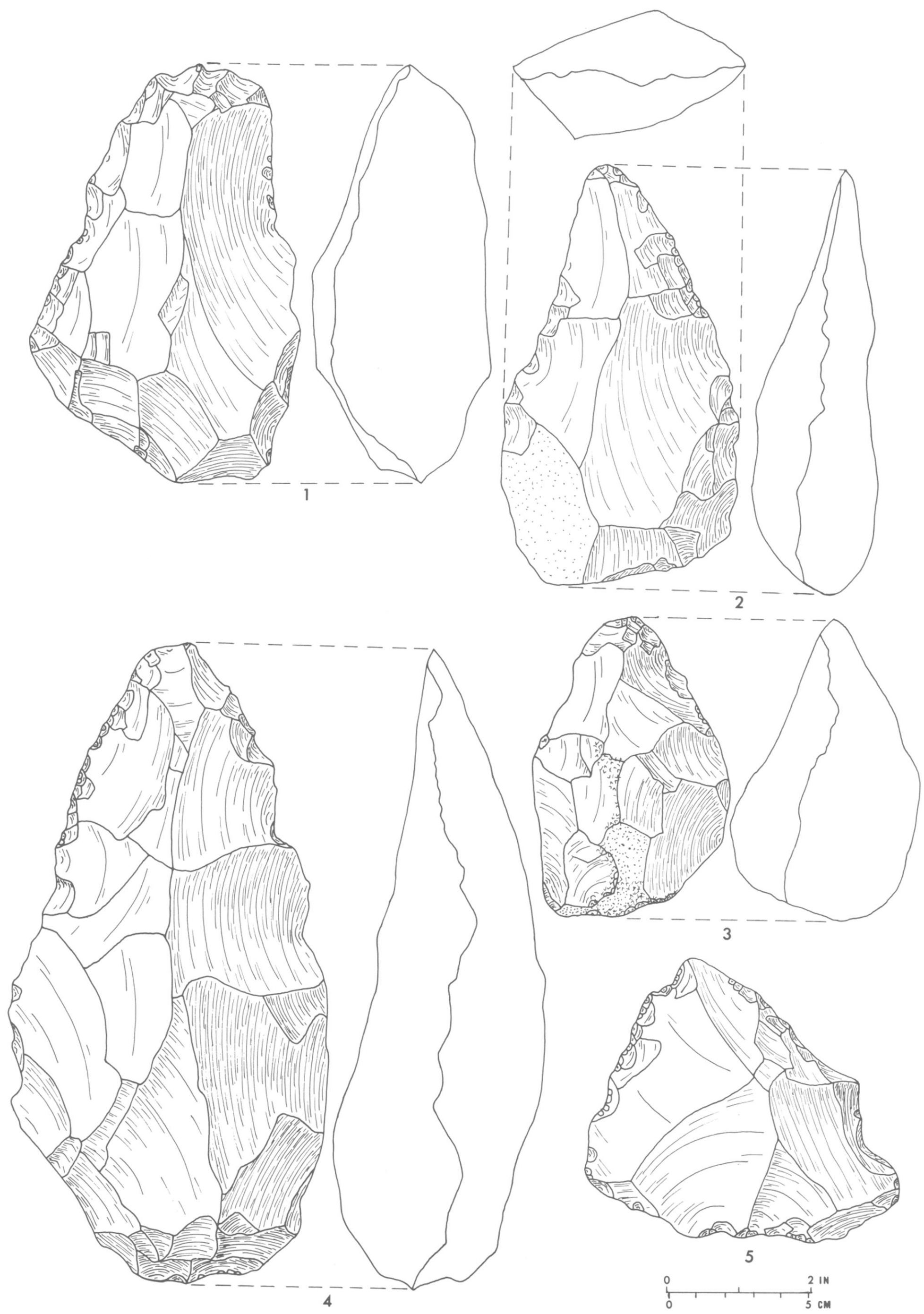


PLATE L

Layer 5

Acheulean

Below surface XI

1. Asymmetrical lanceolate hand-axe. Lenticular cross section. Trimmed butt and pointed tip. Trimmed over both faces with large but shallow flakes. 31 x 14 x 7 cm.

2. Ultra-convergent cleaver. Straight bit and trimmed U-butt. Biconvex cross section. Trimmed over both faces. 28 x 14 x 7 cm.

