NOTES ON THE TASMANIAN AMORPHOLITHES.

(By Fritz Noetling, M.A., Ph. D., etc.)

I. INTRODUCTION.

The application of the terms: Eolithic, Palæolithic, and even Neolithic to designate certain groups of stone implements, has of late become very erratic and uncertain. It would trangress the limits of this paper to discuss the causes of this vacillation, but it is sufficient to say that the so-called "biological" moment is a good deal responsible for this uncertainty. Tools and implements wrought by human hands, whether at the dawn of mankind, or in the heyday of our present civilisation are lifeless objects, and no matter of argument will ever instil them with life. These objects are the produce of a more or less advanced technical skill of their makers, and therefore the representatives of certain technical stages, which must not necessarily have existed simultaneously all over the earth. Form alone, unsupported by other evidence, is no proof of age, this we may take as granted, and all modern authors agree on this point. The best and safest way is therefore to divest the terms Eolithic, Palæolithic, and Neolithic of all connection with age, absolute or relative, and to consider them as terms merely used to express a certain stage of finish—in other words, to represent certain technical stages during the general evolution of human life. If applied in this restricted sense only, the above terms lose at once all their uncertainty, because it is easy enough to define the essential features of a given technical stage.

If we let the bewildering mass of relics which innumerable generations have left behind pass review, one fact becomes conspicuous at once. There is a large group of implements which leave no doubt that it was the intention, the will of their makers to produce a certain, well-defined form. These implements bearing evidence of the intention or will to produce a certain shape may be conveniently termed: Morpholithes. The other large group represents all those numerous, shapeless implements, which bear no evidence of the maker's will or intention to produce a definite shape. This group of implements may fitly be termed: Amorpholithes.

It will at once be seen that the Amorpholithes represent a lower technical stage than the Morpholithes, and that of necessity they are not so conspicuous objects as the latter. In fact, it is almost impossible to distinguish the lowest types of Amorpholithes, that is to say, objects wrought by human hands, from specimens accidentally produced by natural causes, unless we have some unshakable evidence in proof of their artificial nature. It is probably this difficulty, and the reluctance to express a

definite opinion on an object which, after all, may only be a lusus naturæ, which accounts for the indifference, not to say contempt, with which this branch of the prehistoric science has generally been treated. Only quite recently the enormous importance which these rudely manufactured implements bear on the history of our race have been fully recognised, mainly thanks to the energetic and skilful work of the Belgian geologist, Rutot, in Bruxelles. Rutot termed those specimens which he found in the diluvial strata of Belgium, and of late, as he tells me by letter, even in beds of Miocene and Oligocene age: Eolithes. It is in my opinion unquestionable that this term is too widely circumscribed, and that among a larger number of Eolithes in the meaning of Rutot, we can, with the greatest ease, distinguish a certain number of specimens which are always characterised by two very different faces. One face is always flat, and, as proved by the bulb of percussion unquestionably represents the plane of fracture when struck off from the parent block. This face never shows any traces of secondary trimming or chipping. Flatness was an essential feature of this face, and as we shall presently see this flatness was not accidental, resulting from the flaking off the implement from a larger block, but a feature that was desired, intended, to produce when the implement was manufactured. Quite different is the appearance of the opposite face; this is always convex, and always more or less worked or trimmed.

The name of Archæolithes has been suggested for this group of Amorpholithes, and though this term has not been generally accepted, yet the study of our Tasmanian Amorpholithes has convinced me that it fits admirably to the largest number of the specimens found in this island.

I therefore divide the Amorpholithes into two groups, viz:—Eolithes and Archæolithes. As Eolithes, I define all those Amorpholithes which show traces of use only, but no traces that they have been subjected to previous chipping or trimming. Eolithes are, in fact, the most primitive tools human beings ever used. Conveniently shaped pebbles picked up anywhere, sharp-edged pieces of rock, in Tasmania, handy pieces of columnar Diabas; in fact, any piece or fragment of stone that primitive man could use for his simple purposes, without previous dressing, constitutes an Eolithe.

As Archæolithes, I define all those Amorpholithes which previous to use have been subjected to a more or less elaborate dressing which, however, was strictly limited to one face only, the convex indical face (1), while the opposite pollical face always remained flat, and was never subjected to working.

(1) An explanation and the reason for introducing these new terms will be given later on.

Neither Eolithes nor Archæolithes show the slightest trace of symmetry. Of course, no symmetry can be expected in any casually picked up stone; if it exists, it is accidental and not intentional. One might, however, expect some sort of symmetry in the wrought Archæolithes, but not a single specimen among the numerous Tasmanian Archæolithes, which I examined, has shown the slightest trace of symmetry. Some specimens have come to my knowledge which prove that a great amount of work must have been spent in working the elaborately chipped, indical face, but the outline of these implements is devoid of all symmetry. And can there be any greater difference, as far as symmetry is concerned, than between the flat, pollical and the convex, wrought indical face?

Now let us turn to the Morpholithes. The chief characteristical feature besides the intentional form is symmetry. The Morpholithes are symmetrical in two directions; the bilateral symmetry is most probably the result of the intentional form, but in addition to this there is no longer a difference between pollical and indical face. In Palæolithic as well as in Neolithic implements, the faces on either side of the working edge are the same. The Palæolithes and Neolithes are wrought on both faces, the Archæolithes on one face only, a fundamental difference, which, in my opinion, has hitherto not been sufficiently recognised.

The above principles have been embodied in the subjoined table, which concisely sets forth the differences between the great groups of stone implements.

<table>
<tr><td colspan="2">Implements
without
an Intentional Form.
Unsymmetrical:
I. Amorpholithes.</td><td colspan="2">Implements
with
an Intentional Form.
Symmetrical:
II. Morpholithes.</td></tr>
<tr><td rowspan="3">Implements never wrought or chipped, showing traces of use only.
1. Eolithes.</td><td colspan="3">Implements more or less elaborately wrought.</td></tr>
<tr><td rowspan="2">One face only is wrought, difference between Pollical & Indical face. Implements never hafted.
2. Archæolithes.</td><td colspan="2">Two faces always wrought, difference between Pollical and Indical face has disappeared. Implements hafted.</td></tr>
<tr><td>Implements more or less elaborately chipped, but never ground or polished.
3. Palæolithes.</td><td>Implements more or less elaborately polished and ground.
4. Neolithes.</td></tr>
</table>

The different stages of the evolution of technical skill in the production of stone implements is clearly expressed by this table, but, though technically the Eolithes represent the lowest, the Neolithes, the highest types of stone implements, it does not necessarily follow, that from a chronological point of view the Eolithes must always be the oldest, the Neolithes the youngest implements. "Mere roughness of form, unsupported by other evidence, is no proof of the antiquity of an implement," is one of the rules which every student of prehistoric relics should constantly keep in mind.

If we wish to ascertain the age of any stone implement, we must abandon the view of deducing it from form alone, and seek for more reliable evidence elsewhere. The safest, and at the same time most trustworthy evidence, are geological and palæontological data, but these are, unfortunately, not always available. In the absence of reliable data as to age, it is well to remember that, though from a point of technical skill, a certain implement may be much lower than another one, the former may be absolutely much younger than the latter. The Eolithic-Archæolithic civilisation still prevailed in Tasmania, while Europe had already passed through all subsequent stages, up to our present day civilisation, and it is more than probable to assume that in the early days of its history certain parts of Europe had already advanced to the Palæolithic, even Neolithic stage, when others still remained in the Eolithic or Archæolithic period.

The study of the Archæolithes has proved that there exists a wide gulf between Amorpholithes and Morpholithes. However rudely finished a Palæolithe may be, by its symmetrical, intentional form, it is closer related to the most highly finished Neolithe, than the most elaborately worked unsymmetrical Archæolithe is to the same Palæolithe. From the most rudely chipped Palæolithe to the most highly wrought Neolithe is only a matter of gradual improvement of the technical methods employed. Palæolithes and Neolithes are merely the starting and terminal point of one continuous chain, but an Archæolithe can never become a Palæolithe without absolutely losing its most essential and characteristic features.

The Archæolithic man grasped his implements with his fingers only, and he accordingly wrought his tools to that effect. Artificial hafting was unknown to him. If he wished to get a firm grip, it was indispensable that the thumb should have a good rest, hence the necessity of producing a good pollical face.

Palæolithic man did not trouble about the production of a pollical face; no longer did he grasp his implements with his fingers. He had made the greatest invention that

mankind ever made, that which opened the way to higher evolution, the artificial hafting of his tools. When implements were hafted the necessity of producing a firm rest for the thumb could be dispensed with, both faces could be wrought, thereby unquestionably increasing the efficiency of the tools.

I cannot dwell here on the question of a passage stage between Archæolithic and Palæolithic implements. To us highly civilised beings, the step from an Archæolithe to a Palæolithe is so simple, so easy, that it seems unintelligible that a race existed for uncountable generations without making it; yet it is certain that the Tasmanian Aborigines never made that step. They had reached the Archæolithic stage of evolution, and though this stage must have lasted for an almost unmeasurable period, and though certain individuals must have acquired a great skill in working the indical face, they never got beyond it. There arose no inventive genius among them who substituted the artificial hafting of implements to the natural grasp of the fingers, turning the Archæolithe into the more efficient Palæolithe!

The fact that there existed in Tasmania an absolutely pure Eolithic-Archæolithic civilisation almost up to modern times, is of the greatest interest. Unfortunately, this fact has only been recognised when it was too late to collect information which would have shed a flood of light on the early history of our own race. Many a problem that will remain such for ever, could have been satisfactorily cleared up had the great importance of the Tasmanian race with regard to prehistorical study been earlier recognised. As it is, we have to content ourselves by carefully studying the few indestructible traces the race has left behind, viz., their stone implements, and to attempt combining the results of our studies with the few scanty data that have been delivered to us about the life of the Aborigines. In order to arrive at some conclusions which may be of the greatest importance in clearing up the early history of our race, I will attempt here to give a few observations, based on my own studies, but I wish to state they are far from being exhaustive.

