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# SOME ABORIGINAL FLAKES FROM MORNA POINT, NEW SOUTH WALES.

BY

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(From the Department of Geography.)

(Plates xxxii-xxxviii and Figures 1-9.)

## INTRODUCTION.

The paper contains a detailed description of a series of flakes and chipped implements found at a deserted aboriginal camping ground among the sand dunes of Morna Point, New South Wales. The aborigine chose to live near the sea which supplied him with food in the form of shell fish, and all along the coast, in places suitably sheltered, regions of kitchen midden material are to be found. A search among these heaps will reveal very few native weapons such as spears and boomerangs, for these were carried by the hunter wherever he went and were left distributed over wide areas. Segregated artefacts are limited to these small sharp-edged chips of chert or other hard stone, which were struck off from a suitable pebble in hundreds, used indiscriminately for all manner of domestic purposes and then discarded. These chips occur in mounds associated with the shell middens and constitute the typical "workshop" material as described by Etheridge and Whitelegge.<sup>1</sup> In their paper chips from workshops along the coast near Sydney are described in detail, but other than this comparatively little work has been done on these small flaked artefacts in New South Wales. Roth<sup>2</sup> gives a complete description of the method of stone flaking and the various uses to which flakes are applied by the Queensland aborigines. Basedow<sup>3</sup> has also a comprehensive article on stone implements used by the blacks of central and northern Australia. He describes the method of chipping flakes from an original core or nucleus and discusses the uses for which the various types were made. He also describes the methods of flaking by percussion and chipping by pressure.

The use of stone knives and flakes by the natives of central Australia together with descriptions of various tools are given by Horn and Aiston,<sup>4</sup> and also by Spencer and Gillen,<sup>5</sup> from whose

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<sup>1</sup> Etheridge and Whitelegge.—*Rec. Austr. Mus.*, vi, 4, 1907, pp. 233-250.

<sup>2</sup> Roth.—*North Queensland Ethnography*, Bull. 7, 1904.

<sup>3</sup> Basedow.—*The Australian Aboriginal*, Adelaide, 1925.

<sup>4</sup> Horn and Aiston.—*Savage Life in Central Australia*, London, 1924.

<sup>5</sup> Spencer and Gillen.—*The Native Tribes of Central Australia*, London, 1899.

work the following extract is taken: "Sometimes by the side of a waterhole or on the top of a hill where the suitable material exists there will be found numbers of these rude chips which are made as occasion requires and only the better ones among which are kept for use in the making of the cutting surface of the adze or spear thrower." Klaatsch,<sup>6</sup> 1908, has written an article on the stone artefacts of Australia and Tasmania, while Eylmann<sup>7</sup> also describes stone flaked implements. Brough-Smyth<sup>8</sup> describes stone implements used by the natives of Victoria and divides them into eleven groups, while a detailed classification, based on modes of preparation and manufacture, is given by Kenyon and Stirling.<sup>9</sup> The first big division of this classification includes the tools collected from Morna Point as they are all "cutting implements in which the edge is produced by flaking or chipping." Flakes and their uses are mentioned incidentally to the culture of the aborigines in a number of volumes and articles, but much more attention has been paid to descriptions of larger weapons than to the small knives and scrapers used in their making.

In conclusion I wish to acknowledge the kindness of the Trustees of the Australian Museum in placing facilities at my disposal during the preparation of this paper; and also to express my grateful thanks to Mr. Thorpe, ethnologist to that institution, who not only introduced me to the collecting grounds at Morna Point, but also assisted me greatly by helpful suggestions and information concerning references.

#### GEOLOGY AND PHYSIOGRAPHY OF MORNA POINT.

Morna Point is a rocky headland immediately to the south of Port Stephens and approximately twenty miles north of Newcastle. It is interesting to note that this locality was mentioned by Mr. Whitelegge as early as 1907 as being a likely place for the discovery of aboriginal workshops, although his own researches in the vicinity of Newcastle were unproductive. As is shown on the map (Figure 1), the land is in the form of a peninsula with the waters of Tilligery Creek, Port Stephens and the ocean surrounding it on three sides. Across the peninsula are two bars of resistant porphyry separated by a band of weaker material. These bars stand out as rugged headlands, while the weaker area has been eroded to form the inlet of Anna Bay, which gives its name to the surrounding farming district. To the south is a long expanse of beach which extends from Stockton northwards in a line of sand dunes, to where it terminates abruptly in the intrusive rocks of Morna Point.

<sup>6</sup> Klaatsch.—*Zeitschr für Ethnologie*, xi, 1908, pp. 407-427.

<sup>7</sup> Eylmann.—*Die Eingeborenen d. Colonie Südastralien*. Berlin, 1908.

<sup>8</sup> Brough Smyth.—*The Aborigines of Victoria*, i. London, 1878.

<sup>9</sup> Kenyon and Stirling.—*Proc. R. Soc. Vict.*, xiii, 2, 1901, pp. 191-197.

The locality is of considerable geological interest and has been described by David,<sup>10</sup> in the following terms: "At Anna Bay the sea cliffs are formed of a reddish-grey quartz and felspar porphyry the exact relations of which, in the Carboniferous system, are not clear. It has been assumed that this rock is in the nature of a contemporaneous lava; it is intersected in places by basalt dykes

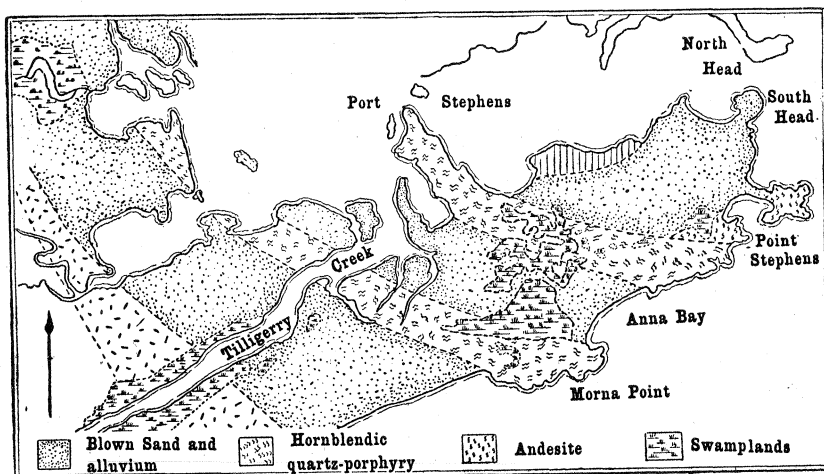


Fig. 1.—Geological Map of the Southern Headland of Port Stephens.  
(After David.)

of later origin. The nature of its junction with the Carboniferous rocks is for the most part obscured from view, as blown sand completely covers the older rocks over almost the entire area from Morna Point to Newcastle." A great deal of the porphyry right on the point is covered by the blown sand which forms a row of dunes along the beach, gradually passing, on the leeward side, into low-lying swampy areas subject to inundations by the waters of Tilligerry Creek. A similar physiographic arrangement persists right from Stockton to Anna Bay, where the road passes over flat alluvial areas of recent origin, with the waters of the creek on one side and separated from the sea on the other by the line of sand dunes. The swampy character of this area is due to the fact that during Tertiary times it was under water and formed part of the estuary of the Hunter River. Since that time much of the land has been reclaimed by silting associated with a recent minor uplift of fifteen feet.

The headland of Morna Point faces due south and has been attacked by marine erosion until it is now in the form of two

<sup>10</sup> David.—The Geology of the Hunter River Coal Measures.—Mem. Geol. Surv. N. S. Wales, Geol. No. 4, pt. 1, 1907.

rocky promontories divided by a small sandy beach, a quarter of a mile long, strewn with agglomerations of porphyritic boulders (Plate xxxii, fig. 1). The beach is quite narrow and quickly gives place to the sand dunes, from thirty to fifty feet high, which shelter it from behind. This secluded area has been, in the past, a favourite camping ground for aboriginal people. Along the sand are middens and conical shell heaps (Plate xxxii, figs. 2 and 3), reduced by the erosion of southerly storms, but still large enough to indicate how much more extensive they must have been in earlier days.

#### THE ABORIGINES OF MORNA POINT.

The groups of blacks who camped in this locality belonged to the Kuring-gai tribe who are described by Fraser<sup>11</sup> as occupying the whole coastal district from Bulli to Port Macquarie. This large tribe was divided into a number of tribules whose distribution is given by Howitt.<sup>12</sup> Those blacks living in the district round Dungog and Port Stephens were known as Gringai and occupied that area in a series of local groups or "Nurras." Enright<sup>13</sup> gives the name "Warrimee" to the group who lived all along the peninsula from Port Stephens to the Hunter River but he has since modified this statement as follows: "The Kuttung tribe occupied the country from a little south of the Macleay to the Hunter River and possibly to the Hawkesbury."

Nothing much concerning the habits and customs of these people can be told from their deserted camping ground. The heaps of broken shells along the beach show that shell fish must have been one of their chief articles of diet, but opossums, kangaroos and other animals, as well as vegetable foods, must have been obtained from the sheltered timbered region on the leeward side of the dunes. Their burial place is located on the higher ground near the southern promontory in a trough between two dunes, where pieces of skeletons and individual bones are still to be seen scattered over the surface. Here large numbers of blacks were buried in the past, but they have since been uncovered by the action of the wind. Exposed skeletons have been removed from time to time from this spot, and extensive digging operations carried on in June, 1926, failed to reveal more than two skeletons and three skulls, now in the possession of the Australian Museum. One of these skeletons was that of an old man who had evidently been buried for a long time. The body was laid quite straight with the head pointing out to sea, which in this case is due south. The arms were placed full length down, and on top of the body. Nothing else was found in the grave except the hand axe (Plate xxxvii, specimen W<sub>1</sub>), which had evidently been the property of the

<sup>11</sup> Fraser.—The Aborigines of New South Wales. Sydney, 1892.

<sup>12</sup> Howitt.—The Native Tribes of South East Australia. London, 1904.

<sup>13</sup> Enright.—Jour. R. Soc. N. S. Wales, xxxiv, 1900, pp. 103-118.

man when he was alive. The bones were soft and friable and some difficulty was experienced in securing them intact. All the skeletons had been buried in deposits of recent sand, which covered a darker and much harder layer composed of sand and a substance not unlike peat. This carbonaceous material, which is now exposed in places, was probably formed by the debris from camp fires built during an earlier period, when sea-level was about fifteen feet higher than the present day.

The culture of these people, as shown by the artefacts found, would seem to have been of the most primitive type. Tools were made by flaking and none show evidence of grinding or polishing. It would therefore seem that they belonged to a standard of culture comparable with the Palaeolithic in Europe, but this cannot be stated definitely, as in Australia ground and polished implements have been found side by side with flaked ones. The difference is due to variety in the available material and its adaptability to certain methods of treatment rather than to other causes. "It is the constant mixture of implements usually regarded as belonging to different levels of culture that forms the most striking feature of the present stone age in Australia."<sup>14</sup>

Flakes of all sizes were obtained in abundance from a certain restricted area on the high land behind the promontory (see Plate xxxii, fig. 4). This sandy hill is a typical aboriginal workshop strewn with shells and innumerable flakes of chert intermingled with cores and "spoils" and a certain number of more carefully formed implements. Chips were also found in association with the middens on this beach (see Plate xxxii, figs. 2 and 3). From this one area nearly all the specimens described below were collected, a new series being displayed after every wind storm. A few chips were found at the very northern end of Stockton beach in association with aboriginal ovens. These ovens are now represented by rings of stones and small heaps of broken *Donax* or "pipi" shells, but they indicate positions where the natives built their fires to cook their shell-fish. All round the rocky headlands of Morna Point broken shells point to the existence of middens now almost completely covered with grass.