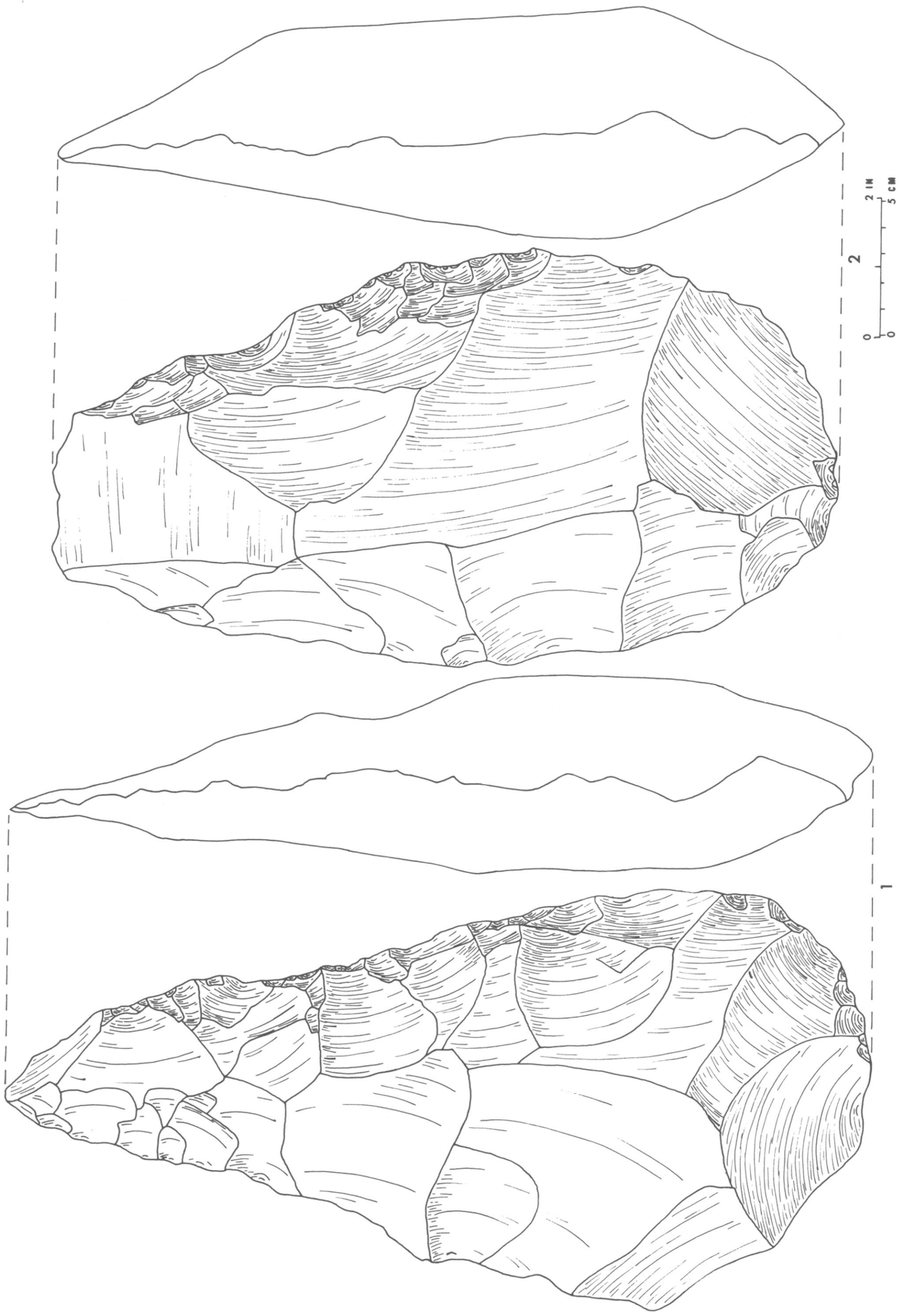


PLATE LI

Layer 5

Acheulean

Below surface XI

1. Parallel-sided cleaver. Straight bit and trimmed V-butt. Lenticular cross section. Trimmed equally over both faces. 23 x 14 x 5 cm.
2. Disc core. Round plan; asymmetrical cross section. Trimmed equally on both faces. 15 x 11 x 7 cm.
3. Disc core. Round plan and trimmed more on illustrated face than on opposite one. 15 x 12 x 7 cm.

