ANNALS

OF THE

SOUTH AFRICAN MUSEUM

VOLUME XXIV

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PART I, *containing* :—

1. *The Montagu Cave: A full Report of the Investigation of the Montagu Rock-shelter.* By A. J. H. GOODWIN, B.A. (With Plates I-VII and 2 Text-figures.)

2. *A Comparison between the Capsian and South African Stone Cultures.* By A. J. H. GOODWIN, B.A. (With 16 Text-figures.)

3. *The Osteology of a Bushman Tribe.* By D. SLOME, B.A. (With Plates VIII-XI.)

4. *The Dentition of a Bushman Tribe.* By Prof. M. R. DRENNAN, Anatomy Department, University of Capetown.

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1. *The Montagu Cave: A full Report of the Investigation of the Montagu Rock-shelter.*—By A. J. H. Goodwin, B.A. (Cantab.), Research Assistant in Ethnology, University of Cape Town.

(With Plates I-VII and two Text-figures.)

Montagu is in the Western Province of the Cape, some seven miles from Ashton railway station. The cave lies another six miles to the eastward of Montagu on Derde Heuvel Farm.

This cave stands at a height of some 200 feet above the bottom of a narrow precipitous-sided valley which runs from the Langebergen Range in a general north-easterly direction to join the Kingua River. The valley is cut through folded Table Mountain sandstone, the dip of which at the cave is almost vertical. From the stream-bed to the cave entrance the slope rises steeply and is covered with thick bush growing on a talus of large and small blocks of sandstone; but above the cave there is a 200-foot broken wall of rock. The cave is on the western side of the valley, and faces nearly due east. The shelter and the inner cave (" tunnel ") above it thus extend in a direction roughly parallel with the strike of the beds.

The cave consists of two chambers. The outer one is of the rock-shelter type, being wide and high at the mouth and descending towards the rear of the cave, and it is with this shelter that the present paper will deal. The second chamber is, at the present day, entered through the first by means of an iron ladder cemented to the back (west) of the outer cave. This tunnel does not seem to have been used at all by the Earlier Stone Age peoples, signs of whose occupation are restricted to the outer cave, but a " kibi " or " ! kwe " stone, contemporary with the Later Stone Age occupation, and also a wooden club, are believed to have been found here.*

It should here be noted that throughout this paper terms such as Palaeolithic, Neolithic, Chellean, Acheulean, Mousterian, and even Bushman have been avoided, and the two terms " Earlier Stone Age " and " Later Stone Age " have been substituted, for the reason that the rejected terms were coined to apply to certain definite European prehistoric cultures in certain definite European lands. It is still doubtful whether the Neolithic phases of culture have spread into Southern Africa, and it is obviously incorrect to refer to the Later Stone Age of South Africa as Neolithic when it seems probable that it is an offshoot of a European Palaeolithic phase of culture.

Again, if it were proved that Mousterian man or some such man had migrated to South Africa complete with his Mousterian culture, we would still be unable to refer to his period as " Mousterian times."

For these reasons, then, and as no human remains were found, it has been deemed best to confine ourselves to the terms Earlier and Later Stone Ages. It will be shown in the course of the paper that the Earlier Stone Age can be divided into two sub-periods in this particular instance. This, however, only suggests a line of investigation in future studies, and is not a generalisation, as so far this sequence has only been noted in this one cave, and until it has been noted in many more instances no generalisation is possible.

The Cave.

The cave at the mouth is 42 feet across, and from front to back measures 47 feet. It is " D " shaped, the upright of the D lying to the front of the cave mouth, and the semicircle to the rear of the cave, from whence the tunnel or upper cave is entered (see text-fig. 1).

At the mouth of the outer cave, and at a height of a foot above the modern floor-level on either side, are two rock-paintings of the usual South African type. Their height above the floor-level, and the fact that they are not covered by any of the floor-level, points to their being drawn when the floor was little lower than at present. The paintings are all small and not of sufficient interest to merit their reproduction in this paper. The interior of the outer cave is dark, and the painters seem to have confined their efforts to the cave-mouth for this reason.

* Péringuey, "Stone Ages of South Africa," p. 33, pl. xix, fig. 152.

The light was, however, sufficient for photographs of the lighter portions of the cave to be taken (see Plate I).

The floor of the cave has been littered and strewn with debris (marked X in the section) to a depth of some feet in places. This was due to several causes. In the first place, there is a normal deposition from the roof of the cave, and from the bats and swallows inhabiting the cave. Secondly, the upper cave was excavated by guano diggers, who, in throwing out guano for conveyance by aerial railway, disturbed the surface and also added some of their own debris. Thirdly, previous excavators of the cave had also added to the debris from the Later occupational layer (B in the sections) and the upper Earlier occupational layer (D in the sections). This accumulation of debris was a difficulty which was only surmounted on the last excavation.

History of the Work.

The cave was first visited in 1918 by a botanist of the South African Museum and a mountaineering friend. They stayed some four or five days, but failed to make any discoveries.

About a year later (see "Cape Times," 31st May 1919) Mr. E. J. Jansen made three visits to the cave. On all occasions he was accompanied by Mr. van Alphen (Resident Magistrate). On the second visit Major Jardine of Cape Town accompanied him, and on the third visit Mr. Russell (Inspector of Schools). To them the Museum is indebted for the discovery.

Mr. Jansen saw among the debris what he describes as "an implement of true palaeolithic form," and thereupon dug through the debris (X), which was here undisturbed, to a depth of some 3 feet. On digging through this he came to "a number of implements of Mousterian times" (*sic*). He soon encountered a red sandy soil E, but did not dig through it. This excavation is called Jansen's pit i. On the second and third visits he attempted to get through this layer (E), but failed at a depth of 3 or 4 feet. He found, however, "a boucher of pre-Mousterian times" (*sic*). They now turned their attention to the western side of the cave (Jansen's pit ii) and dug through to the red sand again. Above the sand they found some rejects, some with the "chisel-edge," and some smaller artefacts.