#### GENERAL DESCRIPTION OF THE ARTEFACTS.

The stone implements collected may be conveniently divided into three groups of which the first is by far the largest. All the specimens in this group are formed of fine-grained chert, mostly light grey in colour. They are all fragments which have been broken off a larger piece of rock, the central portion of which was discarded as useless. Quite a number of such cores were found associated with the flakes. The fragments were of every

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<sup>14</sup> Spencer.—Australian Encyclopædia. Sydney, i, 1925, p. 32.

conceivable size and shape but those chosen for description have a definite cutting edge serrated by use, or else an edge has been formed by secondary chipping. Such retrimming was common and was observed to occur on flakes which were otherwise quite crudely formed. This is probably due to the fact that the natives had to obtain the chert by barter from the Newcastle blacks, and so had to use it economically. Each flake had to be examined before being discarded and as many as possible were brought into service. These treated flakes vary greatly in size and show no definite form, so they do not seem to have been made with any precise object other than the general purposes of cutting, scraping, and skinning, for which a sharp-edged tool was needed. Among these indiscriminate flakes, however, were found other more specialised types which had been fashioned along definite lines. These have been made gradually by modifications of the more primitive forms, and in the following description the simpler types are treated first in order to bring out this line of evolution.

In the second group the implements are much larger and have been made from the igneous rock of the headland. They were at first overlooked and considered to be natural boulders and weathered fragments. Closer examination showed that they were stone implements roughly shaped into a definite form by the removal of flakes. Some of these crude hand axes and choppers are made of andesite, which must have been obtained from a locality farther to the north. (See map; fig. 1).

The third group is represented by one specimen alone, which is not composed either of chert or igneous rock. This implement (Specimen Z, Pl. xxxviii) is a small piece of fine-grained sandstone, cylindro-conical in shape and truncated at one end. Its definite form and association with the other flakes on the workshop prove it to be an artefact probably derived from a neighbouring locality. Its purpose is not quite clear, but it may have been used as a rasp or burnisher for the finishing and smoothing of the spears.

The terms used in describing the flakes are taken from Roth,<sup>15</sup> and are applied in the same sense. The "upper" surface of a flake is the last removed surface, and therefore the one which shows the bulb of percussion. The "lower" surface shows the facets due to other flakes which were previously removed from the core. The "slope surface" marks the position where the blow was struck which caused the flake to break away. The term "flaking" is applied when the pieces have been removed by percussion, while "chipping" is used to express the finer results obtained by pressure. Of the specimens described some are in the Australian Museum collection while the rest are the property of the Department of Geography, Sydney University.

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<sup>15</sup> Roth.—North Queensland Ethnography, Bull. 7, 1904.

## DETAILED DESCRIPTION OF THE ARTEFACTS.

## CORES.

These have been collected because of their interesting relationship to the formation of the flakes and not because they are important as implements. In most cases they were discarded as useless, although some show signs of having served a purpose. Hence the following classification.

A. *Useless Cores.*

Plate xxxiii, figs. A<sub>1</sub>.—A small rounded specimen, which is a remnant of a chert nodule. On one side it is smooth and composed of the original weathered outer surface, while on the other it is faceted by a series of clean fractures where flakes have been broken off. It is a simple core discarded after the desired number of flakes were obtained from it.

Plate xxxiii, figs. A<sub>2</sub>.—A specimen very similar to the one above, except that chips have been flaked from all sides and no portion of the original surface remains. It is fairly small, has many angular facets and shows bruising due to the blows by which the flakes were removed.

Plate xxxiii, figs. A<sub>3</sub>.—This core is flatter and of somewhat different shape, but this modification is due only to the manner in which the flakes have been removed. It has been treated on all sides, and has, therefore, a rugged and faceted appearance.

B. *Useful Cores.*

Plate xxxiii, figs. B<sub>1</sub>.—A flatter type of core, fairly large in size and definitely rounded in shape. Flakes have been struck off from both sides, which are ridged and faceted. Secondary retouching has been carried out along two sides to produce an irregular sharp edge similar to that of the implement described as a "choppee" by Horne and Aiston.<sup>16</sup>

Plate xxxiii, figs. B<sub>2</sub>.—A large thick specimen in which flakes have been removed from all sides except one, where the original weathered surface is still visible. The core is roughly wedge-shaped and at the narrower end secondary flaking has produced a blunted area, which may have been used for chopping or pounding. At the opposite end the sharpness of the ridges is also modified by bruising. This may have been done in order to give the core a more comfortable feeling when held in the hand.

C. *High-crowned Scrapers* (Figure 2).

These are simply useful cores modified into a more regular shape. The under surface is simple and smooth and thus forms

<sup>16</sup> Horne and Aiston.—*Loc. cit.*, p. 99.



a base for the upper faceted portion of the core, which is usually thick and high.

Plate xxxiii, figs. C<sub>1</sub>.—A fairly large specimen, oblong in shape. The upper surface is high and divided into innumerable facets. Where the upper surface joins the simple base is a good cutting edge which has been treated all round with secondary chipping. This formation of a definite edge indicates its use for some scraping purpose.

Plate xxxiii, figs. C<sub>2</sub>.—A smaller, more irregular type, showing part of an original weathered surface on the upper side. The remainder of the upper surface is divided into a number of small facets. The lower surface was at first simple, but has been broken by secondary flaking. The scraping edge is marked by a line of chipping.

Plate xxxiii, figs. C<sub>3</sub>.—A small type in which the base is slightly concave and shows a small bulb of percussion. Otherwise it is similar to the others described above, with a high upper surface broken into small facets and an irregularly shaped cutting edge marked by secondary chipping.

Plate xxxiii, figs. C<sub>4</sub>.—A type also showing a concave base similar to the one above. The upper surface is very high and divided into three main facets by ridges which come to a point at the top. The secondary chipping along the cutting edge is very small.

#### FLAKES WITH SECONDARY CHIPPING (Figure 3).

These mark a further stage in the development of useful tools. The form is still crude and irregular, but in each case secondary treatment along one or more edges shows they have been used for some purpose. The shape of a given flake is quite accidental, being mainly due to the nature of the original core and its response to percussion. This natural shape is sometimes important in determining the usefulness of the flake, but it cannot be considered as any basis for a fixed classification. In the following list of flakes and scrapers, however, it has been found convenient, for purposes of description, to place them in groups showing similarity of shape, as they are not definite tools which can be classed according to use. These flakes represent the most primitive type of implement and are comparable to the Chellean culture of Europe as described by Sollas.<sup>17</sup>

#### D. *Large Flakes.*

Plate xxxiii, figs. D<sub>1</sub>.—A large, elongated, slightly curved flake, with simple upper surface showing bulb of percussion and a distinct

<sup>17</sup> Sollas.—*Ancient Hunters.* London, 1911.

slope surface at one of the narrower sides. The side opposite the bulb of percussion is also blunt and has a small facet similar to the slope surface. The lower face of the flake has three facets and is divided into two major portions by a longitudinal ridge. The two long sides of the flake are curved, one slightly concave and the other slightly convex. Both of these have been extensively chipped to form a good scraping edge.

Plate xxxiii, figs. D<sub>2</sub>.—A thicker, three-sided flake, roughly triangular in cross-section at the wider end, where it appears to have been broken. The other end tapers in to a distinct, though blunted, point. The upper surface is simple and slightly convex. The lower surface is also simple but has been treated by secondary flaking as well as chipping along the cutting edge. The third side has been blunted by flaking and forms a wide ridge between the other two surfaces. The flake appears to be a partially moulded chipped-back knife, broken in the process of formation and then used as a scraper.

Plate xxxiii, figs. D<sub>3</sub>.—A crudely formed flake with a slightly convex upper surface and a lower surface deeply faceted. It has been evenly and finely chipped to form two cutting edges, one of which is distinctly concave, the other is flaked to give an irregular line after the manner of the "choppee."

#### E. *Elongated Flakes.*

Plate xxxiii, figs. E<sub>1</sub>.—An elongated flake truncated at the top by a clean fracture, and tapering at the base in a distinct point. The upper surface is smooth, while the lower surface is divided into two main facets by a longitudinal ridge. One side of the flake is thick and has been blunted by secondary flaking. On the other side the edge is thin and carefully chipped.

Plate xxxiii, figs. E<sub>2</sub>.—A smaller flake roughly rectangular in shape with both upper and lower surfaces divided into a number of small facets. Chipping has been done on all sides, but most extensively at the two narrower edges. At the lower end, secondary flaking and chipping have produced a blunted chisel point.

Plate xxxiii, figs. E<sub>3</sub>.—A typical elongated flake showing a simple upper surface and a two-faceted lower surface with a longitudinal ridge. The top is blunted by a slope surface, part of the exterior of the original core. At the lower end the flake is obtusely pointed. Both long sides have a slightly wavy appearance due to flaking, and have been carefully retouched.

Plate xxxiii, figs. E<sub>4</sub>.—Another elongated type broader at the top but gradually tapering down to a point. The smooth slightly convex upper surface shows no bulb of percussion. The lower surface is divided into three triangular facets which come to a

point near the centre of the flake. On one side the edge has been left untouched but the other is trimmed by flaking and chipping.

Plate xxxiii, figs. E<sub>5</sub>.—A more rounded type but still showing the broad apex tapering to a point at the base. It is faceted on both surfaces and has chipping all round the edges. At the broader end this chipping has been done to give a smoother and firmer grip for the fingers; nearer the point the edges are thinner.

F. *Chisel-pointed Flakes; that is, flakes which have a broad straight edge prepared for use by flaking.*

Plate xxxiii, figs. F<sub>1</sub>.—A very crude flake roughly rectangular in shape with simple upper surface and faceted lower surface. It has been chipped on all edges, but the one used for cutting is straight and marked by fine even flaking which gives it a serrated appearance.

Plate xxxiii, figs. F<sub>2</sub>.—A similar irregular flake. The upper surface is flat and simple, but the lower surface is raised and divided into innumerable small facets. Fine secondary chipping has been carried out along the edges where the two surfaces join. On one side this prepared portion gives a smooth rest for the fingers and on the other forms the useful edge.

Plate xxxiii, figs. F<sub>3</sub>.—A smaller and flatter piece, faceted and flaked on both surfaces and with the cutting edge marked by secondary chipping.

Plate xxxiii, figs. F<sub>4</sub>.—A large flat flake also faceted on both surfaces. It has no distinct bulb of percussion or slope surface. It is roughly rectangular in shape with flaking on three sides, but with chipping confined to the straight useful edge.

G. *Rounded Flakes.*

Plate xxxiv, figs. G<sub>1</sub>.—A rounded flake with a smooth convex upper surface showing a bulb of percussion. It has been flaked away on one side in order to form a thin edge at its junction with the lower surface. This latter is slightly concave and is flaked along the opposite side for the same purpose. At the upper end near the bulb of percussion secondary flaking has produced a wide ridge separating the two surfaces. The cutting edge is irregular with fine serrations and chipping.