II.—DESCRIPTION OF THE TASMANIAN AMORPHOLITHES.

1.—HISTORICAL SUMMARY.

It would be beyond the limits of this paper to give an exhaustive summary of the work previously done. Apart from a few scattered, though valuable notes in the

proceedings of this Society, the most important account will be found in Johnston's admirable Geology of Tasmania. Mr. Johnston was the first who definitely settled the question of the nature of the stone which the Aborigines used for their implements. He proved that this stone was in most cases a metamorphosed sedimentary rock which, by the outbreak of Diabas, had been altered into cherts, hornstones, and porcellanites. Mr. Johnston was also the first to recognise that one side of the implements was invariably flat, while the opposite only was wrought, and that the chipping was always directed away from the flat side, and he particularly dwelt on their unsymmetrical shape. In none of the subsequent books on Tasmania has the subject of the stone implements received the same amount of scientific treatment as in Johnston's Geology.

Another name I wish particularly to mention in connection with this subject is James Scott, once surveyor at Launceston. In a memorandum sent to R. Gunn, Secretary of the Royal Society, written in 1873, Scott makes the following most important statement:—

"In using the flints the thumb was placed on the flat surface, and held by the other fingers resting in the palm of the hand."

To my knowledge this is the only definite statement that has been delivered to us, as to the way the Aborigines held their implements when using them, and as it is made in such a simple, clear and concise way, it is of greater value than a much longer, but hazy description. There can be no mistake as to how the Aborigines held their implements, and all other opinions advanced are not of the slightest value, in face of the statement made by this keen observer. It is most fortunate that this observation has been recorded, but I fairly doubt whether Scott had ever any idea as to its extreme importance, as we will presently see.

I need not dwell on the accounts contained in Brough Smyth's account of the Tasmanian Aborigines, nor on the same subject mentioned in Ling Roth's book on the Aborigines of Tasmania, both are mostly extracts of the papers previously mentioned. The most important reference to this subject is contained in the introduction to Ling Roth's book, written by Professor Edward B. Tylor, who also published a short paper in the Journal of the Anthropol. Inst. of London.

2. CHARACTERISTIC FEATURES OF THE TASMANIAN STONE IMPLEMENTS.

If we examine any larger collection of implements made by the Tasmanian Aborigines, the most striking feature we notice is a bewildering mass of forms, none of which are exactly alike, and the total absence of any definite intentional or conventional shape. We may examine them over and over again, there is sort of general likeness, a family likeness so to speak, but each specimen constitutes an individuality of its own, different from all the others. This absolute want of any intentional shape at once fixes their position in the scale of evolution, and they must be considered as belonging to the first and lowest group of stone implements, viz., the Amorpholithes.

The next question to answer is, do they represent Eolithes, Archæolithes, or a mixture of both groups. At first it seems almost hopeless to decide this question; by far the majority of specimens show a flat face, and opposite to it a more or less wrought, convex face. These specimens must be considered as Archæolithes; if we sort out these, there still remain a fair number, which, although they have been used, unquestionably prove that they never were subjected to any kind of working previous to being used. These specimens have all the criteria of the Eolithes.

The Tasmanian stone implements answer, therefore, to the definition of Amorpholithes, and include the two groups distinguished, viz., Eolithes, and Archæolithes. Not a single specimen has come to my knowledge which has been wrought on both faces, and it is therefore absolutely certain that the Aborigines never reached the higher Palæolithic stage of evolution.

The next question to be decided is: Is there any way of further subdividing the above two groups into separate and distinct classes? At first this seems to be a hopeless task, inasmuch as not two specimens are exactly alike. But by observing certain broad principles, which will presently be explained, it is possible to sort out a number of specimens which have some features in common. It will, however, soon be noticed that these groups merge so imperceptibly into each other, that though two specimens representing the extremes of each are apparently widely different in shape, they are so intimately connected by intermediate links, that it is possible to form a continuous chain of passage from one to the other. It is often quite arbitrary whether we consider a specimen as a lamelliform scraper, a chopper or a knife, inasmuch as it might be ranged in any one of these classes.

The difficulties of a systematic arrangement prove conclusively the absence of any intentional shape, and also

that a certain class of tools was not wrought to serve one purpose, while another was intended for quite a different one (example: knife and battleaxe (celt) of the Palæolithic or Neolithic industry), but that any implement was as fit for the simple purposes it was required as any other specimen.

Before proceeding any further, it may be well to explain two scientific terms which I introduced, in order to render description more concise. Above, I referred to Scott's important observation, that the Aborigines, when using the implements, held them in such a way that the thumb invariably rested on the flat side or face. It is only too natural to distinguish this face as "thumb-face," or to use the more scientific Latin term: Pollical-face, from the opposite one. The opposite, convex, and always wrought face, may fitly be termed Indical-face (from "index," first finger).

The Archæolithic implement, however crudely wrought it may be, will, therefore, always have two distinct physiological faces: the Pollical and the Indical face. In the Eolithic implement, which was grasped without being previously wrought, this difference has not been developed yet, while in the Palæolithic and Neolithic implement it had disappeared again.

This is, in my opinion, the most important discovery the study of the Tasmanian Archæolithes has led to, and as I particularly wish to say thanks to that keen and enthusiastic observer, the late Mr. Scott. None of the authors who have dealt with Archæolithes, not even our greatest authority on the subject of stone implements, Sir John Evans, have recognised that the smooth face of the more primitive "Palæolithic" implements as they were called, is more than an accident resulting from the blow when the implement was flaked or struck off from the parent block. Had it not been for Scott's observation, we would have never known that the flat face of the Archæolithic implement had an important physiological signification, that it was in fact its essential feature, because there were no means of firmly grasping it, unless a flat face was produced on which the thumb could rest. The importance of a smooth and flat Pollical face will at once be seen when we examine a larger collection of Tasmanian Archæolithes. Every specimen that has an elaborately wrought Indical face is invariably distinguished by a particularly even and smooth Pollical face. Not a single specimen have I found in which a highly wrought Indical face was combined with a rough uneven Pollical face. Of course numerous instances occur in which, though the Pollical face is smooth and flat, the Indical face is only moderately worked. However, one thing seems certain, if an aboriginal workman succeeded in striking off a nice flat Pollical face, he usually

valued this flake, particularly if it was a fine grained, dark-blue chert, so much that he spent a good deal of work in shaping the Indical face. In my opinion, this observation proves conclusively the importance of the Pollical face, that it was the essential feature of the Archæolithic implement, and that a good flat Pollical face practically determined the working of the Indical face.

I have not the slightest doubt that once the significance of the Pollical face has been recognised in Europe, the study of the Archæolithes will take quite a new turn.

If we now turn our attention to a closer study of the Tasmanian implements, we will find, that irrespective of the purposes for which they were used, the following classes can be distinguished.

A. NATURAL PIECES OF COLUMNAR DIABAS.

B. WATERWORN PEBBLES.

a. One edge has been either used directly without previous work, or a few flakes have been rudely chipped off.

b. Flakes of Pebbles. The Pollical face is represented by the plane of fracture, the Indical face is formed by the crust of the pebble, or has been slightly improved by chipping.
   1. Indical face unaltered.
   2. Indical face chipped.

c. Flakes of Pebbles, in which the Indical face is represented by the plane of fracture.

C. IRREGULARLY SHAPED, ANGULAR IMPLEMENTS, GENERALLY OF CONSIDERABLE THICKNESS, AND FREQUENTLY OF LARGE SIZE.

a. Irregular lumps showing traces of a considerable amount of work being spent on them. These may be either nuclei or unfinished rejects.

b. Irregular, angular fragments, without a well-defined Pollical face, probably mostly waste from the manufacture of other specimens.
   1. Edges merely used.
   2. Edges trimmed previous to use.

c. Specimens showing a distinct Pollical face, which is generally rather uneven. The Indical face shows a few large flakings.
   1. Edges merely used.
   2. Edges trimmed previous to use.

It is often difficult to keep groups C.b and C.c separate from the more lamelliform instruments of group D., and it is almost impossible to distinguish the more elaborately worked implements of Cc/2, and those of group Ea. Likewise the three groups pass into those of group F.

D. LAMELLIFORM IMPLEMENTS.

These are flakes properly speaking, and they are distinguished from the former by their small thickness, and being struck off from a large piece of rock, they naturally show a well marked Pollical face. They are distinguished from group B.b. by the natural crust being removed by working.

a. Specimens of very irregular shape, without any traces of use, or chipping. These are evidently rejects.

b. The same as the former, but the edges show traces of use.

c. Like the former, but the Indical face is roughly flaked, and the edges trimmed and used.

d. Semicircular flakes. The convex edge is generally nicely trimmed.

e. More or less oval or quadrangular flakes, whose Indical side is well worked with trimmed edges.

f. Like the former, but of more discoidal form.