Following upon the publication of these finds, the South African Museum sent up Messrs. Haughton, Barnard, and Tucker, who arrived, together with two boys kindly lent by the New Cape Central Railway authorities, on 1st October 1919.

Meanwhile some correspondence had passed between Mr. Jansen and the late Dr. Péringuey, then director of the South African Museum, and a plaster cast was taken of one of the implements found. Unluckily, of the two casts associated with the Montagu implements in the Museum collection, neither is marked, and it is impossible to say which is the specimen sent by Mr. Jansen.

Conclusions.

Mr. Jansen's party, it will be noticed, did not discover either the Later occupational layer (B) through which they passed, or the middle Earlier occupational layer (F), unless the implement "found in the hard-bake" (*i.e.* the ferruginous sandy layer E) can be regarded as from this layer (F). Had this been so Mr. Jansen would most certainly have dug further and discovered the layer F some few inches lower.

Stratification of the Cave Deposits.

The several layers have been lettered A–H, from the top downwards, with X to denote the debris, and S the scarpage towards the Grotto (south) side. The layers will be dealt with in order of deposition (see Plates II and III).

Floor.

What is apparently the floor of the cave consists of a whitish rubble of sand and angular fragments of stone of all sizes, and in a more or less decomposing condition. The depth of the deposit varies, and in places passes down into bed-rock. It was difficult to investigate this layer to any great extent owing to the fallen rocks which covered the deposit towards the front of the cave.

H—This is the earliest and smallest occupational layer. It appears to occupy a comparatively small area in the centre of the cave, not extending to the back or sides, but resting directly upon the floor deposit. How far it extended towards the mouth of the cave could not be ascertained on account of the large rocks under which it disappears; it would appear to peter out, and not to extend far in this direction.

The layer varies in depth up to a foot, and is composed of a series of irregular black, grey, and white bands. Only three artefacts were obtained from this layer.

G—This layer contains no implements, and consists of a deposit of red slightly ferruginous sand, with pieces of decomposing sandstone intermixed. It covers the H occupational layer entirely, overlapping it at the back and sides, where it rests directly on the floor deposit. It is fairly even in thickness, varying from 2 to 3 feet in depth.

A specimen of sand from this layer was sent to the Government Chemical Laboratory for analysis. It consists " mostly of quartz sand (partly water-worn) containing organic matter, and is phosphatic." Of three such specimens, sent from the guano cave and layer E, this specimen contains the least phosphate, and that from the guano cave most. There is only a small amount of iron present. The sand of the deposit has been formed, in the opinion of the chemist, " in the disintegration of sandstone, and has subsequently been mixed with bat guano."

F—This is the second occupational layer, and covers the whole of G layer. This, too, is composed of black, grey, and brown bands quite irregularly mixed with white bands (Plate I, fig. 2). On the north side is a large amount of yellowish loam. No visible fragments of charcoal were found in the black bands in either this layer or H. A considerable number of artefacts were found ; in all some three hundred specimens in varying stages of manufacture were brought back to the Museum. The greatest accumulation was found towards the Grotto, on the south-south-west side, thinning out towards the front of the cave and the opposite side.

The excavators remarked an aggregation into two layers, or horizontal planes, the upper one lying immediately below layer E, and the lower one lying about a foot above the bottom of this layer (F).

The thickness of this layer varies from 3 to 4 feet.

E—This is an upper deposit of red sand, and overlies F, covering the whole area of the cave. It is markedly thicker towards the rear of the cave beneath the guano cave opening, and thins out to the front and both sides. At the eastern end of the Grotto is an isolated lenticular patch.

A specimen from this layer was found on analysis to consist of quartzitic sand, partly water-worn, containing less iron than the specimen from G but more phosphate. There are traces of carbonate of lime.

As in layer G the sand is homogeneous, except for small whitish fragments of stone. It is of loose, gritty texture, but at the base of both layers it shades to a dark brown or red, leaving a greasy streak when attacked with the pick. One implement was found in this layer, a few inches below the next layer D, from whence it had apparently been forced.

The scarpage S interferes with this layer at the Grotto end.

The thickness of this deposit varies from 3 to 4 feet.

D—This is the latest of the Earlier Stone Age deposits, to which general period all the previous layers belong. Like F, this layer covers the entire cave, and like both F and H consists of irregular black, grey, white, and brown bands, with no visible fragments of charcoal (Plate I).

A considerable number of artefacts were found, and over three hundred specimens were brought back to the Museum. Here again most of the implements were found towards the Grotto. No implements were found in the top 8 or 9 inches towards the north side. In the centre of the cave, owing to the debris above, little was ascertainable. This layer is again interrupted towards the Grotto by the scarpage, and varies from 2 to 3 feet in thickness.

C—This layer overlies D, and where it was possible to differentiate (*i.e.* towards the back and sides of the cave) it consisted of ordinary brown earth, capped with swallow-guano, which is very thin in places.

The total thickness of the layer is from 6 to 9 inches. It contains no implements. The scarpage (S) seems to consist largely of earth from this layer, which thickens considerably towards the north and south sides of the cave.

B—This overlies C and apparently covers the whole cave, though this could only be recognised on the last expedition, towards the south, north-west, and north sides, where it varied from 6 inches to 18 inches in depth.

The stratum is formed on a basal black band; over this lies a white band, and above this is ordinary brown earth, with black fire-zones and occasional thin white bands.