Plate xxxiv, figs. G<sub>2</sub>.—A similarly formed flake showing one convex and one concave surface divided by a flaked ridge along the back near the bulb of percussion. The lower surface is flaked down on three sides to form a sharp junction with the upper surface. This edge is flaked and finely chipped.

Plate xxxiv, figs. G<sub>3</sub>.—In this flake the ridge along the back has been left rough and untrimmed and the upper surface, there-

fore, appears to be divided into two facets. The distinct bulb of percussion indicates that this is not the case. The lower surface is simple and slightly concave. The straight cutting edge has been carefully retrimmed by flaking and chipping.

#### SCRAPERS.

These are irregular flakes of various sizes very similar to those already described, except that in the scraper the sharp cutting edge is usually formed in the process of flaking, and secondary chipping is not required (Figure 4). These pieces of chert with sharp cutting edges were found all over the workshop area. Many had no doubt been discarded as valueless, but others show definite signs of use. Some chips are much too small to be used as hand scrapers. Only the larger ones are dealt with below, and these are again classed according to shape as this is the most convenient method of grouping for descriptive purposes.

#### H. *Deltoid Scrapers.*

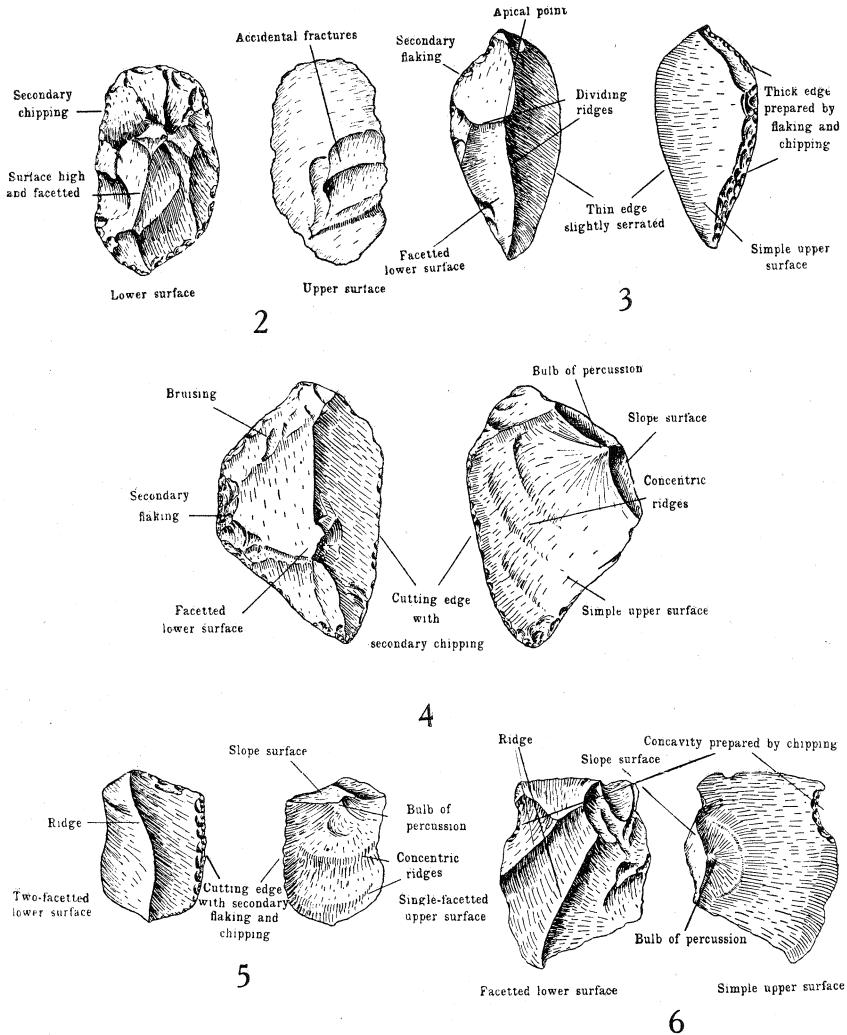
Plate xxxiv, figs. H<sub>1</sub>.—A large deltoid scraper in which the upper surface is simple and shows a prominent bulb of percussion. The lower surface is divided by ridges into three main facets. The slope surface has been broken and bruised by blows given before the flake was successfully removed from the core. This slope surface forms the thicker part of the scraper and provides the necessary grip. The cutting edge, serrated by use, is in the normal position opposite the bulb of percussion.

Plate xxxiv, figs. H<sub>2</sub>.—Though smaller, this scraper is similar to H<sub>1</sub> both in shape and general features. The bulb of percussion is prominent on the smooth upper surface. The lower surface has two main facets, divided by a distinct curved ridge and four smaller faces formed by flaking. The slope surface has been irregularly flaked by blows given previously to its removal. The left hand edge is as sharp for scraping as the normal cutting edge opposite the bulb of percussion.

#### I. *Scrapers intermediate in shape between the elongated and rounded types.*

Plate xxxiv, figs. I<sub>1</sub>.—A thinner flake, somewhat elongated in shape, yet with its end more rounded than those above. It has no main ridge, but the lower surface is divided into facets by six short ridges, four of which meet at a point near the centre of the flake. The upper surface is marked by lines concentric with the bulb of percussion. The slope surface is small. The extent of the cutting edge is indicated by the small serrations which occur on three sides of the flake.

Plate xxxiv, figs. I<sub>2</sub>.—This flake is also thin, but it has not the elongated point and thus more nearly approaches the rounded or polygonal type. On the upper surface the bulb of percussion has been broken by flaking. The slope surface, though distinct, is fairly small, and has been bruised in the production of the flake. The lower surface has four facets. The normal cutting edge opposite



FIGURES 2-6.

2. A typical high-crowned scraper. 3. A primitive flake showing secondary chipping. 4. A simple scraper showing the typical method of formation. 5. A scraper with trigonal formation. 6. A typical "spokeshave" scraper.

the bulb of percussion has been spoilt by the nature of the conchoidal fracture. It is, therefore, the thin edges on either side of this one which have been used for scraping.

*J. Rounded or Polygonal Scrapers.*

Plate xxxiv, figs. J<sub>1</sub>.—A fairly large flat type of scraper with a smooth upper surface showing the bulb of percussion and concentric rings. The lower surface is faceted and flaked. The concave slope surface affords a thick grip for the scraper. All the other edges are thin enough for cutting, and that they have been used is indicated by a number of fine serrations.

Plate xxxiv, figs. J<sub>2</sub>.—A distinctly rounded type with innumerable facets on the lower surface. The slope surface is too small to be clearly discerned. On the upper surface is the bulb of percussion and a well-marked concentric ridge. All edges, except the one at the thicker end near the bulb, have been serrated by use.

*K. Scrapers with a Curved Cutting Edge.*

Plate xxxiv, figs. K<sub>1</sub>.—This flake is interesting in that it has a bulb of percussion on both the upper and lower surfaces. It is therefore obvious that this flake has been broken off a previously formed larger flake. The upper surface has a much fresher appearance than the other. Each has its own slope surface which, with another facet composed of an original weathered area, forms the upper thick portion or grip of the scraper. The two main fractured surfaces meet to form a thin curved cutting edge which is highly serrated.

Plate xxxiv, figs. K<sub>2</sub>.—In this specimen the cutting edge is curved in a manner similar to the one above, but there is only one bulb of percussion, which is surrounded by concentric lines. The lower surface is unfaceted, and, with the slope surface, appears to be part of the original weathered core. Small facets caused by flaking are apparent on the right side of the slope surface. The cutting edge is in the normal position and shows fairly deep serrations.

Plate xxxiv, figs. K<sub>3</sub>.—In the fracture of this flake a deeply curved cutting edge has been formed which gives it a distinctive shape. The flake is flat with a well-marked bulb of percussion on the upper surface. The lower surface is divided into two main facets by a ridge curved in the same direction as the serrated cutting edge. The slope surface is bruised. The specimen is an old one and has become discoloured.

Plate xxxiv, figs. K<sub>4</sub>.—This flake, though apparently of more recent origin, is almost precisely similar in form to K<sub>3</sub>. It has the same deeply curved cutting edge, an upper surface with a well-marked bulb of percussion, and a lower surface divided into two

main facets by a curved ridge. The slope surface, though small, is quite distinct, and shows a certain amount of bruising at the edges.

L. *Acicular or Elongated Scrapers.*

Plate xxxiv, figs. L<sub>1</sub>.—This specimen is a transition type between the rounded and elongated scrapers. The upper surface has a distinct bulb of percussion which makes the thicker and wider end of the flake. It narrows slightly towards the base. The lower surface is divided into three main facets by vertical ridges. These facets have again been divided by flaking. The upper and lower surfaces do not meet to form a thin edge, so the desired effect has been obtained by secondary chipping. The slope surface is at the top of the scraper and is inclined in the normal manner from the lower to the upper surface.

Plate xxxiv, figs. L<sub>2</sub>.—A typical elongated scraper. The upper surface is smooth with a prominent bulb, but no concentric lines. The raised lower surface is composed of three triangular facets. These have been both flaked and bruised in the formation of the scraper; there is no distinct slope surface. At the top and bottom the flake is blunt, but the two long edges have the serrations which show they are the useful sides.

Plate xxxiv, figs. L<sub>3</sub>.—Is an elongated scraper in which the prominent bulb of percussion is at the side instead of the top of the flake. The lower surface is divided vertically into two facets, the thicker one of which has been considerably chipped and flaked. The other facet is smooth and helps to form the thin and serrated cutting edge. The slope surface is small but quite distinct.

Plate xxxiv, figs. L<sub>4</sub>.—This is another specimen in which the two main facets are simple flaked surfaces. Where these two join is the cutting edge, which has been retouched by secondary chipping. Opposite and at right angles to the cutting edge is another facet, which is part of the original core surface. The two slope surfaces also show the exterior of the core at either end of the flake.

Plate xxxiv, figs. L<sub>5</sub>.—A fairly flat elongated flake, of which both the upper and lower surfaces are faceted. On the upper surface the bulb of percussion is very small, but is marked by a few concentric lines on the main facet which helps to form the cutting edge. On the other thicker side are two small facets. The lower surface is irregularly divided into a number of faces. On the thicker edge a certain amount of pressure flaking has been done to give a smoother grip for the fingers. A little secondary chipping has also been done on the cutting edge. There is no apparent slope surface.

Plate xxxiv, figs. L<sub>6</sub>.—Is another flake with a simple upper surface and a raised lower surface. There is no bulb of percussion,

but the concentric lines are in the form of distinct ridges. The lower surface has three facets, two of which have been reflaked. Both the point and the two long sides have been trimmed by secondary chipping to give a good scraping edge.

M. *Trigonal Scrapers* (Figure 5).

These are so named because they are composed of three facets only, one on the upper surface and two on the lower, which has thus a dividing ridge running throughout its length. It is necessary that at least two other flakes should have been removed from the core in order to give this trigonal formation.