E. CHOPPERS.

Under these names I include all those implements of considerable thickness in which the length does not much exceed the breadth, with a well-developed Pollical, and a more or less elaborately wrought Indical face. The edges are mostly neatly trimmed. This group comprises the most highly finished Archæolithes, and, as it is naturally a large one, a number of sub-groups can be distinguished. If the thickness becomes small, it is often impossible to distinguish it from the former group, or if the Indical face is not much wrought from group Cd.

a. Specimens of somewhat irregular shape.

b. Specimens of circular shape; when these specimens are rather thin it is impossible to keep them separate from D.f.

c. Specimens of oval shape. According to thickness this group passes either into De., Eg., or Fg.

d. Specimens of more or less quadrangular shape.

e. Specimens of trapezoidal shape. This group forms the passage between the former and the following one.

f. Specimens of triangular shape. These form a very interesting group, and at least ten sub-groups could be distinguished. These are:

1. Right-handed specimens.
2. Left-handed specimens.
3. Isocoecle specimens with concave basis.
4. Isocoecle specimens, with convex basis.
5. Isocoecle specimens, with convex basis, rather thin.
6. Isocoecle specimens, both sides concave.
7. Rather flat, with strongly convex basis.
8. Rather flat, with left side concave.
9. Rather flat, with right side concave.
10. Specimens with rather a convex Pollical face.

g. Specimens of great thickness, in which the length exceeds breadth considerably. These specimens practically form the passage to the following group. On account of their thickness they cannot be classified as knives, though on account of their elongated form they ought to be included among the following group.

F. KNIVES.

Under these names I include all those implements in which the length considerably exceeds the breadth. The typical specimens are rather thin, and link themselves by this feature to group D.e. (lamelliform flakes of oval shape). Other specimens are of a considerable thickness, and in that case it is difficult to distinguish them from group E.g.

According to the number of longitudinal ridges on the Indical face two large sub-groups can be distinguished, viz:—

I. One-ridged specimens. This type has only one longitudinal ridge more or less in the middle of the Indical face.

a. Specimens of considerable thickness, frequently pointed at one, sometimes at both ends. (See E.g.)

b. Flat specimens, pointed at one end.

c. Long and narrow specimens, both edges well trimmed.

d. Short and broad specimens almost triangular.

e. Specimens ending in a very sharp point, generally of considerable thickness, and with a rather irregularly worked Indical face.

g. Rounded at one end.

II. Two-ridged specimens. In this specimen the median ridge has been removed by striking off a longitudinal flake, and, instead of one, there are now two longitudinal ridges.

h. Flat and rounded at one end.

i. Flat and pointed at one end.

k. Flat and rounded, but having both the longitudinal peculiarly curved.

l. Rather thick and rounded at one end.

G. CONCAVE SCRAPERS.

This group includes all those specimens with one or more concave edges. If two edges are concave, they are separated by a most peculiar tongue or bill-shaped protuberance, which is sometimes pointed; sometimes rounded.

a. One concave edge only.

b. Two concave edges; protuberance rather long, rounded at the end. (Duck-bills).

c. Two concave edges; protuberance short pointed.

d. Protuberance short, broad and rounded, not well set-off against the edges.

e. Triangular implements, with broad butt-end, and two concave longitudinal edges. (Langues-de-chat).

H. COMBINATION IMPLEMENTS.

In this kind of implements one edge has been used as a knife or chopper, while the one or two more have served as hollow scrapers.

I. IMPLEMENTS, DOUBLE-EDGED.

In these the traces of use are on one edge restricted to the Indical, on the other to the Pollical face.

K. RECHIPPED IMPLEMENTS.

Specimens which, after having been used and rejected, have been picked up by a later generation, with a view of using them again.

L. PIECES OF GLASS.

M. MAGIC OR SACRED STONES.

This is a very peculiar group of the Tasmanian stone implements, and consists of waterworn pebbles, mostly of Diabas, which were subjected to a very rough treatment.

a. Flat boulders, showing a rough indented depression in the centre of either both or one face only. The edge is frequently very much battered.

b. Flat boulders which have been subjected to a considerable amount of grinding.

N. HAMMERSTONES.

Spherical pebbles of Diabas, more or less battered all over the surface.

O. PIECES OF RED OCHRE.

P. UNFINISHED REJECTS AND BROKEN IMPLEMENTS.

Q. SPECIMENS FOUND IN NATIVE QUARRIES.

These naturally include all the groups above mentioned.

R. SPECIMENS WHICH HAVE BEEN EXPOSED TO THE ACTION OF FIRE.

This classification distinguishes, therefore, 17 main groups, or, if we omit group P, the broken and unfinished specimen group, Q, those found in quarries, and R, and distribute them among the others, there remain 14 main groups divided into 55 classes and sub-classes. This may, perhaps, seem somewhat astonishing, considering the limited purposes to which these primitive implements were applied, but I cannot sufficiently lay stress on the fact that the above classification is a purely artificial one. Some sort of classification or system is indispensable in order to master this chaos of forms, and the above is the outcome of several attempts. Whatever its faults may be, and they are probably numerous, it has one great advantage, it is elastic. New classes can be added to the main groups, and even some of those now existing can be cancelled without materially altering the whole system. If it is borne in mind that various groups and sub-groups pass so imperceptibly into each other it would, perhaps, be better to reduce their number. It is difficult to decide whether such a course would be advisable or not.

Supposing we were to deal only with those Archæolithes which actually served as tools, therefore omit groups M. (magic stones) and O. (red ochre); and distribute the following groups: K. (rechipped implements); P. (broken and unfinished rejects); H. (combination tools); I., L., N., (hammerstones); Q. (specimens found in quarries); R. (specimens which have been exposed to fire), among the other groups, and if we further distributed parts of group B. (waterworn pebbles and flakes thereof), as well as group C. among the remaining groups, the result would be the following five large groups:—

I. Archæolithes of considerable thickness, in which the length does not exceed the width: Choppers.

II. Archæolithes of small thickness, in which the length does not considerably exceed the width: Scrapers.

III. Archæolithes in which the length considerably exceeds the width: Knives.
   a. Thick and pointed, or rounded.
   b. Thin and pointed, or rounded.

IV. Archæolithes with one or more concave edges: Concave Scrapers.

Such a simple classification would have its undoubted advantages; but if we were to carry it out in practice, we would find the groups so large and unwieldy that a further subdivision would soon be necessary. It could not be considered as a very natural one, either, because a thinner chopper could serve as scraper, and a more elongated scraper as a knife; while one edge of a conveniently shaped concave scraper may have been used as a chopper, a scraper, or a knife. On the whole, I therefore think that the more detailed classification is the practical, because it allows any implement to be classified.

3. DESCRIPTION OF TYPES REPRESENTING THE DIFFERENT GROUPS OF AMORPHOLITHES.

A. PIECES OF COLUMNAR DIABAS.[1] (1.)

These specimens are well-known to every collector of Tasmanian implements, and they are invariably, though not very frequently, found on every camping ground.

(1) Much as I would like to illustrate each of the groups above distinguished by giving a representative photograph, I must, on account of expenses, limit myself in reproducing the most important types only. For a similar reason, and in order not to make the paper too lengthy, I must restrict myself to groups A-H, and M, omitting all the others. Those who wish to inform themselves on the subject of native quarries (Q), and the magic stones (M), I refer to Vol. I of the Tasmanian Field Naturalist No. 2 and 3, in which these subjects have been exhaustively dealt with. I propose dealing with those that are still outstanding, in particular the red ochre and the pieces of glass, as well as a comparison of European and Tasmanian Amorpholithes in subsequent papers.

FIG 1. (2)

PIECE OF COLUMNAR DIABAS: Geilston.

This prototype of every human tool is nothing else but a piece of columnar Diabas, which has been picked up at such places where the Diabas on cooling from its molten state, instead of contracting into huge columns, produced smaller ones, which were from their shape eminently suitable as choppers. Had the rock been less brittle, these natural pieces of Diabas would have been very efficient tools, but their extreme brittleness made them very unsuitable even for the limited wants of the Tasmanian Aborigines. Space does not permit to dwell longer on this type, which is full of the deepest interest. I shall have, probably, an opportunity of dealing with this subject in a separate paper.

B. WATERWORN PEBBLES.

Next to the pieces of columnar Diabas, ordinary waterworn pebbles represent the lowest type of implements. Any flat pebble might be used, provided it had a fairly sharp edge, which made it suitable as a chopping tool without previous trimming. A very characteristic specimen is shown in the following figure.

FIG. 2.

Ba. WATERWORN, FLAT PEBBLE USED AS CHOPPER. Shene (Pontville).

Another more frequent type are pebbles which, at the butt end, still preserve their original surface, while the other end is more or less flaked. It is difficult to say whether these traces of wear and tear are solely due to use, or to intentional flaking, the result will in both cases be practically the same, though it is evident that both represent two different classes of implements. The former are Eolithes, the latter are Archæolithes, which were never finished, and rejected.

The most frequent types of group B, which can also be considered as the lowest Archæolithic type, are flakes of pebbles still preserving their original crust as the Indical face, but being always characterised by a Pollical face. In thickness, as well as as in shape, these flakes vary considerably, and it is unquestionable that they have been struck off from a larger block. Sir John Evans calls this type "external flakes." Some of the thinner ones, which

(2) All figures considerably reduced in size.

had a fairly good Pollical face and a sharp edge were utilised without further improvement, while it seems fairly certain that others were intended for further improvement, but that for some reason or other they were rejected without being finished, though it appears that in some instances even these uncompleted implements were used. A good specimen of an external flake, which was utilised just as it came off from the parent block, is shown in fig. 3

FIG. 3.

Bb/1. TYPE OF EXTERNAL FLAKE, SHOWING TRACES OF USE ALONG THE UPPER EDGE.

Found by Mr. L. Brownell, at Geilston.

Another specimen, of the more elongated kind, which shows traces of work on the Indical face, is represented in fig. 4.

FIG. 4.

Bb/2. TYPE OF ELONGATED EXTERNAL FLAKE, SHOWING TRACES OF FLAKING AT THE BROADER END. (BUTT END.) Old Beach.