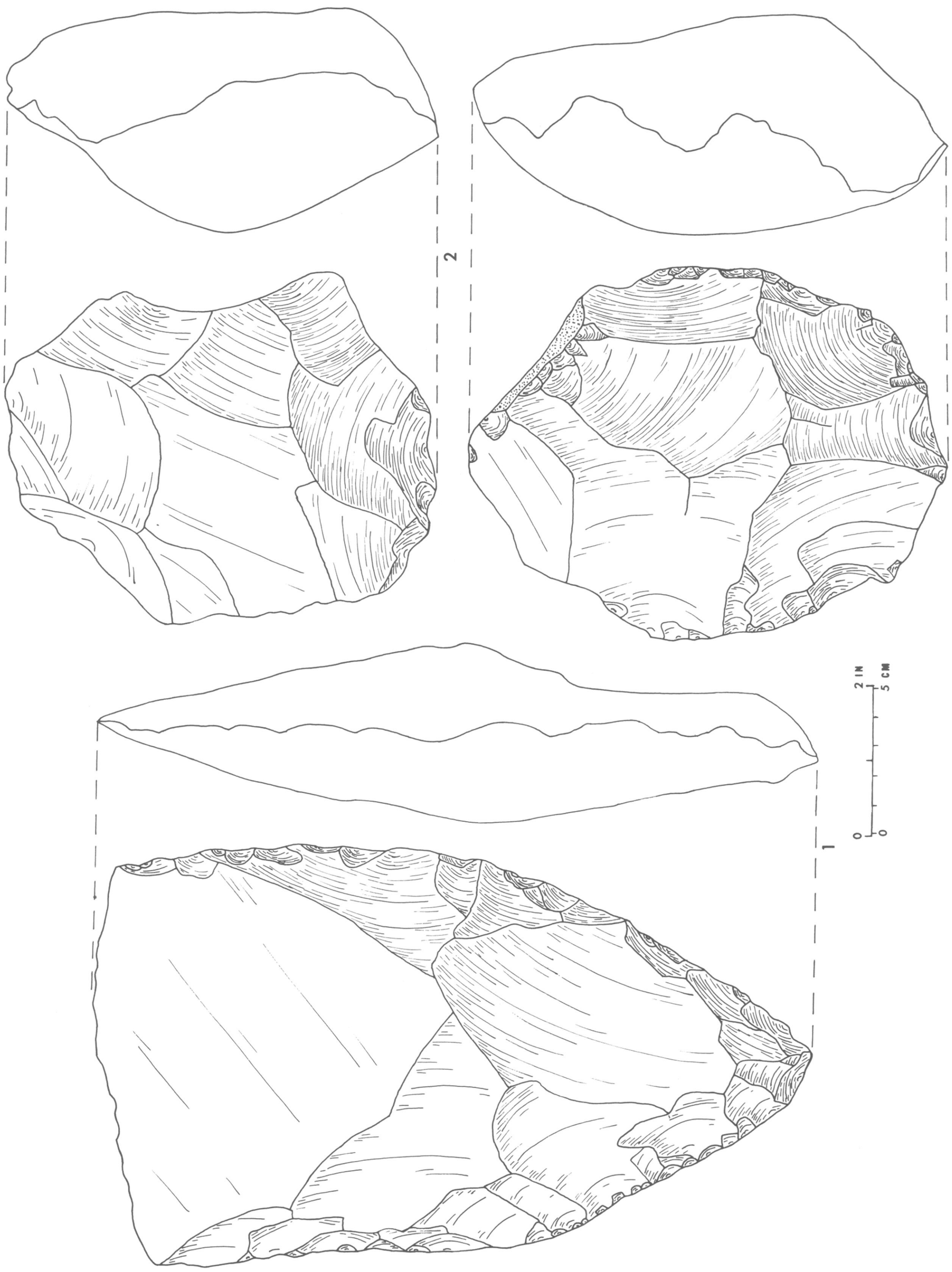


PLATE LII

Layer 5

Acheulean

Below surface XI

1. Beaked biface. Asymmetrical plan and biconvex cross section. Butt trimmed on ventral face. Tip is thick with fine trimming on the dorsal face. 17 x 13 x 11 cm.
2. Scraper. Made on an irregular chunk. Irregular blunt edge trimmed on one end from a fracture plane. 7 x 6 x 4 cm.
3. Push plane. Irregular convergent plan. Concave blunt edge on one end, and irregular blunt edge at opposite end. 18 x 13 x 6 cm.
4. Side chopper. Ends and one side trimmed bifacially; opposite side is a fracture plane. Trimmed edge shows battering from heavy use. 17 x 13 x 12 cm.
5. Biconical core. Ovoid plan and asymmetrical cross section. Trimmed equally on both faces. 15 x 11 x 8 cm.