Plate xxxv, figs. M<sub>1</sub>.—Is a rather elongated flake with an indistinct bulb of percussion situated at the top. The upper surface is smooth except for a number of small flakes which have been chipped off along the side opposite the bulb; the lower surface is formed in the normal manner. It shows secondary chipping along the side next the bulb, and thus the two long sides of the scraper have been prepared for use. The top end of the flake is the thickest portion and has the slope surface which has been bruised during flaking.

Plate xxxv, figs. M<sub>2</sub>.—This flake is of the normal shape but is peculiar in having the bulb of percussion at the lower or pointed end. The bulb is small, and the slope surface very minute. This end of the scraper is therefore thinner than the top end, which is quite thick and has two facets at right angles to the upper and lower surfaces of the scraper. The two long vertical edges, one of which has been retrimmed, show small serrations due to use.

Plate xxxv, figs. M<sub>3</sub>.—This flake is not very large and yet in form it is a typical trigonal scraper. It has a smooth upper surface with a distinct bulb of percussion at the top and two concentric ridges. The slope surface is well marked and shows a slight amount of bruising. On the lower surface the two facets are divided by a curved ridge which joins the two sides in a slight point at the base. The two sides are also curved, one concave and the other slightly convex; the convex side has been treated with secondary chipping.

N. *Thick-backed Scrapers*.

These are very similar to types described before, except that they are much thicker and have usually only one cutting edge.

Plate xxxv, figs. N<sub>1</sub>.—This flake has a simple, smooth, upper surface from which the bulb of percussion and the slope surface have been flaked away, thus forming a third surface at right angles to the other two. This gives the flake a wedge formation. The lower surface is composed of two triangular facets which form two cutting edges on the lower portion of the flake. The third surface, or "back" of the scraper is very thick and broken



into a number of facets. Where it joins the lower surface it has been retouched by secondary chipping. The cutting edge has minute serrations.

Plate xxxv, figs. N<sub>2</sub>.—A specimen also showing wedge formation, with a smooth upper surface, a faceted lower surface, and a thick surface opposite the cutting edges. The upper surface has a small bulb of percussion but no concentric lines. The lower surface is divided by curved ridges into a number of faces. There are two curved cutting edges, but one is more regular than the other and has therefore been used more freely and has more serrations. The "back" of the scraper has been smoothed off by flaking and bruising.

#### O. Scrapers Showing Secondary Chipping.

These flakes are all fairly small, but they exhibit variety in shape and form. They differ from the other scrapers since they have been subjected to secondary treatment in order to make them more suitable to the uses required of them. They mark a big step forward in the formation of definite stone implements.

Plate xxxv, figs. O<sub>1</sub>.—An irregularly flaked scraper similar to types described above in that it has a simple upper surface, a faceted lower surface, and a third surface or "back" opposite the cutting edge. In this case, however, the back is quite narrow. The upper surface does not show the bulb of percussion. It is quite simple except for secondary chipping along the cutting edge. The lower surface is divided into two main facets with smaller ones at either end. Extensive pressure flaking has been executed along the back in order to give a firm grip.

Plate xxxv, figs. O<sub>2</sub>.—A similar type but without the definite ridge along the back. The upper surface is simple and has had the bulb of percussion broken away with the resulting formation of a crude and uneven ridge, much flaked and broken. The lower surface has also been broken by flaking. The cutting edge is directly opposite the ridge and has been trimmed by pressure.

Plate xxxv, figs. O<sub>3</sub>.—A small flake, elliptical in shape, which also shows the formation of a rudimentary ridge along the back opposite the cutting edge. The upper surface has a prominent bulb of percussion. The lower surface is smooth but has been flaked along the upper edge. The ridge has been smoothed by pressure flaking, while the cutting edge is curved and serrated.

Plate xxxv, figs. O<sub>4</sub>.—This flake is a small and narrow one in which both the upper and lower surfaces are simple and unfaceted. There has been an attempt to form a ridge along the back, but in this case it is very narrow. Secondary flaking and chipping have been done along the back and also along the cutting edge.

P. *Spokeshaves.*

These are simply a combination of the irregular "useful" flake and the scraper which has been modified by secondary chipping. In this case an irregular flake has been chosen and a suitable edge trimmed to form a small concave area with a rough scraping edge. These concavities are used for the definite purpose of smoothing off the rounded tips of spears (Figure 6).

Plate xxxv, figs. P<sub>1</sub>.—This flake has a smooth upper surface and a raised and highly faceted lower surface. In appearance it resembles the "useful core." All the sharp edges have been retrimmed and on one of these is the small concave area used for smoothing spears.

Plate xxxv, figs. P<sub>2</sub>.—A much flatter flake composed of a greenish jasper. It is a typical flake with an upper surface showing a bulb of percussion, and a highly flaked lower surface. It has two cutting edges, one of which is serrated by use. On the other is the small concave depression, which gives it a place in this group.

#### CHIPPED-BACK KNIVES.

Under this heading are grouped a number of flakes of varying size all of which have been treated by pressure flaking to give an unusual knife-like form. They differ in shape from the well-known "La Gravette"<sup>18</sup> type, specimens of which are found abundantly south of Newcastle at Redhead. They are thicker and more blunted at both ends; similar, though more perfect types, described by Thorpe,<sup>19</sup> from Mayfield in the Newcastle area, have been compared by him to the "sector of an orange." Small chipped-back knives have been described by Horne and Aiston<sup>20</sup> as occurring in Central Australia, where they are used for surgical purposes. These latter, however, are pointed at the ends, while the ones from this area are blunted and would seem to have been used for skinning animals or chopping at their flesh rather than for surgery. That the knife has been evolved from the scrapers showing secondary chipping is clear from the number of intermediate types which were found. Many of the specimens show the fine flaking which distinguishes the "Aurignacian retouch."<sup>21</sup>

Q. *Flakes Intermediate Between the Scraper and the True Chipped-Back Knife* (Figure 7).

Some of these are primitive transition types while some are knives which were left unfinished or spoilt in the making. Materials being scarce in the locality, the spoils as well as the good tools had

<sup>18</sup> Breuil.—*Revue Anthropologique*. Jan.-Feb., 1911.

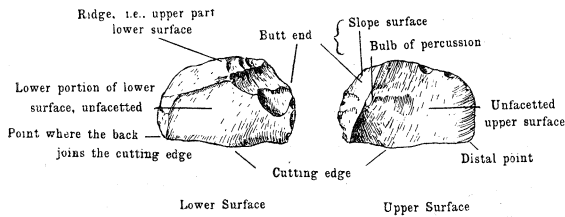
<sup>19</sup> Thorpe.—*Rec. Austr. Mus.*, xvi, 5, 1928, p. 241.

<sup>20</sup> Horne and Aiston.—*Savage Life in Central Australia*. London, 1924.

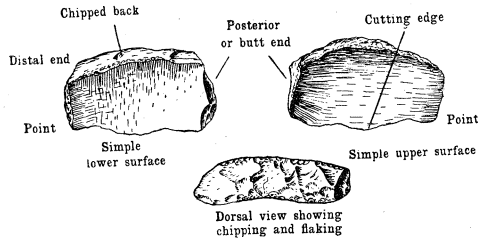
<sup>21</sup> Sollas.—*Ancient Hunters*. London, 1911; and Osborn—*Men of the Old Stone Age*. New York, 1916.

to be used, and this, no doubt, is the reason why we do not find such perfectly made knives in this district as at Newcastle, where chert is more plentiful.

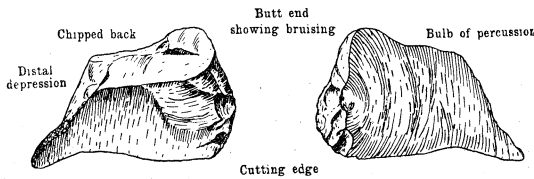
Plate xxxv, figs. Q<sub>1</sub>.—The upper surface shows a prominent bulb of percussion, with a concentric ridge and a long cutting edge opposite the bulb. The lower surface is faceted after the manner of the normal scraper and has one main ridge parallel to the cutting edge. The back of the flake is on the thick side and has only been crudely chipped, so that, though it form a grip for the finger, it is crude and uneven. As the chipped back is not clearly and evenly defined this form resembles the scraper more than the true knife.



7



8



9

FIGURES 7-9.

7. A prepared flake showing the transition from a scraper to a chipped-back knife. 8. A simple chipped-back knife. 9. A chipped-back knife showing dorsal depression.

Plate xxxv, figs. Q<sub>2</sub>.—A small, rather high flake, with smooth under surface showing bulb of percussion at the top. The lower surface is divided into three facets. The back is quite well-defined and the serrated cutting edge terminates against it in a definite point.

Plate xxxv, figs. Q<sub>3</sub>.—A medium sized specimen roughly flaked to form an upper and lower surface, with a broad ridge along the back opposite the cutting edge. Along this ridge the flaking is crude but some chipping has also been done. The upper and lower surfaces are both smooth and unfacetted, but the former shows a prominent bulb of percussion. The cutting edge shows compound flaking and pressure chipping. Both ends of the knife are blunt.

Plate xxxv, figs. Q<sub>4</sub>.—In this transition type no effort has been made to flatten down the upper side in order to make a definite ridge. The flake is a normal one and shows an upper surface with bulb of percussion, a facetted lower portion, and a slope surface, which is part of the original core. The lower surface is divided by a main ridge into a simple surface near the cutting edge, and an upper thicker portion which is facetted. It is this upper portion which in later specimens is blunted by chipping and forms the back of the knife. At the distal end the cutting edge is extended into a point.

Plate xxxv, figs. Q<sub>5</sub>.—This is a more suitable flake as it is elongated and has the bulb of percussion on the end instead of the side. The upper surface is smooth; the lower surface is divided into two distinct portions of which the lower simple one is the larger. The upper portion is facetted and has been slightly flaked but not completely blunted. The butt of the knife is formed by the bulb of percussion and the slope surface, while at the distal end the cutting edge joins the back in a fairly distinct point. The flake has all the features necessary for the preparation of a true chipped-back knife (see Figure 7).

Plate xxxv, figs. Q<sub>6</sub>.—A more irregular form, yet with a distinct ridge extensively blunted by chipping. The deeply serrated cutting edge is curved and both ends are blunted. The specimen is only a crude one, yet it shows the transition stage.

#### R. *Imperfectly Formed Chipped-Back Knives.*

In these specimens there has been a distinct attempt to form the true chipped-back knives, but they are crude and incomplete. Their imperfection may be due to unskilled workmanship, to inequalities in the fracture of the chert, or simply to haste in preparation which caused them to be left unfinished.

Plate xxxv, figs. R<sub>1</sub>.—A fairly small implement almost oval in shape. The lower surface has three facets and the upper surface, though composed of one facet only, is irregular. The cutting edge

therefore is not even, but it has been used and broken into minute serrations. The ridge along the back has been formed by flaking and has then been retrimmed by chipping along each side. In this case the point of the knife is on the left-hand side of the upper surface. This is noted to be a variable factor probably dependent on the individual character of the flake.

Plate xxxv, figs. R<sub>2</sub>.—A small specimen in which the bulb of percussion is at the side instead of at the butt end. Both upper and lower surfaces are simple and smooth. The ridge at the back is very broad and crudely flaked. Towards the distal end trimming by pressure has been carried out, but it has been left incomplete. The cutting edge is long and slightly curved and shows marked serrations due to use. The knife is pointed at one end and blunted at the other and has been used as a tool while not quite finished.