The specimens here figured shows distinctly that it has been subjected to a good deal of flaking, and the left edge has apparently been used. It is impossible to say whether the flaking of the Indical face is intentional, and the specimen is a half-finished reject, or whether the chips came off when other specimens were previously struck off from the same block. A mis-spent blow at the broader end seems to indicate that it was intended to turn the flake into a more serviceable tool, and that, therefore, the working of the Indical face was due to intention, and not only to utilisation. The most remarkable of this group are a small number in which the flat face shows traces of working, instead of being used as Pollical face. Specimens of this kind are pretty rare.

C. IRREGULARLY SHAPED ANGULAR IMPLEMENTS, GENERALLY OF CONSIDERABLE THICKNESS, AND FREQUENTLY OF LARGE SIZE.

This group comprises a large number of Archæolithic implements, and it can be considered as the next stage between the external flakes and the more highly-

wrought Archæolithes. If we imagine the Indical face of an external flake a little more worked, we arrive at this stage. On the other hand, it is pretty certain that larger splinters, resulting from the breaking of a block, were used, whether they presented a good Pollical face or not; specimens of this type are very common, and a good representative is shown in the following figure.

FIG. 5.

Cb/1. ANGULAR ARCHÆOLITHE, WITHOUT A POLLICAL FACE, SHOWING TRACES OF UTILISATION. Old Beach.

Not unfrequently a certain amount of work was spent in trimming the edge of such a splinter, though the Pollical face was all but serviceable, a specimen of this type is shown in the following figure.

FIG. 6.

Cb/2. ANGULAR ARCHÆOLITHE, WITHOUT A REGULAR POLLICAL FACE, BUT WITH A BEVELLED CUTTING EDGE: Geilston.

The next higher stage are specimens which have a well-marked Pollical face, without much work being spent in trimming the Indical face; the edges may have been used, just as they were if sharp, or subjected to previous trimming. If a little more work has been spent in working the Indical face, it is almost impossible to distinguish such specimens from those of group Ea. A specimen of the former type is shown in fig. 7.

FIG. 7.

Cc/1. ANGULAR ARCHÆOLITHE WITH A GOOD POLLICAL FACE; LEFT EDGE USED WITHOUT TRIMMING. (1) Maryvale (Tea Tree).

This group includes some of the larger specimens that have come under my notice, one of them measuring $5\frac{1}{2}$ x $5\frac{1}{8}$ inch, and another $7\frac{1}{2}$ x $4\frac{1}{2}$ inch. It is, however, very probable that specimens of this type must be considered as rejects.

(1) The specimen above figured is also a good instance of re-chipping; the traces of use on the left edge are without a patina, while those on the upper and right edge (not visible in the figure) as well as the remainder of the surface on both faces are covered with a greyish-white patina.

Another type included in this group are specimens from which it is impossible to say whether they are nuclei, or unfinished rejects. These specimens are frequently of a large size, and to the casual observer they would appear to have been worked all round on every side. It is, however, obvious that these specimens cannot be considered as implements, which it was intended to work on both faces. In the first instance, their lumpy form, the entire absence of any shape, proves that they must be either nuclei or unfinished rejects. I found one of these specimens near Kempton, and the flakes that had been struck off were still lying around it, and could be fitted into their places. We have here clearly a nucleus, and its flakes, both being rejects. Other specimens equally prove that numerous attempts had been made to produce a smooth Pollical face, but either owing to the nature of the rock or ill-directed blows, these attempts failed, and the specimen was rejected.

D. LAMELLIFORM IMPLEMENTS.

This group is distinguished from the former chiefly by its smaller thickness, and that more specimens show that a considerable amount of work has been spent, not only in trimming the Indical face, but also bevelling the edges. We might consider them as flakes of group Bb/2, whose Indical face has been so much worked that original crust has entirely disappeared. (1).

I think this group includes all those which Sir John Evans has termed "trimmed flakes."

The lowest type are flakes with a good Pollical face, whose Indical face has been wrought by one or a few more large chips being struck off. The sharp edges were generally utilised without previous bevelling. Fig. 8 is a good illustrative specimen of this type.

FIG. 8.

Cb. LAMELLIFORM ARCHÆOLITHE (TRIMMED FLAKE), SHOWING A SLIGHTLY WORKED INDICAL FACE, AND TRACES OF USE AT THE LEFT EDGE. South Arm.

The next figure shows a lamelliform implement, whose Indical face has been more elaborately worked.

(1) Frequently enough small traces of the original crust still adhere to the implement.

FIG. 9.

Cc. LAMELLIFORM ARCHÆOLITHE (TRIMMED FLAKE), SHOWING A MORE ELABORATELY-WORKED INDICAL FACE, AND EXTENSIVE TRACES OF USE. Bellerive. Found by Mr. E. Anthony.

Though the shape of the lamelliform implements varies considerably, those of roughly quadrilateral outline are most common, some of which are very elaborately trimmed all along the edges. Others are of a more oval form, which gradually passes into a more circular shape. The size of the flakes varies considerably, fig. 9 measures 5 inches in length, but others, which by their bevelled edges and traces of use, prove that they are implements, and not spalls falling off during the manufacture of others, measure only $1\frac{1}{2}$ x 1 inch, and I believe there are specimens even below this size, which is covered by an ordinary sized thumb. A remarkable group is trimmed in such a way that one side presents a more or less semi-circular, or crescent-shaped, bevelled edge. An extremely good specimen of this kind is represented by fig. 10.

FIG. 10.

Cd. LAMELLIFORM ARCHÆOLITHE (TRIMMED FLAKE), SHOWING A SEMI-CIRCULAR BEVELLED EDGE ON LEFT SIDE. Maryvale (Tree Tree).

Another remarkable specimen is shown by the next figure. This specimen has a beautifully trimmed, bevelled edge on the left hand side, but instead of being continuously convex, the lower part is deeply concave. It is obvious that though the upper part could be used as a knife, the lower part was used as a hollow scraper. It is certainly remarkable that although the upper part shows some unusually neat and regular chipping, this is absent in the lower part. It is therefore very probable that the concave lower part is not intentional, but the result of use, during which the lower, apparently pointed end of the implement was broken off.

FIG. 11.

Ce. LAMELLIFORM ARCHÆOLITHE (TRIMMED FLAKE), SHOWING SEMI-CIRCULAR BEVELLED EDGE, CONCAVE AT THE LOWER PART. Woodlands (Melton Mowbray).

It is very difficult to suppress the notion that the semi-circular edge was intentional and not accidental, because it is not only restricted to the lamelliform group of Archæolithes, but occurs in the next group just as well. Sir John Evans states that to this form the name of scraper has been applied from its still being used in that capacity by the Eskimos. (Ancient stone implements, page 643).

Another not unfrequent type are the Lamelliform Archæolithes of discoidal shape, as shown in fig. 12.

FIG. 12.

Cf. LAMELLIFORM ARCHÆOLITHE (TRIMMED FLAKE), OF DISCOIDAL FORM; EDGES BEVELLED AND USED. Old Beach.

It is very difficult to keep this group separate from group Eb., if the thickness increases somewhat, and though there is no doubt about the extremes of both groups, the intermediate stages are difficult to classify.

E. CHOPPERS.

Under this heading I comprise all those Archæolithes, of considerable thickness, but very various shape, which are distinguished by a nice flat Pollical and a usually elaborately chipped Indical face, in which the length, as a rule, does not considerably exceed the breadth.

This group includes the largest number of Archæolithes, and it gradually passes on all sides, so to speak, into the different groups here distinguished. When the thickness becomes smaller, it is impossible to draw a sharp line between this group and the lamelliform trimmed flakes. If the Indical face is less elaborately worked, it merges into group C, if the length begins to exceed the breadth a separation from group F is difficult.

It is impossible to give here all the forms which are included in this group, and I must restrict myself in selecting a few of the most characteristic types.

The most common type is an implement of somewhat irregular shape, of considerable thickness, and more or less elaborately worked Indical face, as represented by fig. 13.

FIG. 13.

Ea. COMMON CHOPPER, WITH WELL-FORMED POLLICAL AND CHIPPED INDICAL FACE. Geilston.

The next figure shows a more discoidal form.

FIG. 14, 14a, 14b.

Eb. DISCOIDAL CHOPPER, WITH PARTICULARLY FLAT POLLICAL FACE; INDICAL FACE, WELL CHIPPED; TRIMMED AND WORKED ALL ROUND. Maryvale (Tea Tree).

Fig. 14, Indical face. Fig. 14a, Pollical face. Fig. 14b, side view.

When of a more elongate form, oval-shaped implements are produced which gradually pass by decrease in thickness, either into lamelliform Archæolithes of group D, or into cultelliform types of group F. A fine specimen is represented in fig. 15.

FIG 15.

Ec. OVAL CHOPPER, WITH ELABORATELY CHIPPED INDICAL FACE. Found by Mrs. Oldmeadow, Woodlands, Melton Mowbray.

The oval form gradually leads of over to more quadrilateral specimens, of which the following is the most characteristic type.

FIG. 16.

Ed. QUADRILATERAL CHOPPER. ELABORATELY WORKED. Melton Mowbray.

The next type, the trapezoidal shape, also evolves from the elongate forms.

FIG. 17, 17a, 17b.

Ee. TRAPEZOIDAL CHOPPER. ELABORATELY WORKED. Maryvale (Tea Tree).

Fig. 17, Indical face. Fig 17a, Pollical face. Fig 17b, side view.

If the former type is carried to its extreme by continuing the two longitudinal edges till they intersect, the triangular forms result, of which as many as nine or ten varieties have been distinguished. I select only two of the most characteristic forms.

FIG 18, 18a.

Ef/3. ISOCOECLE, TRIANGULAR CHOPPER, WITH SLIGHTLY CONCAVE BASIS. Old Beach.