An entirely different type of implement was found here, and the layer belongs definitely to the Later Stone Age. These implements are of a non-local chert. Charred fragments of grass and reed were found in the lowest and succeeding black bands.

A—This is the modern surface deposit, overlying B. Towards the cave centre it consists of a brown earth a foot thick, giving place towards the sides to swallow-guano 3 or 4 inches thick, and still accumulating. In the centre, beneath the debris, are remains of dead grass.

The Debris.

X—This consists largely of angular fragments of small stones, with occasional larger fragments (up to 15 to 20 lbs. in weight). The presence of fragments of an "agglomeration of small crystals of gypsum, darkened with organic matter and containing phosphates, some of these being water-soluble," points to part of the debris being thrown down from the guano cave above, where the same type of material is found.

Since then the Later Stone Age deposit (B) and the upper Earlier deposit have been shovelled up and incorporated by previous excavators. This seems much more likely than that the implements of both periods were thrown down from the upper cave, as flakes found in the debris seem to have come from identical cores with flakes *in situ* in the B layer.

Conclusions.

We may so far conclude that there are four definite occupations in this cave. The three earlier examples (layers H, F, D), divided one from the other by some 3 feet of quartzitic sand, are homogeneous and of one main cultural group. How the interjacent layers were deposited cannot be ascertained. Slow accumulation owing to the decomposition of the sandstone roof would imply a considerable period between the occupational layers. On the other hand, a sudden rush of water from or through the upper cave, if this were possible, might reduce the intervening periods to a matter of one rainy season. This is improbable, as no sufficient ingress is discernible in the upper cave.

However, a definitely long period has elapsed between the occupational layers B and D, as may be seen from the accumulation of mould and swallow-guano to a depth of 9 inches. A distinct period has necessarily elapsed between B and the present time.

Falls of rock appear to have taken place during each occupational layer, which would point, as does the decomposing state of the fragments which have fallen, to a comparatively fast deposition of sand from the cave roof.

An Account of the Course of Excavation.

(See text-fig. 1.)

Dr. Haughton, having travelled to Montagu for a preliminary survey and to obtain leave from the owner of the farm, commenced work with Messrs. Barnard and Tucker on 1st October 1919. This expedition returned on 16th October.

Jansen's pits i and ii were found, and excavation was started at the point iii, and extended towards and took in Jansen's pit i. This is marked as Trench 1, and gives a continuous section half-way across the cave of layers A, B, C, and D, and a part of F. Finds 1–12 were found.*

A trench was then dug towards the back of the cave (Trench 2), Find 13 coming from layer B, and 14 from D. Here they found that the ferruginous sandy layer rose to the back of the cave, and 15 was discovered, layer D. Excavation, a foot at a time, was now begun at the south side of Trench 2. Finds 16–19 resulted from D, also a buck or sheep tooth, towards what is termed throughout "the Grotto,"

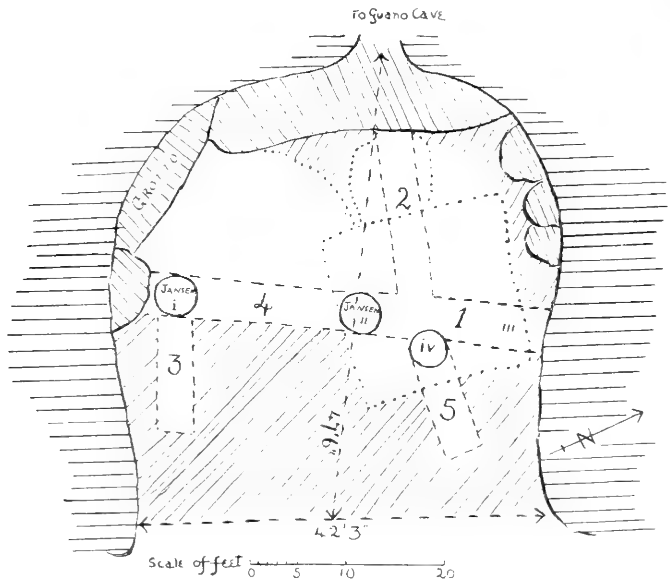


Fig. 1.—Plan of the Cave.

an overhanging rock, jutting out some 5 feet. Finds 21–71 were found again in D. The red sand reaches to the mouth of the Grotto, where it is overlaid by an ash bed. Finds 73–109 were made in D again, Find 72 being picked up by the late Dr. Péringuey from the debris in the course of a brief visit he paid to the cave.

Trench 3 was then dug from Jansen's pit i towards the mouth of the cave, but was abandoned owing to the debris. Finds 110 and 113 are from here; the red sand is petering out, and giving place to white sand and implements. It is therefore possible that these two imple-

* Each implement as it was found was marked with a number, and the data entered up in the field note-book.

ments are from layer F. Finds 114 and 115 are from D. Find 116 is again probably from F.

A trial pit was then sunk through Jansen's pit ii. This was then trenched to Jansen's pit i to a depth of some 4 feet, and the real nature of the cave became apparent for the first time. Finds 117–120 were made in layer F, and the trench had to be abandoned as the walls were in danger of subsiding.

The next deposit, G, was dug to a depth of 3 feet, but F was not reached, and this too had to be abandoned.

Pit iv was then dug, and found to be of similar composition to Jansen's pit ii. Trench 5 was then dug towards the cave mouth, but this too had to be abandoned after Finds 121–123 had been found in layer D. This ended the first expedition.

This expedition found layers D and F, and attempted to dig through G. They did not differentiate A, B, and C, as they were working to a great extent in disturbed ground.

The second expedition consisted of Messrs. Barnard and Tucker. They started work on 5th November 1919. Mr. Tucker left on 19th November, and the late Mr. Lightfoot took his place and stayed on with Mr. Barnard until 27th November 1919.