Plate xxxv, figs. R<sub>3</sub>.—A small type, oval in shape, in which the formation of the ridge is more complete. It has been flattened and retrimmed by pressure flaking. Both upper and lower surfaces are smooth, the former showing concentric lines but no bulb of percussion, as it has been flaked away. The cutting edge has been strongly chipped, and terminates on one side in a pointed distal end and on the other in a blunted posterior. Its imperfection lies in the insufficient amount of chipping along the back.

Plate xxxv, figs. R<sub>4</sub>.—A larger type more triangular in shape. The bulb of percussion on the upper surface has been partly flaked away to form the butt end of the knife. The lower surface has a ridge running from the back to the cutting edge, and the upper facet is part of the exterior of the original core. The cutting edge is long and serrated. The distal end of the knife is brought to a distinct point which forms the apex of the triangle. Along the back is some excellent chipping, but this has not been carried far enough.

#### S. *Simple Chipped-Back Knives* (Figure 8).

Plate xxxvi, figs. S<sub>1</sub>.—A small implement very carefully and finely made. Both upper and lower surfaces are simple and smooth and the ridge along the back is narrow, so that the knife is flatter than usual. It is longer than it is wide and almost semi-circular in shape, with no difference in the formation at either end. The cutting edge is badly chipped, which shows that the knife has been subjected to rough use. The back is compoundly flaked and chipped.

Plate xxxvi, figs. S<sub>2</sub>.—Another small flat type, but one which is more oval in shape owing to its distinctly curved cutting edge. The bulb of percussion and small slope surface are at the distal, instead of the butt end. The pressure flaking is fairly even and has been executed all along the back. The cutting edge is chipped and serrated by use.

Plate xxxvi, figs. S<sub>3</sub>.—A similar form, somewhat larger, with a wider ridge carefully flaked and chipped. The chipped back is semi-circular and joins the cutting edge in two blunt ends. The end opposite the bulb of percussion is more carefully made as it is the front of the knife. The lower surface is rough owing to inequalities of fracture, and the cutting edge is deeply serrated.

Plate xxxvi, figs. S<sub>4</sub>.—A small specimen, with a carefully chipped back not so evenly and regularly made. The front of the knife is carefully flaked and is more regular than the posterior end. The lower surface has been faceted by flaking on the upper portion near the ridge.

Plate xxxvi, figs. S<sub>5</sub>.—Another small type not so perfectly made. The prominent bulb of percussion on the upper surface occurs to one side instead of at the end. The lower surface is simple and smooth. The ridge is clearly defined and carefully and finely chipped at the front. The cutting edge is curved and has been trimmed by the removal of a regular series of small flakes. It thus affords a good example of the "Aurignacian retouch" mentioned above.

Plate xxxvi, figs. S<sub>6</sub>.—A larger specimen with a carefully flaked distal end and a wider unflaked butt end, near the bulb of percussion. The ridge is formed along the back and down the distal point, but has been omitted from the posterior end. The ridge is wide and formed by normal flaking, while the edges along each side have been retrimmed by pressure. The edge which joins the lower surface forms a prominent ridge. The cutting edge has been roughly flaked, probably during its use as a knife. The bulb of percussion gives a good thumbhold, and the ridge forms a rest for the forefinger, so that the knife fits comfortably into the hand.

Plate xxxvi, figs. S<sub>7</sub>.—A larger and cruder type of chipped back knife with a curved cutting edge which makes it oval in outline. The ridge is restricted along the back of the implement, while the serrated cutting edge curves up to meet it. The upper surface is smooth except for the bulb of percussion. The lower surface has been roughly flaked near its junction with the ridge. This latter is fairly wide and has been formed by the compound action of percussion and pressure.

Plate xxxvi, figs. S<sub>8</sub>.—A larger specimen of similar type more crudely made. It is oblong in shape as the length is a good deal greater than the width. The unfaçetted lower surface is part of the original core exterior. The upper surface is divided into two portions by a longitudinal ridge. Near the cutting edge it is simple and smooth, but the upper portion has been crudely flaked causing irregularity in the shape of the ridge along the back. This ridge has been formed by flaking and is only chipped along the edge where it joins the lower surface, and down the distal point of the

knife. The cutting edge has been extensively flaked and chipped along the weathered surface in order to prepare it for use. This seems to indicate that the implement has been used more as a scraper than as a knife.

#### T. *Ridged Chipped-Back Knives.*

These are quite similar to the types described above, but they have a distinctive ridge extending from the chipped back to either the distal or the posterior end of the cutting edge.

Plate xxxvi, figs. T<sub>1</sub>.—A medium-sized specimen in which the ridge runs from the back to the posterior end of the knife, thus dividing the lower surface into two facets. The bulb of percussion has been broken off in the formation of the back, which is very wide, but which tapers away at the posterior end. At the forward end it is also narrower, and was originally continued down to the point, where it has now been broken away by use. The back has been treated in the usual manner, with crude flaking followed by chipping along the edges. The cutting edge is flaked and chipped along the upper surface.

Plate xxxvi, figs. T<sub>2</sub>.—A larger flake with a similar ridge running across the lower surface to the posterior end. The butt end is formed by a prominent bulb of percussion and a small slope surface. The back of the knife is narrow and extensively chipped, even down to the distal end. The cutting edge is long and straight and has the serrations confined to a region near the point, which has obviously been the most used part of the implement.

Plate xxxvi, figs. T<sub>3</sub>.—The distinguishing ridge extends from the chipped back to the front end of this implement. The bulb of percussion is located on the side near the chipped back, to which it imparts an irregular shape. The chipped back is not sufficiently extensive to reach the extremities of the cutting edge. Both sides of the implement are blunt. The cutting edge has been treated on both sides by the small regular flaking of the "Aurignacian retouch."

Plate xxxvi, figs. T<sub>4</sub>.—A smaller specimen with two distinct facets on the lower surface. The ridge along the back is irregular and only crudely flaked. The cutting edge shows signs of use by the presence of innumerable minute serrations.

#### U. *Wedge-bladed Chipped-back Knives.*

These are distinguished by their short thick form and almost square outline. The sides are nearly as long as the cutting edge thus giving the knife a wedge or chisel shape.

Plate xxxvi, figs. U<sub>1</sub>.—A very fine specimen spoilt by the fact that it has been left incomplete. The chipping along the back has been carefully done from the distal point to almost half-way across,

after which it is left in a very crude, roughly flaked condition. It has thus an irregular outline, although the sides are long enough to give it a wedge-like appearance. The chipped back is noticeably broad. The cutting edge is fine and straight, but has been roughened by flaking.

Plate xxxvi, figs. U<sub>2</sub>.—A smaller implement, oblong in outline and with a ridge from the back to the posterior end. The back is not clearly defined except for some fine pressure flaking along the edge where it joins the upper surface. Although it exhibits the typical wedge shape it is a crude and primitive type. The cutting edge has been chipped during its use as an implement.

Plate xxxvi, figs. U<sub>3</sub>.—Although this flake is smaller, it is similar to U<sub>2</sub>, but more care has been taken in its manufacture. A distinct point, chipped on both sides has been produced. The remainder of the back is crudely flaked, and only chipped along the edge where it joins the upper surface. Such chipping as has been done is sufficient to form a comfortable grip, and that it has been of use is indicated by the serrated and chipped cutting edge.

Plate xxxvi, figs. U<sub>4</sub>.—Another crude and primitive type on which flaking, but no secondary chipping, has been done. It is roughly wedge-shaped, with a smooth upper and lower surface and a crudely faceted back. The cutting edge is good and has been slightly serrated by use.

#### V. *Chipped-back Knives with Dorsal Depression* (Figure 9).

These types are a somewhat specialised variety and were not found in any large number. Similar forms, however, have been collected from the Newcastle district, in sufficient quantities to establish it as a definite artefact.

Plate xxxvi, figs. V<sub>1</sub>.—A crudely made chipped-back knife showing the typical method of manufacture. On the upper surface is a bulb of percussion which forms the thick butt of the posterior end. The distal end is in the form of a long point, where the secondary chipping has made a distinct depression, which affords a firm grip for the forefinger. The remainder of the dorsal ridge is unchipped, and has been left in its primitive flaked condition. The curved cutting edge is thin and sharp and shows minute serrations.

Plate xxxvi, figs. V<sub>2</sub>.—A crude and primitive form, but one which is interesting since the distal end has a point similar to V<sub>1</sub>. It is triangular in section with a smooth upper and lower surface and a wide dorsal ridge. This ridge has been trimmed on either side by pressure flaking. The fracture on both surfaces is uneven, and in the case of the lower a circular depression has formed. This affords an excellent rest for the thumb, but cannot be considered as an intentional modification. The thin curved cutting edge has been rendered uneven by extensive use. At the posterior end the implement is truncated, probably by recent fracture.



## CRUDELY FLAKED CELTS.

These flaked celts are very primitive and crudely made, but they have each a prepared cutting edge which is located either at the side or at the front. In the latter case they were probably used as axes, while in the former they would be held differently and given a chopping motion, although the two uses would be interchangeable. The following division into groups is based on the position of the cutting edge.

*W. Flaked Hand Axes.*

Plate xxxvii, figs.  $W_1$ .—A massive specimen in quartz keratophyre which has been formed by flaking. The simple upper surface has a distinct bulb of percussion which, with the slope surface, forms the thick butt end of the implement. The axe was originally triangular in cross-section, but the two main facets of the lower surface have been altered by secondary flaking. The side opposite the bulb of percussion has been flaked to form the cutting edge, which shows secondary chipping and serrations due to use. Though crude it has a definite form, and further evidence of its authenticity lies in the fact that it was found buried with a skeleton in the aboriginal cemetery at Morna Point.

Plate xxxvii, figs.  $W_2$ .—This is an interesting specimen as it was the largest chert implement found at Morna Point. It is two-sided with a simple upper surface and a faceted lower surface. The posterior end of the axe is narrower instead of wider than the cutting edge as there is no bulb of percussion and only a small slope surface. It is roughly triangular in outline with the lower surface divided into three facets by ridges which meet to form the highest point in the axe. There is compound secondary retouching along the cutting edge and at either side. It consists of a row of large cavities due to flaking, which enclose numerous smaller ones due to chipping.

Plate xxxvii, figs.  $W_3$ .—Another type of similar form which has been flaked from a piece of hornblende-andesite. At the butt end is a distinct bulb of percussion and the slope surface. The upper surface is simple and fairly smooth, while the lower surface has been faceted by crude flaking, although a portion is left which shows the weathered exterior of the original core. The axe has been trimmed by secondary chipping on both sides as well as on the front cutting edge.

Plate xxxvii, figs.  $W_4$ .—A very crude specimen, imperfectly formed. It has been flaked from a boulder of quartzite, and portion of the original weathered exterior is apparent on the lower surface. The upper surface was at first a simple facet, but has later been subjected to crude flaking at the edges. The lower surface has

also been flaked at the edges and an irregular cutting edge is the result.