Fig. 18, Indical face. Fig. 18a, Pollical face.

One of the finest Archæolithes that has ever come under my examination is the next one, fig. 19. This implement is an almost perfect right-angled triangle, whose hypothenuse is slightly convex. This specimen belongs to that type which I call right-handed triangular Archæolithes, because, when laid on the Pollical face, with the point upwards, the hypothenuse is on the left, and the right angle at the right side.

FIG. 19, 19a, 19b.

Ef/1. RIGHT-HANDED TRIANGULAR CHOPPER. MOST ELABORATELY WORKED. Old Beach.

Fig. 19, Indical face. Fig. 19a, Pollical face. Fig. 19b, side view.

The left-handed triangular Archæolithe is just the reverse of the former; in this case the hypothenuse is on the right, the right angle on the left side. It is remarkable that in most of the specimens of this type the point of the angle is more or less rounded off, so as to form, in some instances, an almost continuous curved edge, without however, losing the triangular shape.

The last group of the choppers is represented by specimens of almost extreme thickness; in fact, the thickness is so great as to prevent a firm grip, and it seems therefore very probable that this group merely represents unfinished rejects. So far, all the specimens of this group which have come under examination show an elongate shape.

Eg. FIG. 20, 20a, 20b.

ELONGATED CHOPPER OF EXTREME THICKNESS; POLLICAL FACE NICE AND FLAT; INDICAL FACE PROBABLY NOT FINISHED. South Arm.

F. KNIVES.

This large group comprises all those forms in which the length considerably exceeds the breadth. Typical specimens are usually thin; if they become small there is practically no difference from the lamelliform Archæolithes of group De., though one would not have the slightest

difficulty in distinguishing the extreme types of both groups. If the thickness increases, the knives merge into group Eg. In fact, it is very difficult to keep groups Eg. and Fa. separate.

The knives have another peculiarity; they may be termed the typical "ridged" Archæolithes, because one group shows a single longitudinal ridge on the Indical side, formed by two faces sloping from it towards the edges; the other group shows two such ridges, and it is plain that they have been produced by splitting off the single median ridge. I therefore divide the knives into two sections, viz., (1) with a single more or less median longitudinal ridge; (2) with two more lateral longitudinal ridges.

A peculiar group of the knives are those which terminate in a very acute point; perhaps it would be advisable to separate this group from the knives altogether, because this kind of implements probably served as borers and not as cutting tools; but for the present I find it impossible to carry out this separation. On the other hand, the knives with rounded ends are well distinguishable from those with one, or even two, pointed ends.

From the large number of specimens I select only the following:—

FIG. 21.

F1/a. TYPICAL SPECIMEN OF A ONE-RIDGED KNIFE. Native Quarry: Shene (Pontville).

The next figure represents a good illustration of a pointed knife, though there are others which exhibit a sharper point still.

FIG 22, 22a, 22b.

F1/b. POINTED KNIFE. Shene (Pontville).

Fig. 22, Indical face. Fig. 22a, Pollical face. Fig. 22b, side view.

Among the one-ridged knives, with rounded end, the following specimen takes the foremost place; in fact, it is one of the finest and most complete specimens that have ever come to my notice, and I am greatly indebted to Mrs. Oldmeadow for having kindly given me this specimen.

FIG. 23, 23a, 23b.

F1/g. ONE-RIDGED KNIFE, ROUNDED OFF AT BOTH ENDS. Woodlands, Melton Mowbray. Found by Mrs. Oldmeadow.

The next specimen is a good illustration of a two-ridged knife. It seems that the two-ridged knives were

not often pointed, but mostly rounded off at one end at least. So far, no complete specimen has come under my notice, they all appear to have been broken.

FIG. 24.

F2/h. TWO-RIDGED KNIFE. Melton Mowbray.

G. CONCAVE SCRAPERS.

This is a curious group, which is distinguished by one or two more or less concave edges. If there are two concave edges, they are separated by a tongue-shaped protuberance, which shows always a median longitudinal ridge, and is usually, but not always, rounded off at the end. It is difficult to say whether the concave edges are intentional or the result of utilisation. In most cases, when there is only one concave edge, it is very probable that the curved outline is the result of wear and tear, by continuous scraping off a rounded object (spear). In others, it seems equally certain that the concave edges are trimmed and, therefore, intentional. Among the large number I select only a few specimens.

The specimen shown in the next figure is in some ways rather a remarkable one; it is distinctly a one-edged concave scraper, but it is also certain that the other side has been considerably used, and as the concave edge was apparently bevelled previous to use, a sort of longitudinal ridge is produced, which gives it the tongue-shaped appearance of the double scrapers.

FIG. 25.

Ga/b. ONE-EDGED CONCAVE SCRAPER. Maryvale (Tea Tree). Found by Mrs. Percy Butler.

The next specimen is a typical double-edged concave scraper, of the type which have been termed "duck bills." The tongue-shaped "bill" is in this specimen rather long, while in fig. 27 it is very short, though rounded, and in fig. 28, short but pointed.

FIG. 26.

Gb. DOUBLE-EDGED CONCAVE SCRAPER (DUCK-BILL). Old Beach.

FIG. 27.

Gb. DOUBLE-EDGED CONCAVE SCRAPER (DUCK-BILL, SHORT-TONGUED). Maryvale (Tea Tree).

FIG. 28.

Gc. DOUBLE-EDGED CONCAVE SCRAPER, WITH A VERY SHORT, POINTED TONGUE. Old Beach.

The last of the specimens included in this group is rather a peculiar one. Its general outline is triangular; the butt-end rather broad, somewhat rounded; the upper end pointed, but rounded off. The two side edges are fairly concave, and on the Indical side is a median ridge. This implement bears the greatest similarity to the langues-de-chats of the French Archæologists. This type is not very common, but it is obvious that it belongs to the group of the double-edged concave scrapers.

FIG. 29.

Ge. DOUBLE-EDGED CONCAVE SCRAPER (Langue-de-chat). Melton Mowbray.

H. COMBINATION IMPLEMENTS.

The necessity of dealing with these implements under a separate heading may, perhaps, be questioned, inasmuch as numerous other specimens have most probably been utilised for different purposes. There are, however, some very peculiar specimens among this group, which are better kept separate from the others. The most common form these implements take is that one or two edges have been used as concave scrapers, while the other served as chopper or knife. The following is a very illustrative example.

FIG. 30.

H. TYPICAL COMBINATION IMPLEMENT. LEFT EDGE USED AS SCRAPER OR CHOPPER. (NOTE THE SEMI-CIRCULAR SHAPE. LOWER EDGE AS CONCAVE SCRAPER.) Melton Mowbray.

It is easy enough to imagine that with an implement of the above kind, a wooden spear could be manufactured from start to finish without any other tool being required.

4. THE USE OF THE AMORPHOLITHIC IMPLEMENTS.

It is only too natural that the inquiring mind turns towards the question of utilisation when a collection of these amorphous stone implements is examined. To our

modern mind it is almost incomprehensible that these crude implements could have served to any useful purpose, and yet they must have, otherwise it is not probable that their manufacturer would have spent so much labour in shaping them.

Luckily, we have at least so much information about the habits and customs of the Aborigines that we can arrive at a very correct idea as to the various purposes these Amorpholithes were used for.

One of the most important observations has again been handed over to us by Scott. He states: "The flints were used principally for cutting and sharpening spears, waddies, and for making notches or rough edges on the end of the waddies. . . They were also used for cutting notches in the bark of the trees." Scott tells us that the principal object for which these crude implements were used was the cutting and sharpening of their wooden spears, they were, therefore, essentially cutting or chopping tools.

On the other hand, it is certain that Scott's statement of the purposes for which the flints were used is not quite exhaustive. We know that sharp specimens were used for nicking off the hair of the women, and for the production of scars on the flesh of the men. It is also on record that "sharp flints" were used to open up the roasted animals they used for food, and it is also fairly certain that sharply-pointed specimens were used to drill holes into the shells and bones they used to wear as ornaments. The question therefore remains, are the purposes enumerated exhaustive or not? Some of the implements that have come under my notice are most suggestive of a spear or arrow head, and had they been found in Europe they would without the slightest hesitation been pronounced as such. The following three figures, of fictious spear and arrow heads, will amply illustrate this view.

FIG. 31.

FICTIOUS SPEAR HEAD. REALLY A KNIFE OF GROUP Fc. Old Beach.

FIG. 32.

FICTIOUS ARROW HEAD. (NOTE THE BEAUTIFULLY-MADE TANG FOR INSERTION INTO THE SHAFT). REALLY KNIFE OF GROUP Fc. Maryvale.

FIG. 33.

FICTIOUS ARROW HEAD. REALLY KNIFE, SCRAPER OR BORER. Old Beach.

We are luckily in the position to answer the above question conclusively and in the negative. The altercations between Aborigines and Europeans have been frequent enough ever since their first hostile meeting in 1803, but though the accounts are dramatic in every way, not a single one mentions that the Aborigines used bow and arrow or spears provided with stone heads. Particular stress is always laid on the fact that their only weapons were wooden spears, though they occasionally seemed to have resorted at throwing a shower of stones at their assailants. It is, therefore, absolutely certain that neither the use of bow and arrow, nor the mounting of their wooden spears with stone heads, was known to the Aborigines. We can, therefore, at once refute any attempt to recognise arrow and spear heads among the Tasmanian Archæolithes, however suggestive the form of such an implement may be.

Scott, as well as other observers, state that the Aborigines never used the "flints' as tomahawks. In order to be effective, a tomahawk, battleaxe, or celt requires an artificial handle, the stone must be hafted. Now, as the Aborigines never used any hafted tool or implement—on this point we have the emphatic statement of Scott and others—it is equally certain that there are no tomahawks, battleaxes, or celts among the Tasmanian Archæolithes.