They commenced operations on the north side at Trench 1. On this occasion they carried all excavated earth outside the cave, thus making for cleaner work. Layer B was recognised, and several flakes, etc., were taken, also a cylindrical stone showing signs of rubbing.

Find 124 was obtained from D, 125 from F, and 126 from B.

Layer E of sand thins towards the north side, and towards the mouth ; layer D also thins out, both being pressed up by F.

They now dug 2 feet into G, but abandoned the pit temporarily, and cleared away the debris on the south-east side. Find 134 was discovered in the debris and 135 in layer B. Find 136 was also from the debris. Number 137 had evidently been trodden into the sand (E) from D.

At the back of the cave, B was found undisturbed again, and here again no *coups-de-poing* were found.

A pit 15 feet square was now dug through to layer G. In this a trial pit was dug, and this disclosed the presence of layer H. Several artefacts were found. This layer peters out towards the back of the cave. A third pit was opened up a few feet away from the second, leaving a wall 2 feet thick separating the two. The upper layer D is here 2 feet thick, and apparently Find 143 is from here.

The red sand decreases, then increases towards the Grotto. From F were obtained 144–146. The layer is some 3 feet thick. The coloured bands decrease in number towards the back of the Grotto, and creamy bands make up the layer.

Description of the Implements.

Earlier Stone Age.

In all the three lower occupational layers the *coup-de-poing* is present in large numbers; they are fairly evenly distributed, but in layers D and F there is a larger accumulation towards and in the Grotto than in the more open parts of the cave. In H it was impossible from the few artefacts found there to ascertain whether this was true here or not.

The material used throughout is Table Mountain sandstone. It is a quartzitic sandstone, coarse in texture, and of little use in small flakes. The cave is at the base of a 200-foot broken wall of this same Table Mountain sandstone, while the approach consists of a rising talus of sandstone boulders. The stream in the valley below is also full of the same material, and it is from here that it is presumed that the material was obtained. The artefacts may therefore be considered to have been made from local stone.

While the material throughout all these three Earlier Stone Age layers remains the same, the shape has a distinct tendency to vary. Two shapes of *coup-de-poing* are present, a regular almond-shape (Plate V) and a regular pear-shape (Plate IV). It would appear that an attempt was made to produce finished implements of the same size in both types. The size is roughly from 6 to 8 inches in length, about 1 to 1½ inches in depth, and from 3 to 4 inches across.

In both types the butt is worked to an edge, and is not smoothed in any way; this might point to the possibility of a haft or pad being used when in use, but nothing of the kind is known. Both implements end in a point, the pear shape is more acute in angle than the almond, and is somewhat similar to the European *ficron* type.

The great majority of these finds are not finished implements, though it is difficult to differentiate between finished implements and rejects. Some possible finished implements are, however, present, and it is safe to judge from these what the maker was aiming at, and what an accepted implement was like. These specimens it is perhaps safer to term "better specimens."

The greater number are, however, merely "roughed-out," and these, judging by the standard attained by the better specimens, must be regarded either as unfinished rejects or as unfinished implements, known as blanks. From a study of the implements the conclusion I have reached is that the method of manufacture was not the same, but varied with the size of the flake struck off from the original boulder. If the fragment dealt with was of sufficient size the process seems to have been to make an object similar in shape to the desired *coup-de-poing* but very much larger, the process being to reduce the size all round until it reached the desired proportions, but retaining the original shape.

Several of these large unwieldy blocks are present. A particularly large specimen measures 13 inches long, 4 inches deep, and 7 inches across. Two other specimens are roughly shaped by some six or seven heavy flakes from each side. These are almost identical in size and shape, some 10 inches long, 3 inches thick, and 8 inches across.

A certain number of better specimens were chosen from each layer. Layer H yielded no better specimens, only some three or four artefacts being found. From layer F came seventy-seven better specimens, of which fourteen were sufficiently advanced to be accepted (if they had been found alone) as finished implements. From layer D came eighty-nine better specimens, and of these some twenty-eight were acceptable as being well into the last stages. It is not likely, from the fact that they were found together with so many obviously unfinished artefacts, that these should be really finished, though some may be.

These better rejects show a desire for symmetry and an attempt to produce a delicate implement. The edge is straight in the better specimens, showing no "alternate flaking" on the edges, nor is there any screw effect attempted, so far as can be seen.

There is in some instances a secondary working along the edge, producing the step effect known as "resolved flaking."

The disposition of the two shapes is worthy of note. Layer H could not be judged, owing to the paucity of the deposit, though of the two *coups-de-poing* found both appear to be unfinished specimens of the pear type.

In layer F, of the seventy-seven better specimens, sixty-two are pear-shaped and fifteen are almond-shaped.

In layer D, of the eighty-nine better specimens, seventy are almond-shaped and fifteen are pear-shaped, the remaining four being almost round, or ovate.

This shows a decided tendency in the earlier stage towards the pear shape, and in the later towards the almond shape, in this particular instance only. No similar evidence is known from other sites.

Amongst the specimens are found others of a different shape (Plate VI). These consist of pieces of stone, a little larger than the *coup-de-poing* (though not always so), in some cases worked slightly round the butt end, but in most cases unworked except for a few large shaping-flakes which have been struck off. The real character of these is uncertain, and therefore it is best to leave it for the present unnamed. It is possible that they are merely a stage in the manufacture of the *coup-de-poing*. Specimens of this type have been found elsewhere, and were regarded by the late Dr. Péringuey and others as implements.* None show use, nor do any appear to have had any secondary working.

There were forty-eight present in layer D, and twenty-five in layer F.