Plate xxxvii, figs.  $W_5$ .—This axe is made of quartz-porphry and is more carefully and evenly formed. In shape it is similar to  $W_2$  with the butt end narrower than the prepared cutting edge. The upper surface is smooth and simple. The lower surface is raised and has been flaked round the sides to give the required sharpness to the edges. A flake driven off from the front has left a sharp line of division between the butt end and the cutting edge. The axe has been trimmed all round by secondary chipping.

#### X. *Crude Choppers.*

Plate xxxviii, figs.  $X_1$ .—This implement in its general form and character shows a marked resemblance to the wedge-shaped chipped back knives described above, although it is very crudely made and is a massive type formed of hornblende-andesite. It has a distinct dorsal ridge, unevenly flaked, which joins the cutting edge in a retouched distal point. The posterior end has been made blunt by rough flaking. The upper and lower surfaces are both simple and at their junction form the straight cutting edge.

Plate xxxviii, figs.  $X_2$ .—A crudely flaked chopper in quartz-porphry, which is similar in form to  $X_1$ . The upper surface is fairly even, but the lower is faceted by flaking, which is especially prominent along the cutting edges and towards the distal end of the implement. The blunted ridge is confined to the back, where it affords a firm and comfortable grip for the hand. The posterior end is wider than the distal end and has been broken away by rough flaking. The cutting edge is irregular as in  $X_1$ .

Plate xxxviii, figs.  $X_3$ .—A massive flake of weathered igneous rock, probably felsite. The upper surface is even and unfaceted, while the lower surface is divided into two portions by a prominent ridge. The lower portion is simple and joins the upper surface in a straight cutting edge. The upper portion has been flattened by flaking, and forms a primitive dorsal ridge which extends down to the cutting edge on the distal side. The cutting edge shows secondary flaking.

#### Y. *Massive Scrapers.*

In these massive igneous types there is no definitely prepared and limited cutting edge; they are polygonal in shape, with many sides suitable for use.

Plate xxxviii, figs.  $Y_1$ .—A fairly large flake of hornblende-andesite with a smooth upper surface on which is part of a con-

centric ridge, but no bulb of percussion. The lower surface, part of the exterior of the core, has been treated by crude flaking all round the edge. Thus it has a very irregular outline, with a number of sharp edges where these flakes join the upper surface.

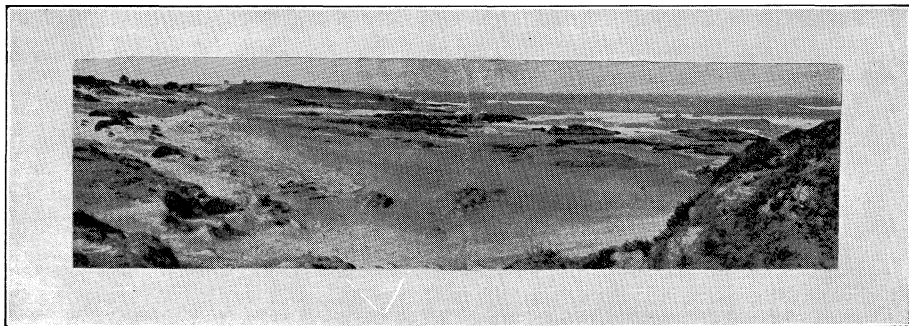
Plate xxxviii, figs. Y<sub>2</sub>.—A similar irregular form in hornblende andesite, with an unfaçetté upper surface and a crudely flaked lower surface. There is a distinct slope surface and both sides show a small bulb of percussion, although on the lower surface it is limited to one facet. Two sides of the implement have been trimmed by flaking and these are the ones which were used for general scraping purposes.

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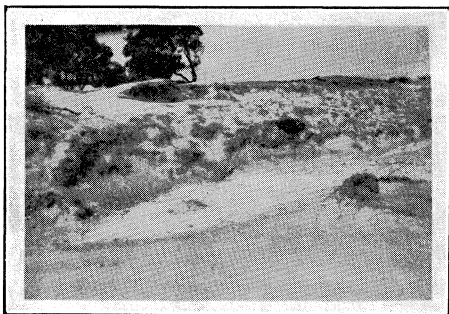


EXPLANATION OF PLATE XXXII.

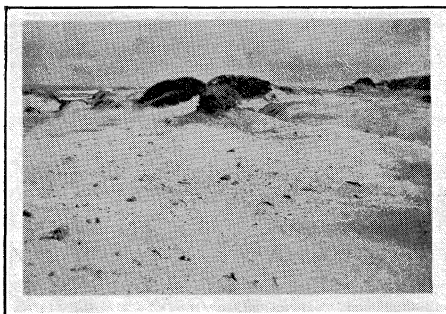
- Fig. 1. View of Morna Point showing the rocky beach with shell middens.
- Fig. 2. Scattered midden shells on the beach at Morna Point.
- Fig. 3. A conical shell midden on the beach at Morna Point.
- Fig. 4. The aboriginal workshop among the dunes at Morna Point.
- Fig. 5. The quartz and felspar porphyry of the Morna Point headland.



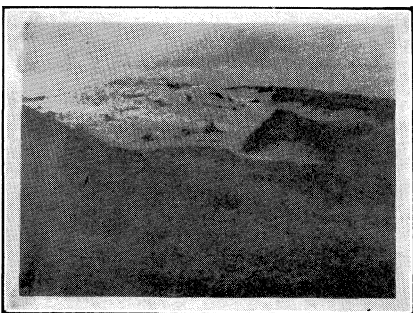
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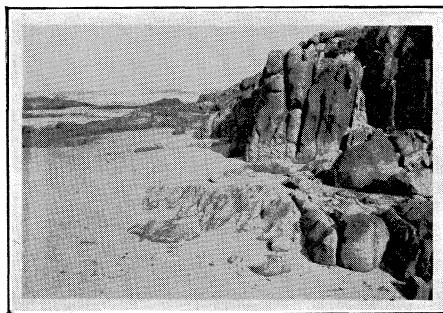
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3



4



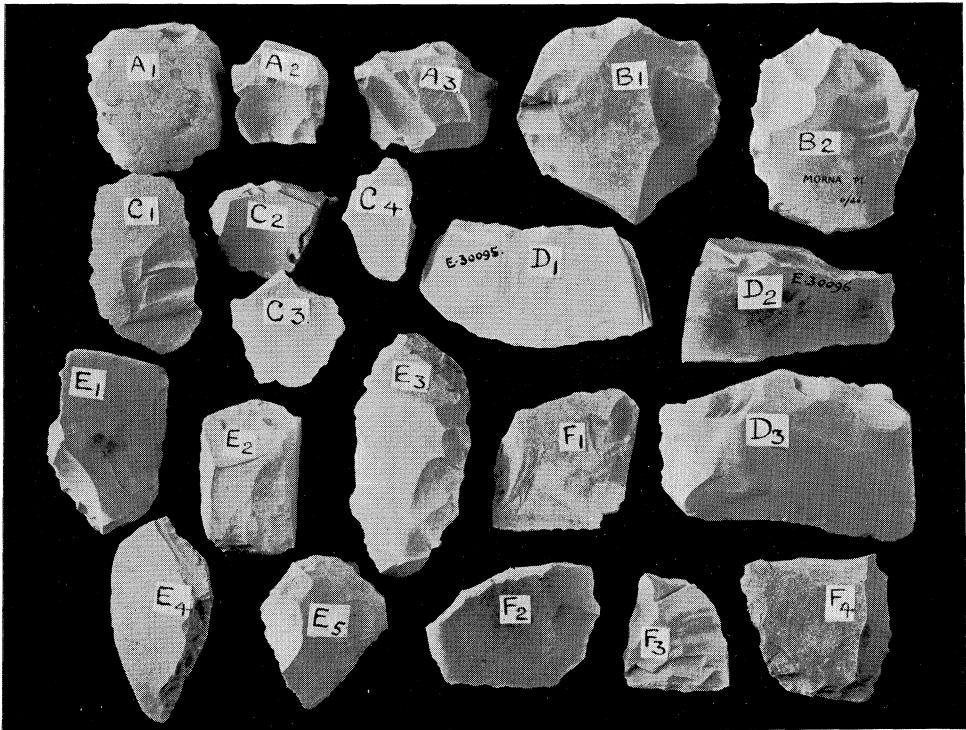
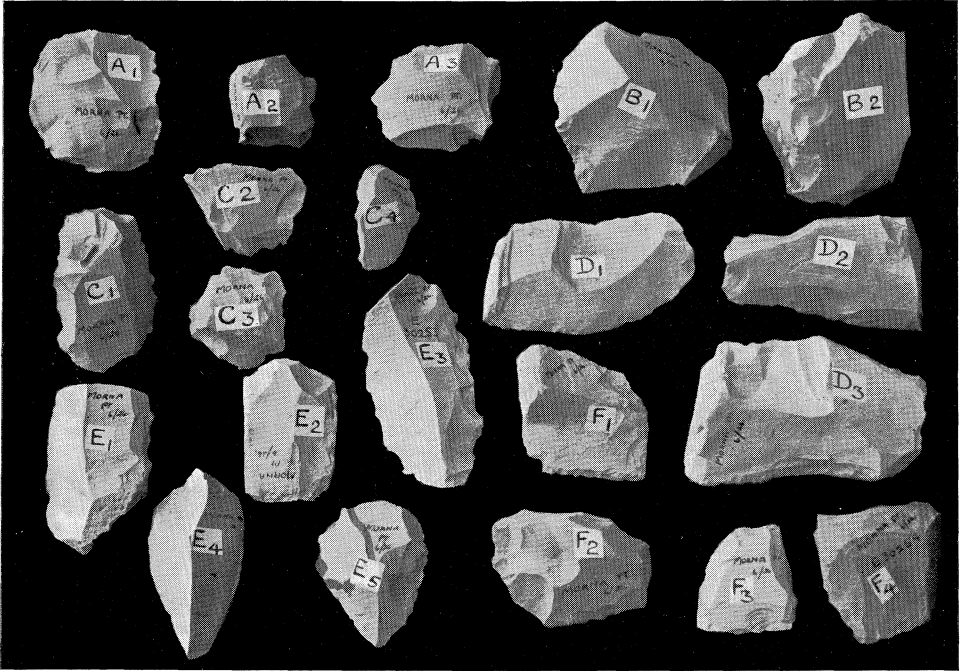
5

EXPLANATION OF PLATE XXXIII.

Fig. 1. Lower surface of cores and flakes with secondary chipping.

Fig. 2. Reverse view.

$\frac{2}{5}$  natural size.