One of the most important purposes for which the stone implements of a higher stage of civilisation were used, viz., as weapons of offence and defence, does therefore not apply to the Archæolithes of Tasmania, and this, at once, considerably restricts their scope of utilisation. If the Tasmanian Archæolithes were neither weapons of offence nor defence, they can have only been used in connection with the performances of domestic life, if this word be permitted.

Enough has been handed over to us to know that this daily domestic life was of the most primitive fashion, and mainly consisted in providing for food. They had no houses, huts, or tents; they had no industries, the only art they understood was the plaiting of baskets. The use of the saw, however inefficient it may have been, was wholly unknown to them. We can, therefore, still further restrict the scope of use of the Archæolithes, and arrive at the conclusion that the Archæolithes were in the first and principal instance cutting instruments in the broadest sense of the word, and the conclusion thus arrived at is, therefore, fully in harmony with Scott's statement.

It is certain that the Archæolithic and, perhaps, also some of the Eolithic implements were chiefly used in the manufacture of the wooden spears and waddies. It is almost sad to think what an enormous amount of time and labour has been spent by the Aborigines, mainly to shape these poor tools in order, produce with their assistance an equally inefficent weapon. It is almost incomprehensible to our modern mind, that not one of these human beings that were born, lived and died, for generations uncounted, had the inventive genius or lucky idea to improve the efficiency of their stone implements by substituting the artificial handle to the natural one of the hand. This is, to my mind, one of the greatest problems in the psychology of this race.

If we muster a collection of Tasmanian Archæolithes in order to ascertain which of them were most suitable for the above mentioned purpose, we find that, except a few thin flakes, (group D) and some of the thin and pointed knives of group F, almost every specimen could be used in the manufacture of spears. The concave scrapers (group G) were most probably used to give the last polish, and to sharpen the end.

The heavier and stronger Archæolithes and, in particular, most probably the Diabas Eolithes were used for cutting notches into the bark of trees, which were ascended to hunt for opossums. (1).

The more delicately wrought lamelliform implements of groups D and F were probably used as knives for cutting the meat of roasted animals, as well as in skinning them, if ever a skin was required. The sharpest specimens were probably used to produce the scars, and to cut the hair, though the latter could be equally well, if not better, performed with two more solid implements as long as the working edge was sharp enough.

Those implements which terminated in a particularly acute point, group Fe., and, perhaps, also those of group Ge., were used as borers to perforate the shells and bones worn as ornaments.

Another purpose for which some of the Archæolithes may have been used, was probably for lighting a fire. Ling Roth is very adverse to this view, notwithstanding the evidence of Furneaux and La Billardiere. Sir John Evans has, however, proved that primitive man of Europe produced fire by means of a piece of iron pyrites and a flint. Iron pyrites, or, for the matter of that, copper pyrites is by no means rare in Tasmania, and the probability that

(1) Several writers refer to the fact that the women, when ascending the tree, used to carry the stone implement on their heads. The flat columnar pieces of Diabas would be eminently suitable for such a purpose if in general use, and not only occasionally resorted to.

one of the pieces of "flint" found in the baskets by La Billardiere was really a piece of pyrites is by no means small. That such a piece was not correctly designated as such, but simply called flint, is more than probable; in fact, the contrary would have been more astounding, considering that these men, however good sailors and explorers they may have been, probably never noticed such details which would even tax the power of observation of the modern scientist to the utmost.

This pretty well exhausts the purposes for which the Tasmanian stone implements were used, and the only question which remains to be examined is, how were the Archæolithes produced. Again we turn to Scott for information. He states that he had "seen the men sitting for an hour or so, at one time, chipping one flint with another." Here we come to another stumbling block, was it really one "flint" that was used to work or chip the other "flint," that is to say, was the "hammer" used in the production of an implement of the same material as the latter, that is to say, a cherty rock, or is it not possible that the "hammer" was of a different material altogether. It is a favourite theory of numerous collectors to assume that certain specimens belonging to my group, Mb. were used as "hammer stones." I have my great doubts as to the correctness of this view, but other specimens belonging to group N most forcibly suggest the idea of being used as hammerstones. A typical specimen is here reproduced.

FIG. 34.

N. HAMMERSTONES. South Arm.

On the other hand it seems very improbable that these clumsy Diabas pebbles could be used to produce the neat trimming some of the more highly finished specimens show, although it cannot be denied that they were good and serviceable implements to strike off the first flakes from a larger block. It is, perhaps, probable that the larger spherical hammerstones were used to detach the first flakes, and that more handy, sharply-edged pieces of chert were used in working and trimming the specimens thus obtained. We might imagine that the common angular fragments or flakes that fell off when a large block was broken were used for such a purpose. It seems, for instance, more than probable that the numerous pieces lying about in the quarry on Coal Hill (Melton Mowbray) were used for trimming other specimens; the presence of almost countless fragments, whose edges show unmistakable signs of use, is otherwise quite inexplicable. I am afraid that this question will never be satisfactorily solved, and

though we may take it as certain that stones were used in order to trim the Archæolithes subsequently used for cutting purposes; and though with a certain amount of probability we can consider a certain group of spherical Diabas pebbles as hammerstones, it will be almost impossible to distinguish those which were used in trimming the implements from the Archæolithes used for general cutting purposes.

4. ANTIQUITY OF THE AMORPHOLITHES FOUND IN TASMANIA.

Having described the general features of the Amorpholithes and their use, the question of antiquity arises, as a matter of course. Even the most casual observer will notice two facts, viz.:

a. That no implements of a higher stage (Palæolithic or Neolithic) have been found in Tasmania.

b. That the race which used the Amorpholithes must of necessity have migrated to the island previous to its separation from the mainland of Australia.

The fact that no stone implements of the higher order have been found in Tasmania up to the present time may be taken as certain. Of course this does not prove that they do not exist, but inasmuch as numerous collectors have lately interested themselves in these relics of the past, it is only fair to assume that stone implements of the higher orders had come to light if they existed. If they exist at all, they must be buried deep in the soil, or in cave deposits hitherto unexplored; but I have the greatest doubts as to their existence, because if such implements were found in Tasmania they would prove that either a higher civilised race lived in Tasmania previous to the arrival of the Aborigines, or that that race degenerated since their arrival from a higher state into a lower one. Though not impossible, I think both theories to be highly improbable.

The second point is at once clear. We know that the Aborigines of Tasmania possessed no knowledge of seafaring; it is therefore absolutely certain that they cannot have crossed Bass Strait, but must of necessity have migrated to the present island previous to its separation and inhabited it when this great geological catastrophe took place.

Now, if we examine the camping grounds on which the implements are found, we notice several other interest-

ing facts. All the camping grounds appear to be of comparatively recent age, none of those I have hitherto visited gave me the impression as if it had been used for a very lengthy period. Anybody who has seen the sites of old inhabited places in India, Persia, or Egypt knows the enormous amount of refuse that collected there as the waste of past generations. However simple the wants of our Aborigines may have been, there was always a certain quantity of waste, and this must have, in the course of time, accumulated, forming a large heap of refuse on the camping grounds. But such a layer of refuse is entirely absent in the camping grounds. The most natural explanation is, to assume that the camping grounds were used for a short time only, and constantly shifted. However tempting this view may be, there is a serious objection to it. Three things were absolutely essential for a camping ground: Fresh water, a plentiful supply of food, and a warm soil permeable to water.

As the Aborigines possessed no vessels whatsoever in which to carry any water, except occasionally in a shell, the nearness of fresh water was absolutely indispensable for a camping ground. The nearness of food was not so necessary; it could be carried in baskets for any reasonable distance, if necessary, and as long as the supply was plentiful in the neighbourhood, any place near fresh water was suitable, provided it fulfilled the third condition. This is, perhaps, the most curious of all. A little observation proves that almost all camping grounds were situated on sandy soil. If a small island of sand occurs in a large area of argillaceous soil, we may be almost certain to find a large number of implements on that spot, even if not a single specimen is found all around it. I had this proved over and over again by actual observation, and in hunting up new sites I always find out the sandy places, and I am rarely disappointed.

The Aborigines neither camped on rocky, nor on heavy clayey soil, and the reason for this is obvious. Rocky ground can never be considered as comfortable, argillaceous soil becomes slushy in the rain; but the sandy soil is soft, warm, and the rain water soon disappears and leaves it dry. I do not say for a moment that there were no exceptions to this rule, but taken a supply of fresh water and plenty of food, the Aborigines always selected the sandy soil in preference to any other for their camping sites.

Now, it is only fair to assume, that if the Aborigines never dwelt for any length of time at any of these places, but always shifted to new ground after a time, the available localities must eventually become exhausted. Former

camping grounds had, therefore, to be revisited, and this must eventually result in the accumulation of large heaps of refuse such as we observe, for instance, in the cave deposits in Europe. But, as already stated, these heaps of refuse are wanting in the Tasmanian camping grounds, and the only refuse we note are here and there a few traces of ash or charcoal and stone implements, which are limited to a layer of not more than 6 to 12 inches from the surface.

The only accumulations of refuse we observe in Tasmania are the shell heaps along the sea coast and the estuaries of the bigger rivers. The accumulation of these shell heaps is easily accounted for, and is of no special interest; inasmuch as a large shell heap must collect within a comparatively short time. (1.)

If we examine the situation of the shell heaps and the old camping grounds, it becomes at once unquestionable that both came into existence not previous, but after the present system of drainage had been established; in other words, after Tasmania had acquired its present shape, that is to say, become separated from the mainland.

So far, I have not seen a single camping site or shell heap which tends to contradict this view. I may be wrong, and others may, perhaps, be discovered, which disprove this view, but all those I have so far examined have been formed after Tasmania had acquired its present contours and physical features.