A final type is of interest; it may be termed for the present a polyhedral. This consists (Plate VII) of a piece of stone, usually some 4 inches in diameter and 2 inches in depth. The shape is generally that of a fairly regular polygon, the sides of which are formed by striking flakes off along the edge alternately, the flakes usually leaving a small platform about half an inch to an inch across in the centre of each side. The edge that results is highly irregular, and the result is an ugly ill-finished artefact, bounded by the irregular edge, which of course follows the line whence the alternate flakes were struck.

These are distributed evenly among the layers; H yielded one, F yielded thirty-two, and D sixty-eight. Twenty-two were found in the debris X. These also are of Table Mountain sandstone. It is a puzzle to discover what they were. Other similar specimens are mentioned from Spain, and elsewhere in South Africa. They are not *coups-de-poing*, and could not be shaped into them; they are not cores for small implements, as none were found, nor would they be of much use in this material; nor are they Levallois flake cores, as none have been found with the final flake removed, and such a flake struck from a core of this type would be of little use.

In Europe they have been termed fabricators, but this also must be rejected, as none of the specimens show signs of having been used, the edges being quite clear-cut and unweathered.

On the other hand, hammer stones have been found. These are round river pebbles, the rounded edges, points, etc., of which have been

* Péringuey, *loc. cit.*, pp. 25, 26, pl. viii, fig. 57; pl. x, fig. 66, etc.

pitted by the action of detaching flakes. About a dozen are present from each of the layers D and F. They are about 4 inches in diameter, and of similar stone to that used in making the artefacts.

The accumulation of two layers of sand, G and E, each some 3 feet deep, and an upper layer C, of some 18 inches thick, besides the accumulation of organic matter in the implementiferous layers, point definitely to a very long period of occupation by a people of a single culture, the typical implement of whom was the *coup-de-poing*. (See conclusions, stratification of cave deposits.)

The cave, however, still remains unexplained. We do not appear to be dealing with a workshop site, as there are no flakes present in any of the layers.

We do not seem to be dealing with a cache, as some specimens are obviously rejected for some defect in the stone.

A dwelling site is improbable, owing to the presence of both obvious rejects in large numbers and possibly finished implements. There are, however, evidences of fire; but, on the other hand, no animal bones were present, nor any other signs of habitation. The organic matter found in the occupational layers is phosphatic, and probably consists partly of bat guano.

We can, however, conclude that we are here in the presence of a long series of occupations by a people of *coup-de-poing* culture. The *coup-de-poing* found here, being of the same type as that found in the Belgian Congo, Tunis, and Spain, may be regarded as having a common origin with the Chellean or Acheulean of Western Europe.

Later Stone Age Deposit.

(Text-fig. 2.)

Layer B, the latest of the deposits, must be regarded as a workshop site. The type of implement aimed at is similar to that found in large quantities at Smithfield and Cradock, and also at the Cape Peninsula. These may be regarded as of the Later South African Stone Age.

The typical implement of this industry is an end scraper, which is described from its shape as a "duckbill." It consists of a flake, trimmed by two or three long flakes before being struck off the core. This gives a neat fluted effect to the back. The edge opposite the bulb of percussion is then worked to give a chisel-edge. The angle of this edge may be anything up to a right angle (fig. 2, No. 2).

The debris and layer B are regarded as separate for the sake of accuracy.