G. C. Clutton, photo.

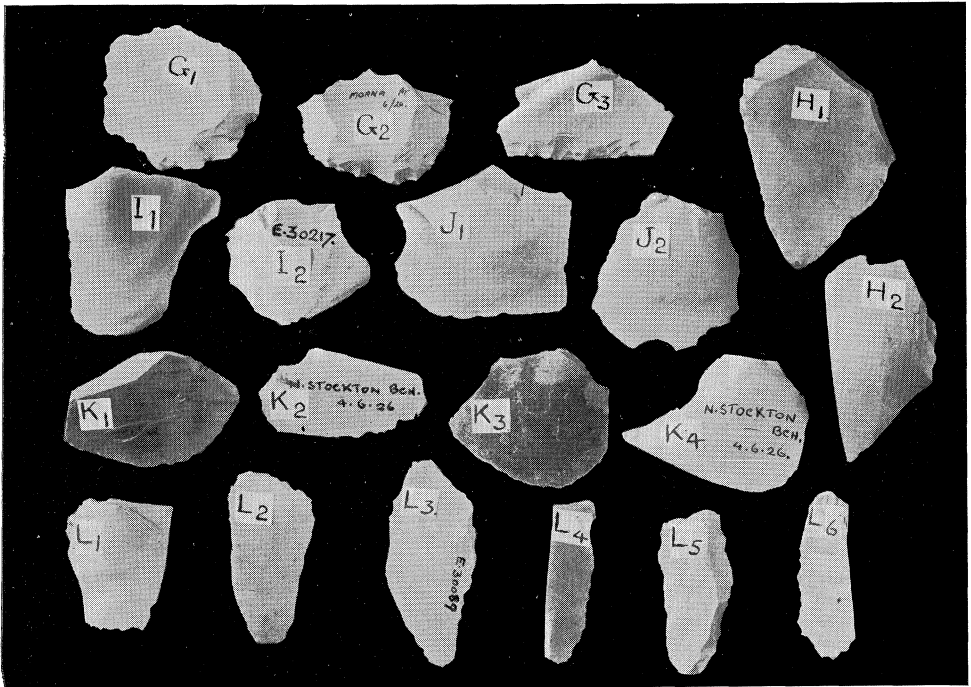
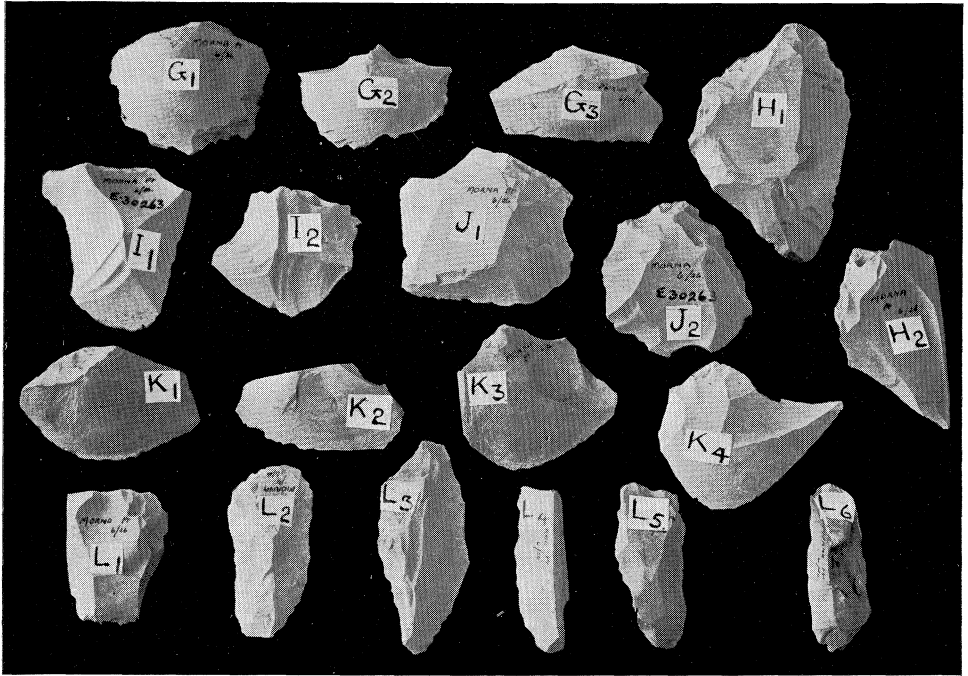


EXPLANATION OF PLATE XXXIV.

Fig. 1. Lower faceted surface of various types of scraper.

Fig. 2. Reverse view, showing the bulb of percussion.

$\frac{2}{3}$  natural size.



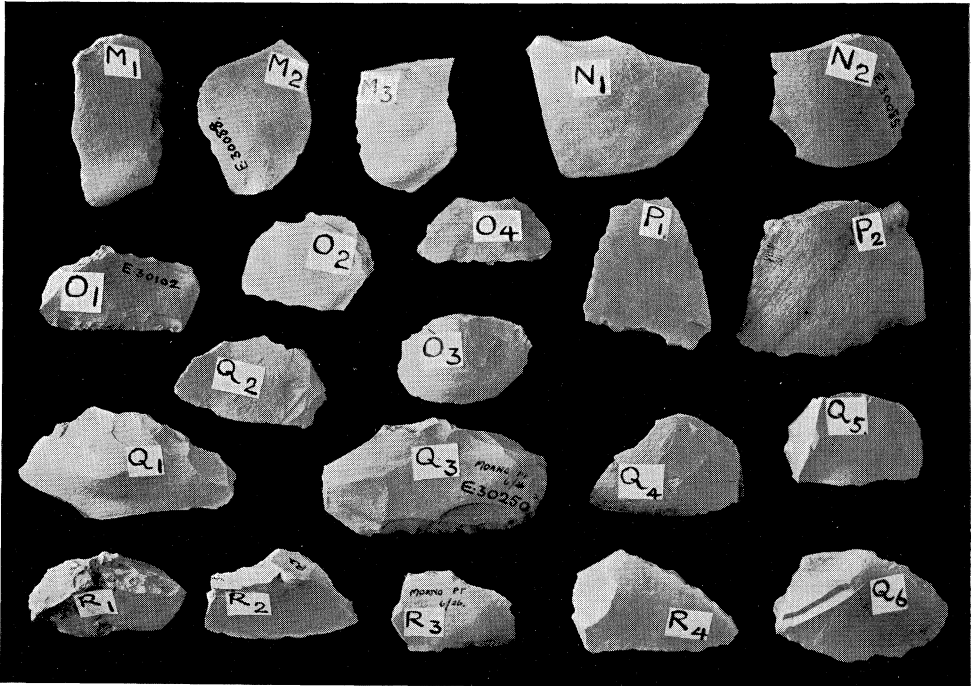
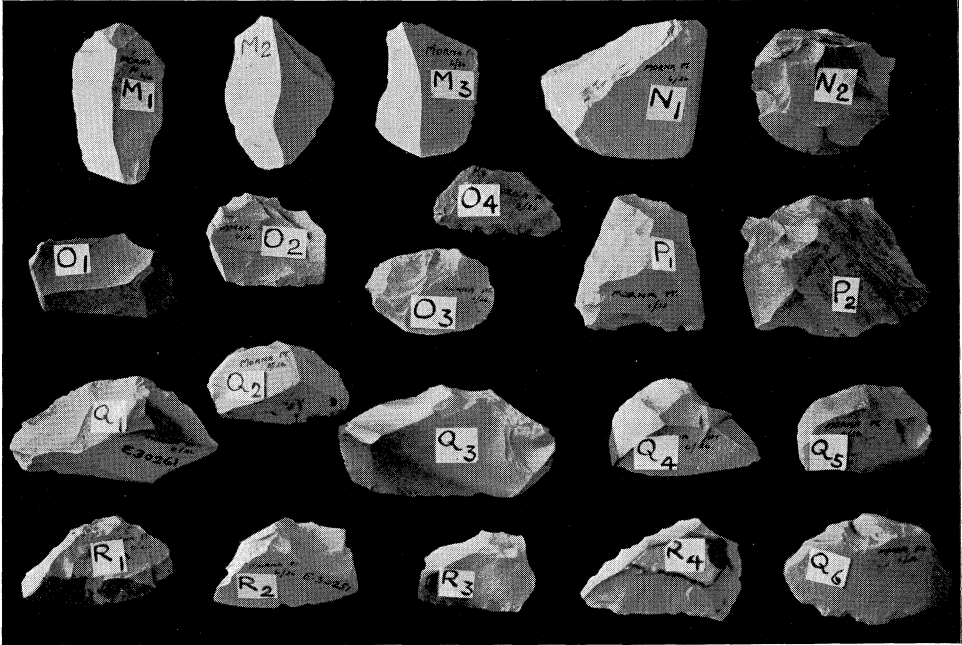
G. C. Clutton, photo.

EXPLANATION OF PLATE XXXV.

Fig. 1. Scrapers and imperfectly formed chipped-back knives.

Fig. 2. Reverse view showing the upper surface.

$\frac{2}{3}$  natural size.



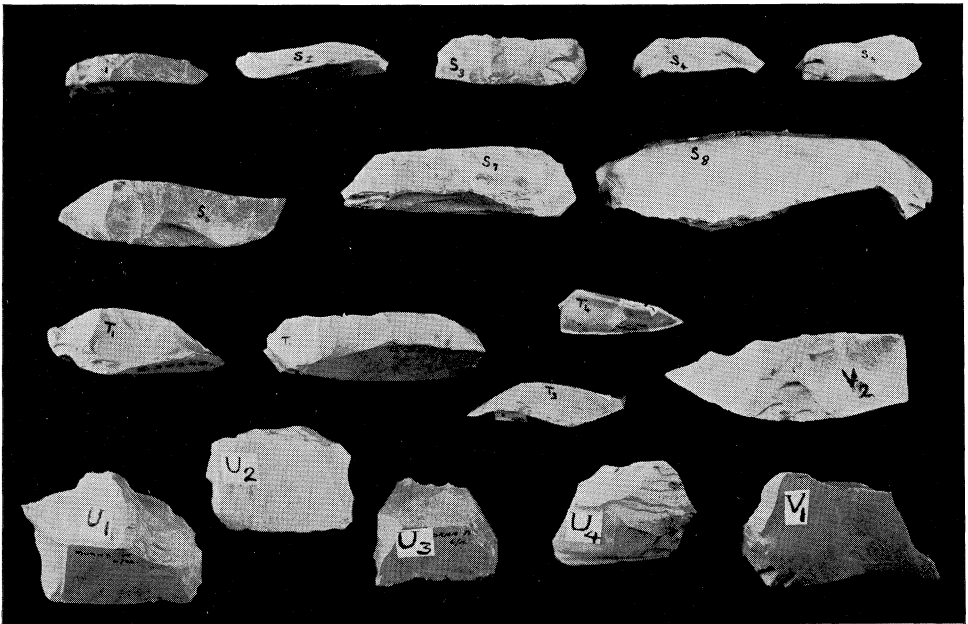
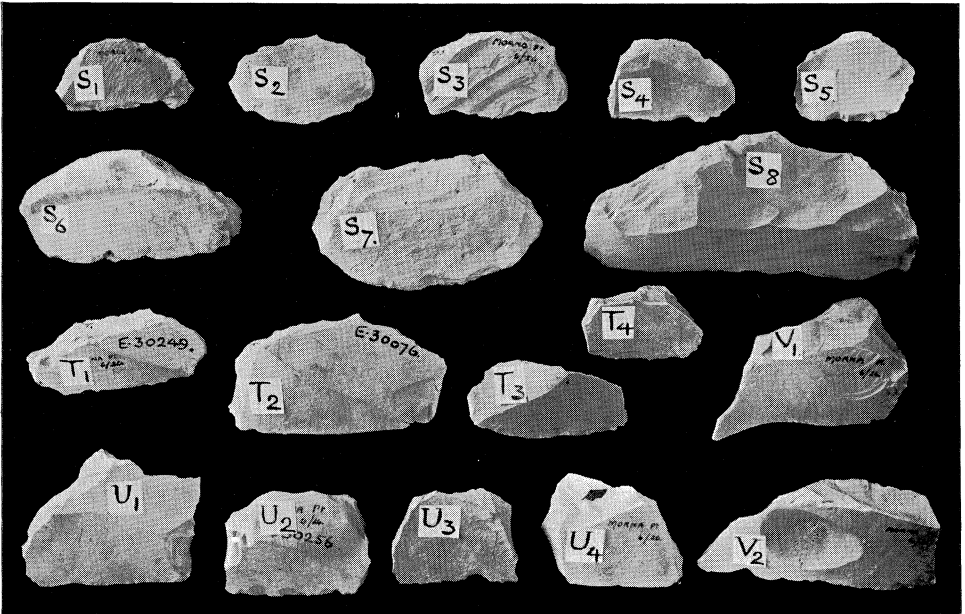
G. C. Clutton, photo.