This is, in my opinion, a very important fact, because in conjunction with certain geological evidence it may tend to throw some light on the all-important question of age.

We know, and recent investigations have conclusively proved that the highlands of Tasmania were, geologically speaking, in very recent times, covered under vast sheets of ice. The exact area of this glaciation is not known yet, nor is it known to what height above sea level the ice reached. Prof. Gregory states that on the West Coast glacial deposits are found near Queenstown; the enormous boulder beds near Strahan are most probably of glacial origin. With all reserve, I venture to say that to judge from the present scanty evidence the glaciers extended to a much lower sea level in the Western than in the Eastern part of Tasmania. If we assume that all the land above 1,200-1,300 feet of the present level was covered under ice during the glacial period, I think we are well within limits. But even this moderate estimate leaves only a

(1) A short calculation will easily prove this; assuming every member of a tribe of 50 persons consumes 50 oysters a day, not a very large allowance by any means, yet this would result in the daily production of 5000 valves, or 1,825,000 valves per year. Assuming that each valve weighs not more than 1 ounce (a very low estimate) this tribe would leave a refuse heap weighing 50 tons, being composed of nearly 2 million valves every year.

comparatively small area of the present island free from ice. It may further safely be argued, that if a large portion of Tasmania was covered under ice-masses of great thickness, this large quantity of ice must have had a considerable influence on the climate. Whatever view we take, that part of Tasmania which was not covered under ice was certainly much colder than it is now, and being in such close proximity to the glaciers, probably swept by icy-cold winds for the most part of the year. It was all but a hospitable and inhabitable region, in which those naked savages would have speedily perished had they been obliged to live in it permanently.

We can, therefore, take it as granted that the first population of Tasmania settled in the island after the disappearance of the glaciers, because all the camps and shell heaps hitherto discovered are situated within the arid, storm-swept and cold region above mentioned. According to information kindly supplied by Prof. Macaulay, Archæolithes have been found near the Great Lake on beds which are probably of glacial origin. Of course, these implements may have been left there long after the glacier had disappeared, but it is certain that they could not have come to their present resting place previous or during glaciation.

We have now gained another important step. We know that present Tasmania was uninhabitable for a primitive race like the Aborigines during the glacial period, and that their appearance may have either coincided with the melting away of the ice, or took place immediately after it. We also know that this immigration took place previous to the separation of the island from the mainland, and we therefore come to the very important conclusion that the island of Tasmania was separated from the mainland after the disappearance of the glaciers. The Eolithic-Archæolithic industry was, therefore, established in present Tasmania in post-glacial times.

Now, let us turn to Europe. The Eolithic-Archæolithic industry occurs in Europe chiefly in beds that are either of præ-glacial or glacial age. There is a great difference of opinion as to the duration of the glacial period in Europe, but on the whole geologists have agreed that the ice age terminated abut 10–12,000 years before our present era.

Now, if we assume that the diluvial ice age was synchronous all over the earth, the first immigration of human beings into Tasmania must have taken place about 10 to 12 thousand years before our present times, and the separation of the island from the mainland very shortly after that period.

This hypothesis raises at once another question. I have above mentioned that the main relics of the Eolithic-Archæolithic industry in Europe are found in beds of præ-glacial and glacial age. Under the assumption of the synchronism of the ice age they must, therefore, not only geologically but also absolutely be much older than those of Tasmania. Australia could therefore, not be considered as the cradle of mankind as some European scientists take her to be, but rather a kind of reservation in which the remains of those primitive tribes that inhabited Europe previous and during the ice age were preserved, thanks to her isolation from the main mass of the European-Asiatic Continent immediately after the termination of the ice age.

There are, however, a few objections to this hypothesis; the main is the assumption of the synchronism of the ice age. We have generally good geological reasons to assume that the diluvial ice age was synchronous all over the earth, but we have, so far, no absolute proof for this theory. Now, were we to assume that Tasmania and Europe were simultaneously populated by tribes using Eolithic-Archæolithic implements, it is evident that the glaciation of Tasmania must have commenced and terminated much earlier than that of Europe. The first immigration of human beings into Tasmania would then have taken place at a much more remote period than above assumed.

There remains another consideration which, in my opinion, is the weightiest of all. I have mentioned above that all the shell heaps and camping ground came into existence when Tasmania had already acquired its present physical features, in other words, its present shape. Now, supposing we were to assume that Tasmania was not only once connected with the mainland, but actually forms the last western remnant of a continent that once stretched far towards East, the habitability of Tasmania would at once take another aspect. We could assume, that although the western highlands were covered under ice, the more eastern parts were of a more temperate climate in which a primitive race could thrive.

When those last revolutions took place, which shaped the outlines of our present continents, the remainder of this race, which survived, was driven westwards, and settled in the country that had now become free of the bounds of ice, and which was formerly inaccessible to them. This hypothesis dispenses with the necessity of assuming that the glacial period existed in Tasmania at a much eariler date than in Europe, because it allows of an inhabitable region simultaneously with the glaciation of the other part. If we assume that in this region dwelt

the race, the last remainder of which populated Tasmania, there is no necessity to suppose that the island of Tasmania became separated from the mainland of Australia after the disappearance of the glaciers. This separation may have taken place while the glaciers still existed.

The greatest objection against this hypothesis is the great depth of the sea between Tasmania and New Zealand, the bottom of which, for the greatest part, is more than 12,000 feet below sea-level. On the other hand, it would explain the modern look of the camping grounds. If we were to assume that the subsidences of the land between present Tasmania and present New Zealand took place very slowly, always submerging the older camping sites under the sea-level, gradually driving some of the tribes towards West; and if we assume that the last and final of these disturbances, which gave Tasmania its present shape, took place in comparatively recent times, say, about 2,500 years ago, this hypothesis overcomes all the difficulties which we meet when we assume that Tasmania was first populated about 12—10,000 years ago.

This theory seems to be rather a bold one, and few could grasp the idea that large geological disturbance can have taken place in comparatively recent times. Yet modern geology has proved that this was actually the case. England was not yet separated from the Continent, after the greater part of the great inland ice had disappeared. The Baltic Sea, which is now connected with the open ocean, formed a great inland lake, the so-called "Ancylus Lake," long after the ice had receded, and the bursting of that lake probably resulted in the great Cimbrian flood of which the Roman historians speak, and which set the tribes of the Cimbri and Teutones on their move towards Rome, whose terror they were for a long time, till they were finally defeated in 113 A.D. As there can be no doubt as to these great geological disturbances taking place in Europe, in geologically speaking, very modern times, there is no reason why we should not admit similar disturbances to have taken place in equally modern times in Tasmania. To sum up:

1. Present Tasmania became only inhabitable after the disappearance of the glaciers.
2. This disappearance can be fixed at about 10—12,000 years before our present era.
3. The primitive race that immigrated into Tasmania must have become isolated from the remainder of the world very soon after its immigration, otherwise it would have been wiped out long ago by a more energetic race.

4. If the immigration took place at so remote a period, the camping grounds could not present that modern look which they unquestionably have.

5. Is it probable that a race remained absolutely stationary for about 12,000 years, without advancing one step in civilisation, when in Europe it has practically only taken that time to reach our present stage?

6. The objections under 4 and 5 are so weighty that it is almost impossible to assume Tasmania has been inhabited by the Aborigines for any lengthy period.

7. The only hypothesis to get out of this difficulty is to assume, that though the ice may have disappeared at the time above stated, Tasmania was not inhabited till at a very recent date, and that the tribes which, at the time of glaciation, may have dwelt to the North and East, were driven to this formerly uninhabitable haven of refuge by geological disturbances taking place at very recent times, and resulting in the production of Tasmania's present outline.

8. The earliest date at which we could fix this is about 3,000 years before our present time, though, of course, the commencement of the geological disturbances may go back to a much earlier date.

Whichever view we take, two facts remain unrefutable: Present Tasmania became only inhabitable after the ice had disappeared, and the aboriginal population can only have moved into it after the melting of the ice, but previous to the present isolation of the island. The only question about which there can be a divergence of opinion is the question of fixing this time. If certain geological views be accepted, then the event of the first populating of the island may date back to a very remote period; but there is evidence to show that it cannot be dated earlier than 10—12,000 years, and probably not later than 3,000 years before our present times. (1).