Debris.—Three duckbills are present; they are some 2 inches long,

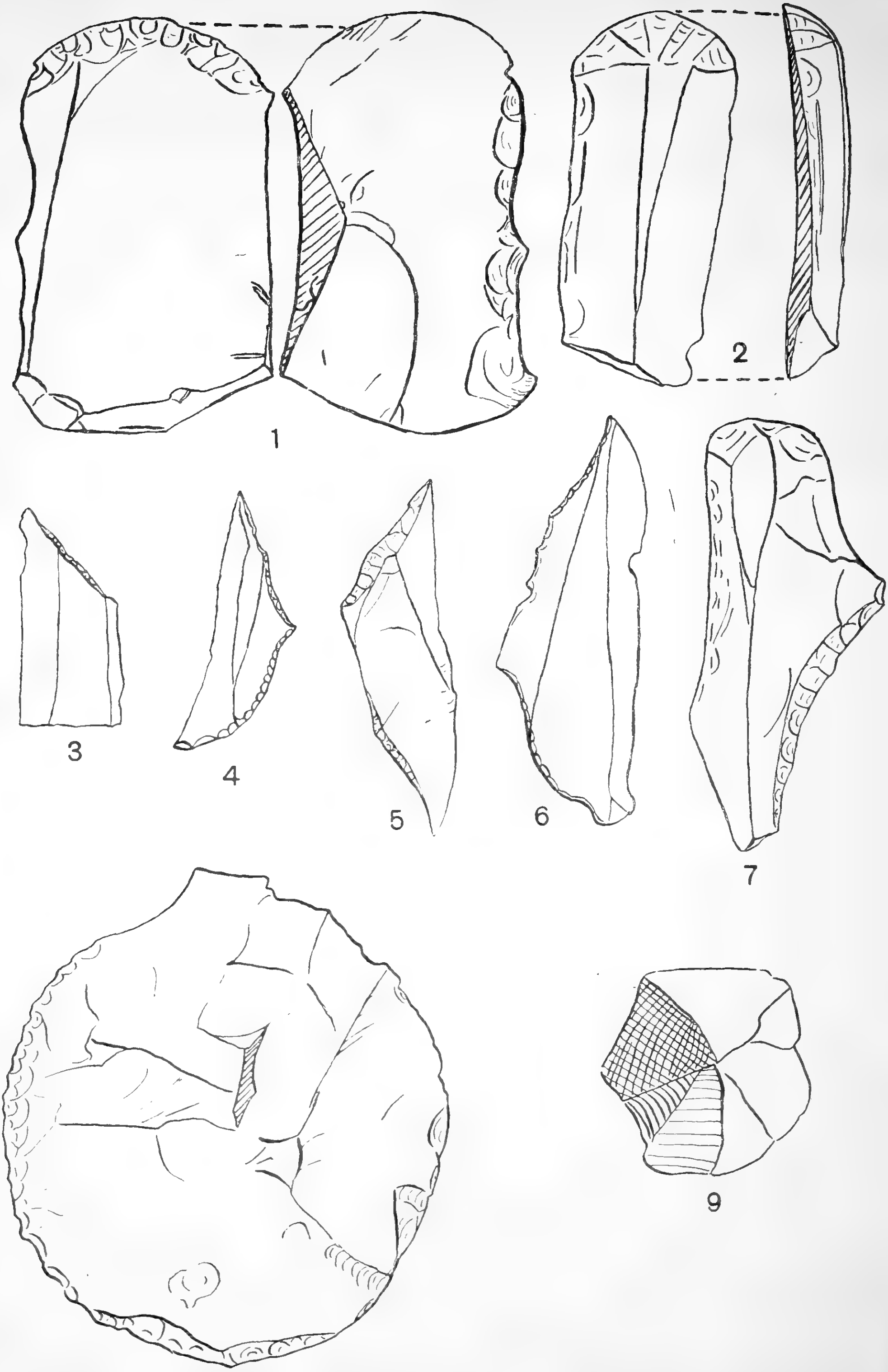


Fig. 2.—Drawings, natural size, of implements of the Later Stone Age. Nos. 1, 3, 5, and 6 from the debris; Nos. 2, 4, 7, 8, and 9 from layer B.

and vary from $\frac{1}{2}$ inch to 1 inch in width. These (as are all the implements in both deposits) are of a chert. This is not strictly a local stone, and has been brought here by the workers, but from what distance is not yet ascertained.

Four points are also present, two broken and two whole. Three of these are worked along the edge only, on the face opposite the bulb of percussion; the fourth appears to be unworked.

Two or possibly three light points are also present; they are on thin flakes, and have a worked point on either one end or on both. A small double-concave scraper was found, and also two ill-formed crescents of a rough Pygmy shape and size.

Layer B—Undisturbed in this layer are several Pygmy cores (fig. 2, No. 9) all without signs of secondary working. A small Pygmy-like crescent is also present. One duckbill which has been under the influence of fire was found, as also a slightly concave scraper, and a large circular scraper, some 2 inches across (fig. 2, No. 8).

There are some other objects present; these are not of the same material as the other. A rough cylinder of stone, some $3\frac{1}{2}$ inches long and $1\frac{1}{4}$ inches in diameter, is of a hard plum-coloured sandstone. It appears to have been used as a "cold chisel" for removing flakes. Of the same material are a small nodule (? chisel) about 2 inches long and $\frac{1}{2}$ inch in diameter, and also a lower grindstone.

A block of softer light-red sandstone has been used for sharpening arrows, awls, etc. Two faces are deeply cut by the action of sharpening.

Conclusions.

Layer B and the implements thrown up by earlier excavators in the debris would appear to represent the same culture. It is a typical workshop site of the most usual South African phase of the Later Stone Age.

It is considerably later than D, F, and H, and extends to fairly modern times. It may be regarded as associable with the paintings at the cave mouth.

I wish to thank the Director of the South African Museum for the opportunity of examining the material excavated, the field notes, and Dr. Barnard's Report on the excavations; and Dr. Haughton for his help in the geological statements. The particulars here given of the cave itself, the course of the excavations, the stratification of the deposits, and the positions in which the artefacts were found, are all derived from Dr. Barnard's report.

EXPLANATION OF PLATES.

PLATE

I. Fig. 1. View of interior of the Montagu Cave from the eastern corner.
2. Close-up of section within the dotted line.

II. Section of cave from front (east) to back (west).

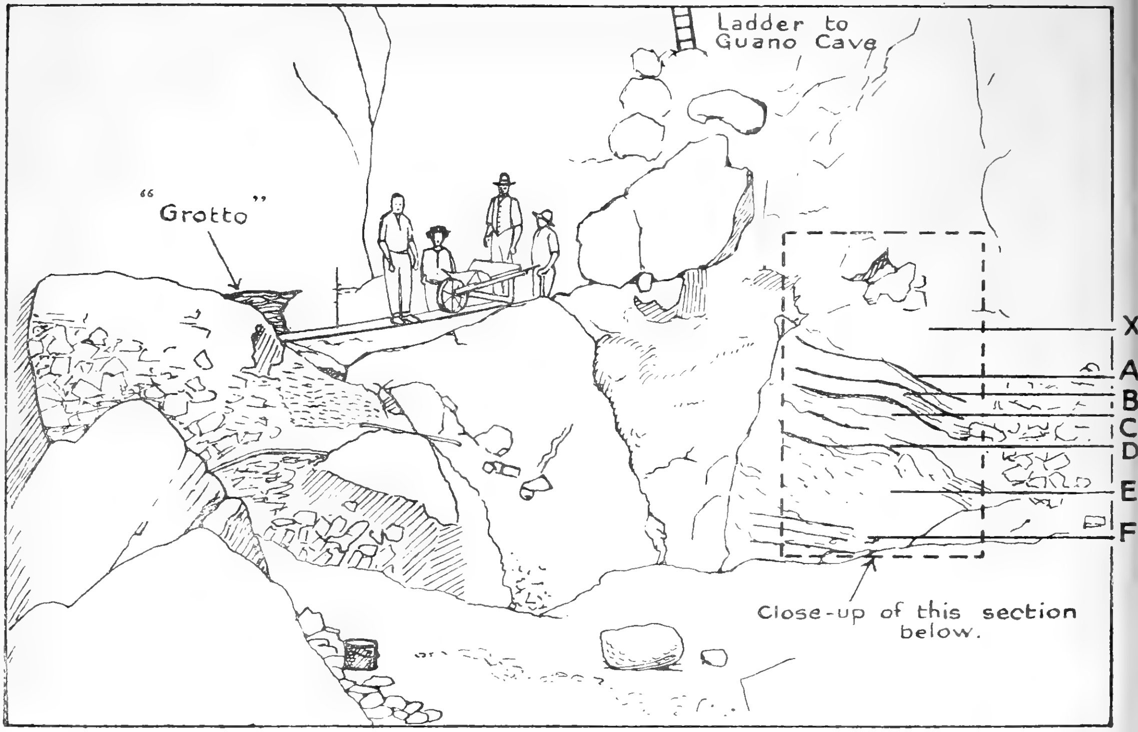
III. Section of cave from north side to south side.