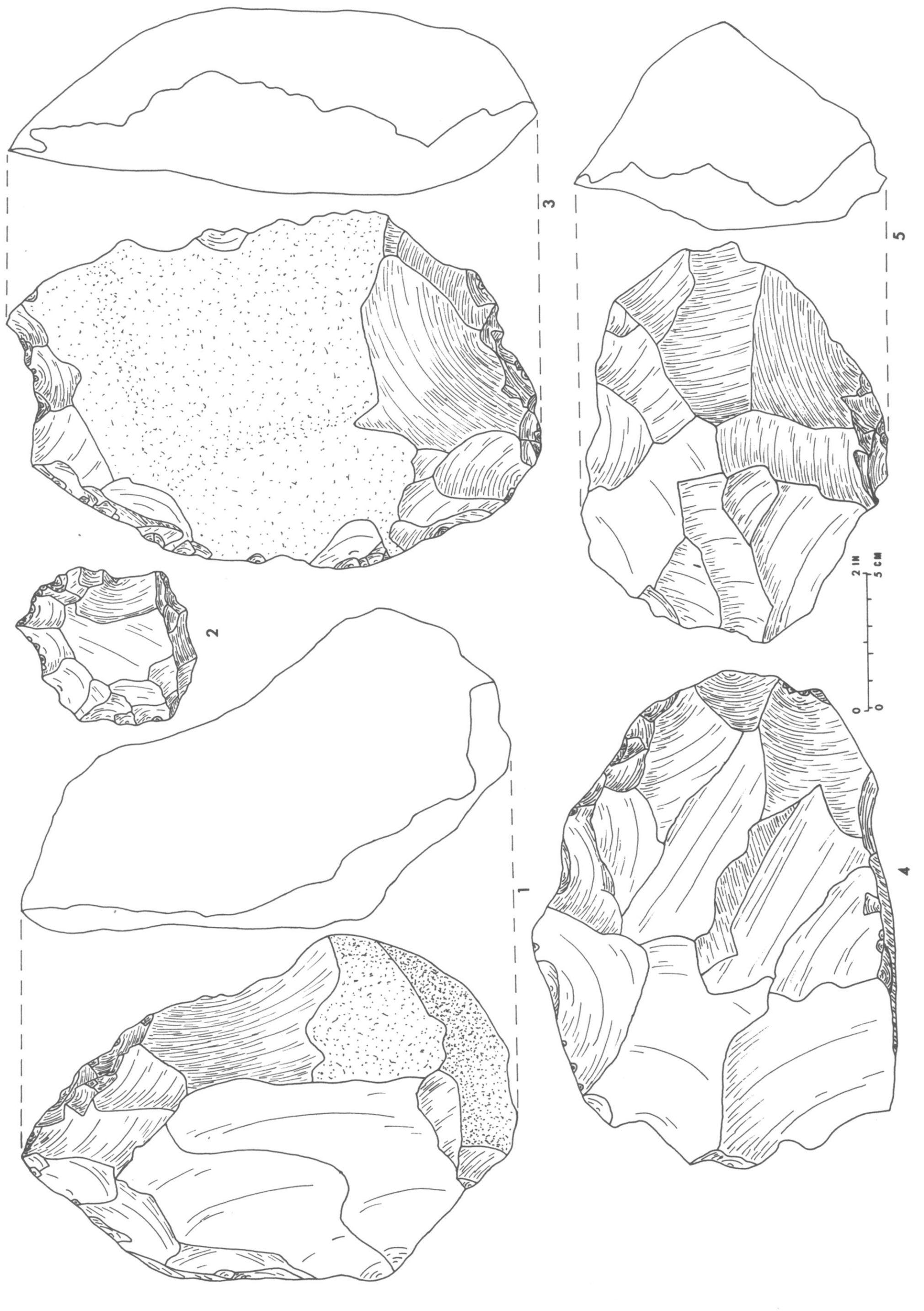


PLATE LIII

Layer 5

Acheulean

Below surface XI

1. Plano-convex core. Ovoid plan and high-backed cross section. Trimmed radially on flatter face; opposite face consists of two fracture planes and three large negative scars. 22 x 16 x 6 cm.
2. Scraper. Made on an irregular, high-backed chunk. Denticulate blunt edge with one notch on one side near one end trimmed from a fracture surface. At opposite end, a convex shallow edge has been trimmed from a fracture plane. 13 x 7 x 8 cm.
3. Long ovate hand-axe. Biconvex cross section and unifacially trimmed butt. Trimmed only along one side on face opposite to illustrated one. 15 x 9 x 5 cm.
4. Core scraper. Made on an irregular chunk. Notched steep edge trimmed from a fracture plane. 9 x 9 x 6 cm.