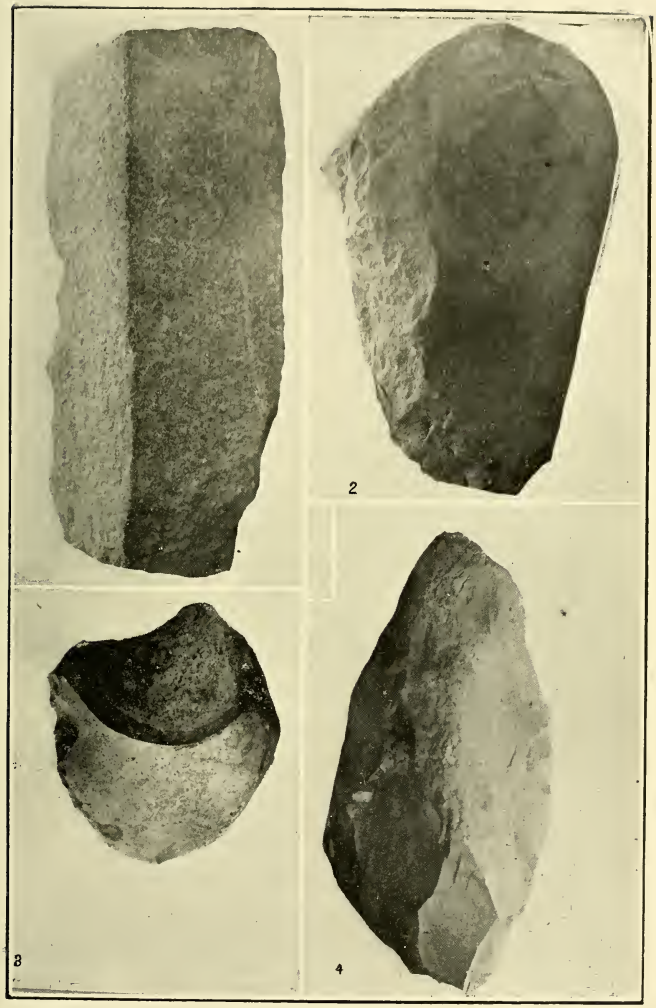
For the present, we have to content ourselves with this result, but much remains still to be done in either proving or disproving it. In the first instance, the relationship

(1) I may remark here that it seems a great pity that hardly any of the legends of the Aborigines have been collected, at least not to my knowledge. As it is unquestionable that they witnessed great geological changes, the recollection of these terrible events must have impressed itself so vividly in the mind of the survivors that it is fair to assume that it was handed over to future generations in the shape of legend.

of the camping sites to the glacial beds will have to be studied. In particular, it will have to be examined whether there really are no Archæolithes in beds of glacial age in Tasmania, and whether, as it now appears, the Archæolithes are strictly limited to the surface of the soil.

The cave deposits which most certainly exist in Tasmania will have to be examined, and the question whether there is any relationship between the extinct fauna occuring on King's Island, and the former inhabitants will have carefully to be gone into.

After all these questions have been studied and decided one way or other, we will be in a much better position to settle the antiquity of the Eolithic-Archæolithic civilisation in Tasmania. In the mean time our most urgent duty is to collect as much information about the occurrence of the relics of a race that became extinct within the memory of the present generation, or else a time will come when it is again "too late," and a future generation will blame us for our omissions.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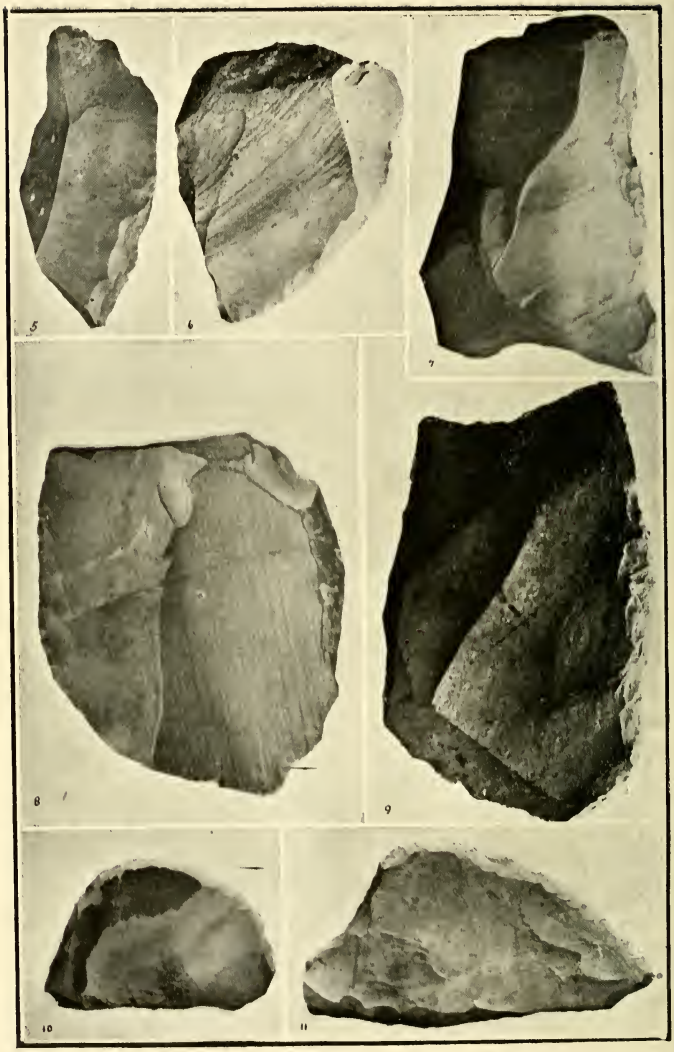
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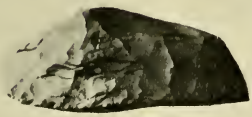

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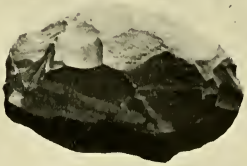

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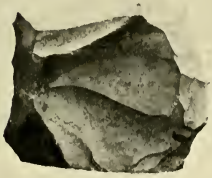

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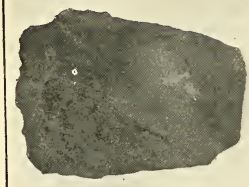

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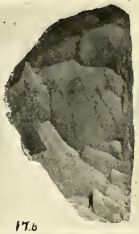

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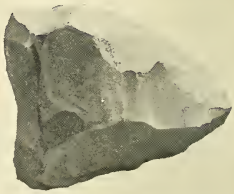

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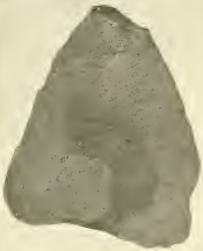

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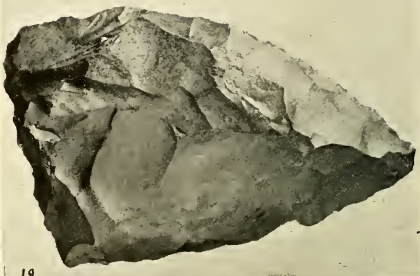

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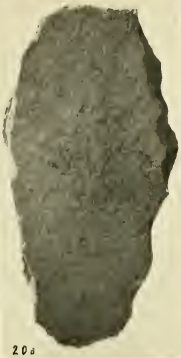

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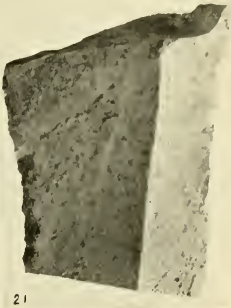

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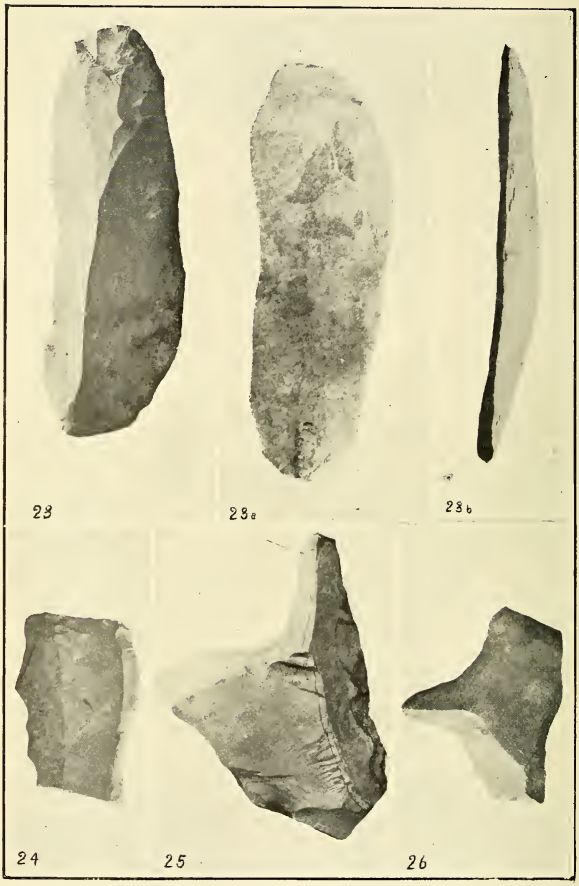
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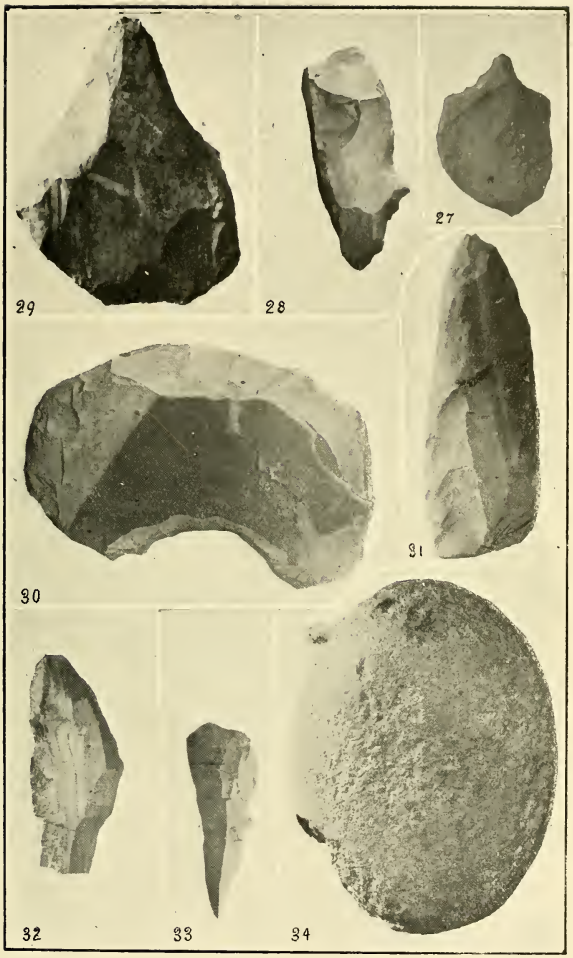
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