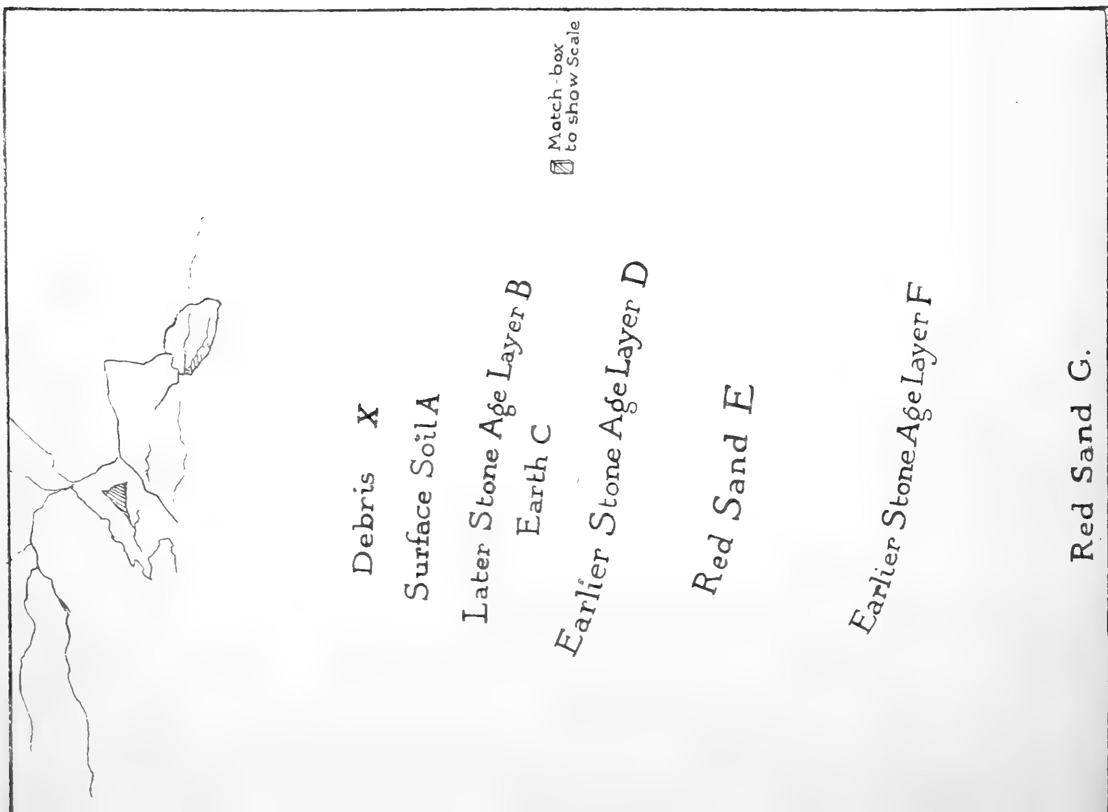
IV. Front and side views of a pear-shaped *coup-de-poing*. (The scale applies only to the left-hand figure.)