EXPLANATION OF PLATE XXXVI.

Fig. 1. Chipped-back knives.

Fig. 2. Dorsal view.

$\frac{2}{3}$  natural size.



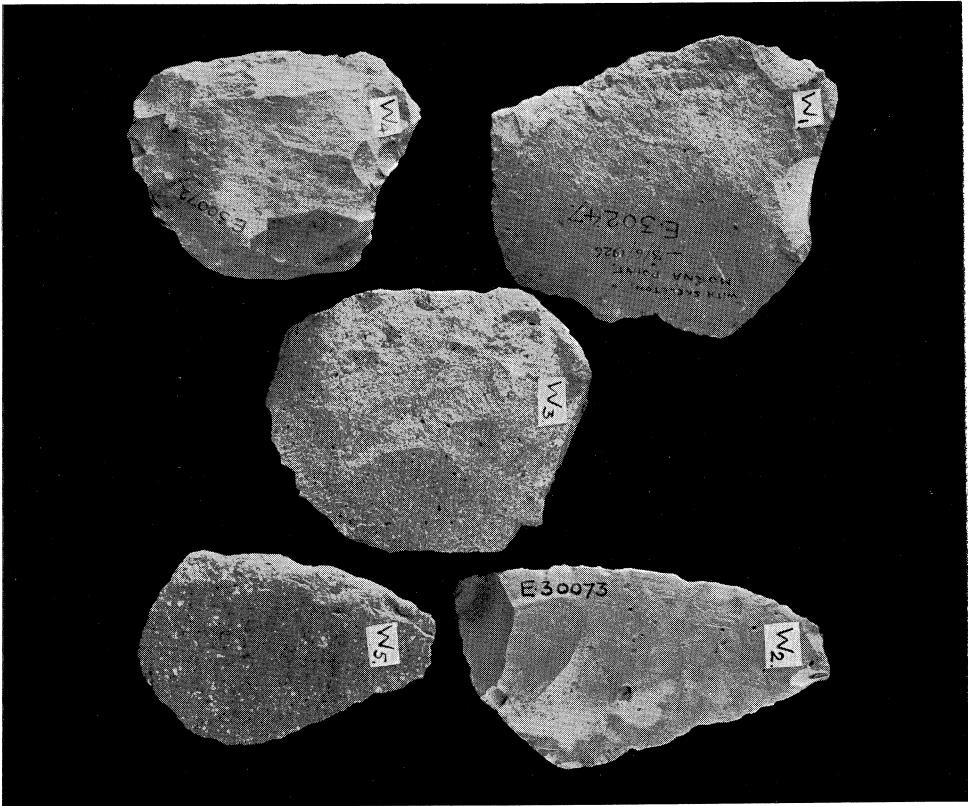
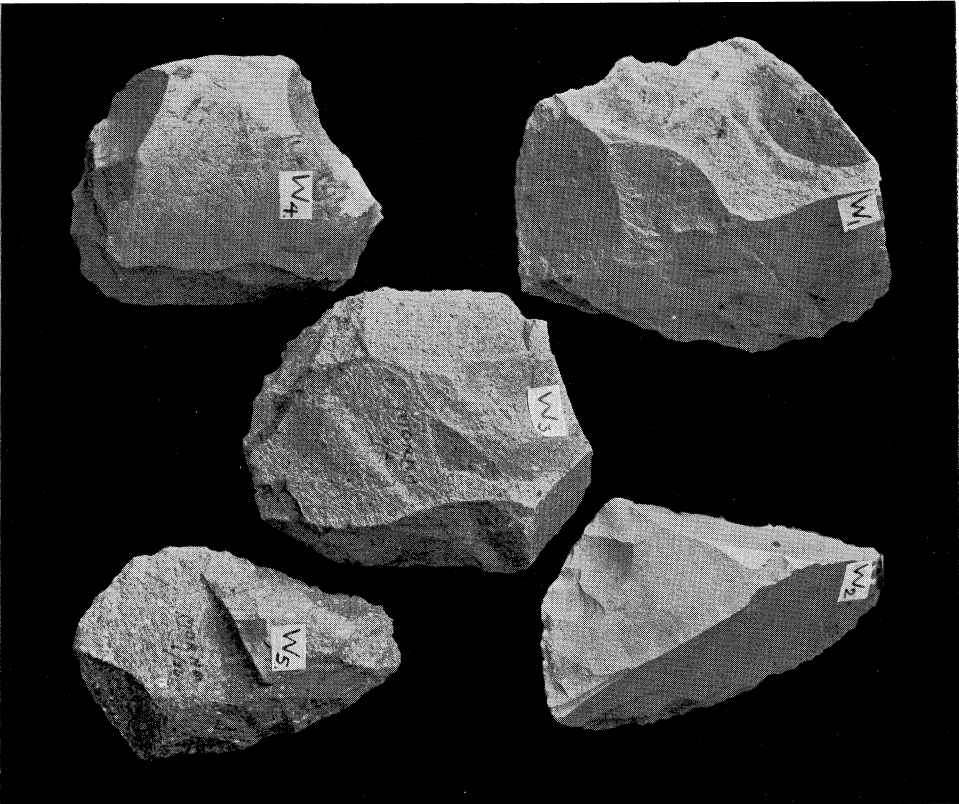
G. C. Clutton, photo.

EXPLANATION OF PLATE XXXVII.

Fig. 1. Crudely flaked hand axes.

Fig. 2. Reverse view.

$\frac{2}{3}$  natural size.



G. C. Clutton, photo.

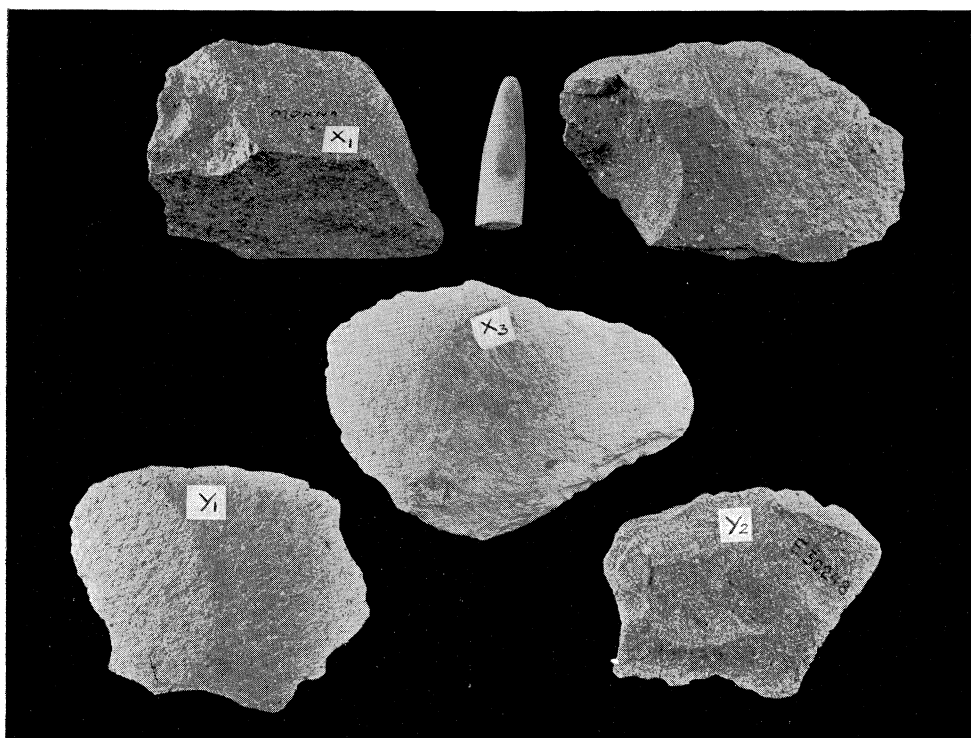
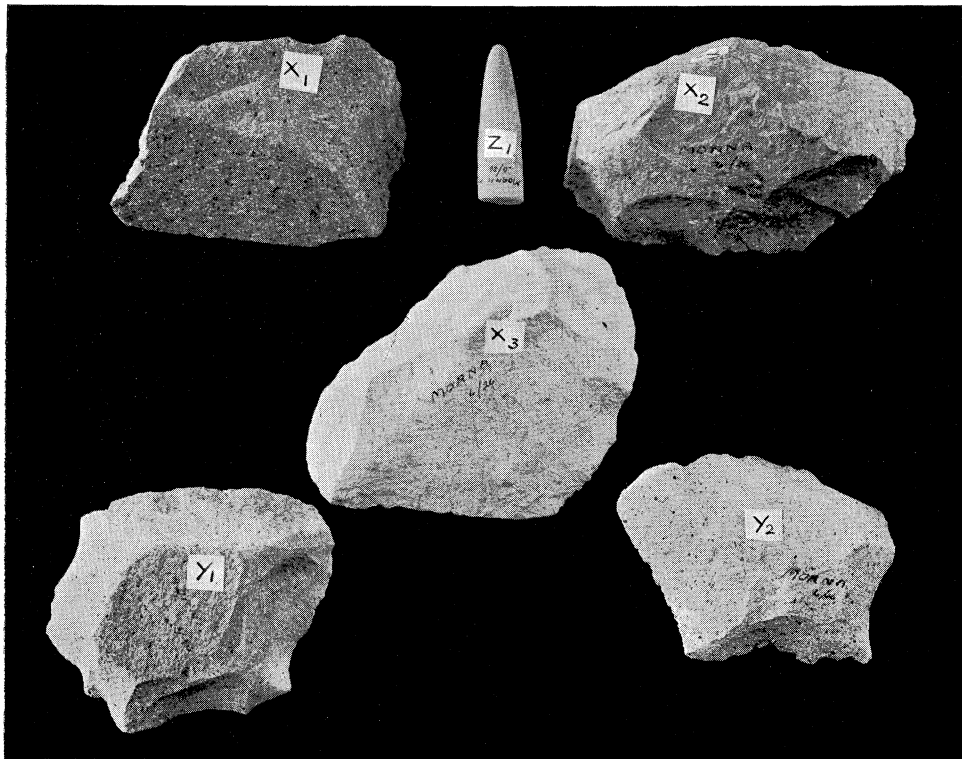


EXPLANATION OF PLATE XXXVIII.

Fig. 1. Crude choppers and massive scrapers.

Fig. 2. Reverse view.

$\frac{2}{5}$  natural size.



G. C. Clutton, photo.