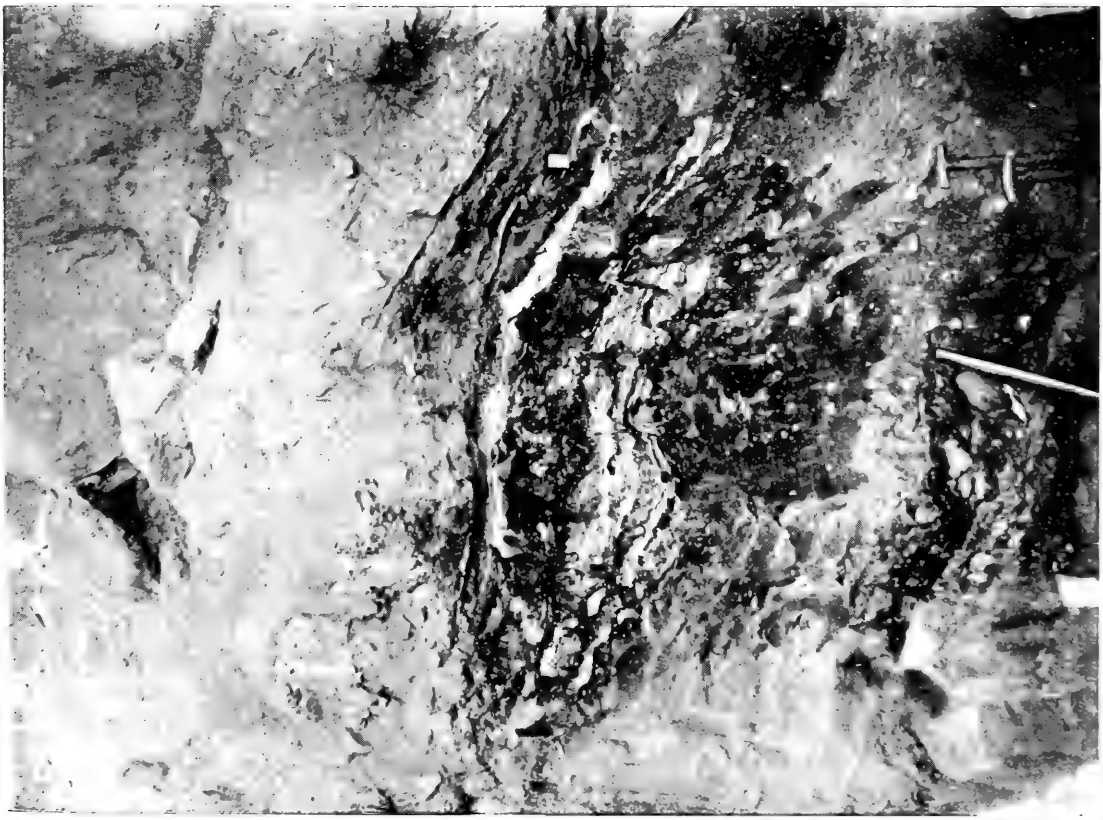
V. Front and side views of an almond-shaped *coup-de-poing*. (The scale applies only to the left-hand figure.)

VI. Implement with rounded butt and chisel edge.

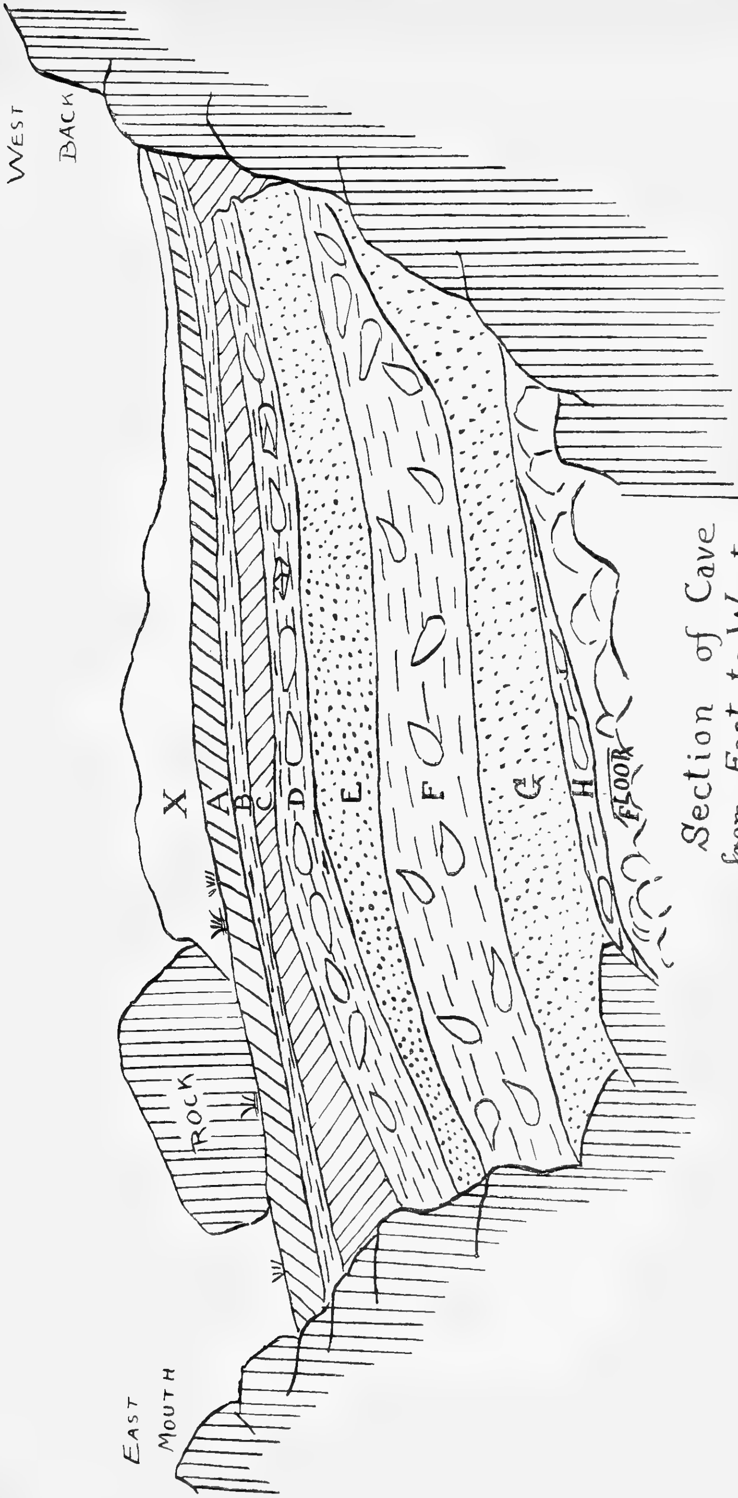
VII. Polyhedral type of implement.


Ladder to Guano Cave
"Grotto"
X
A
B
C
D
E
F
Close-up of this section below.


Match-box to show Scale
Debris X
Surface Soil A
Later Stone Age Layer B
Earth C
Earlier Stone Age Layer D
Red Sand E
Earlier Stone Age Layer F
Red Sand G.



Photos, K. H. Barnard.



Section of Cave from East to West.

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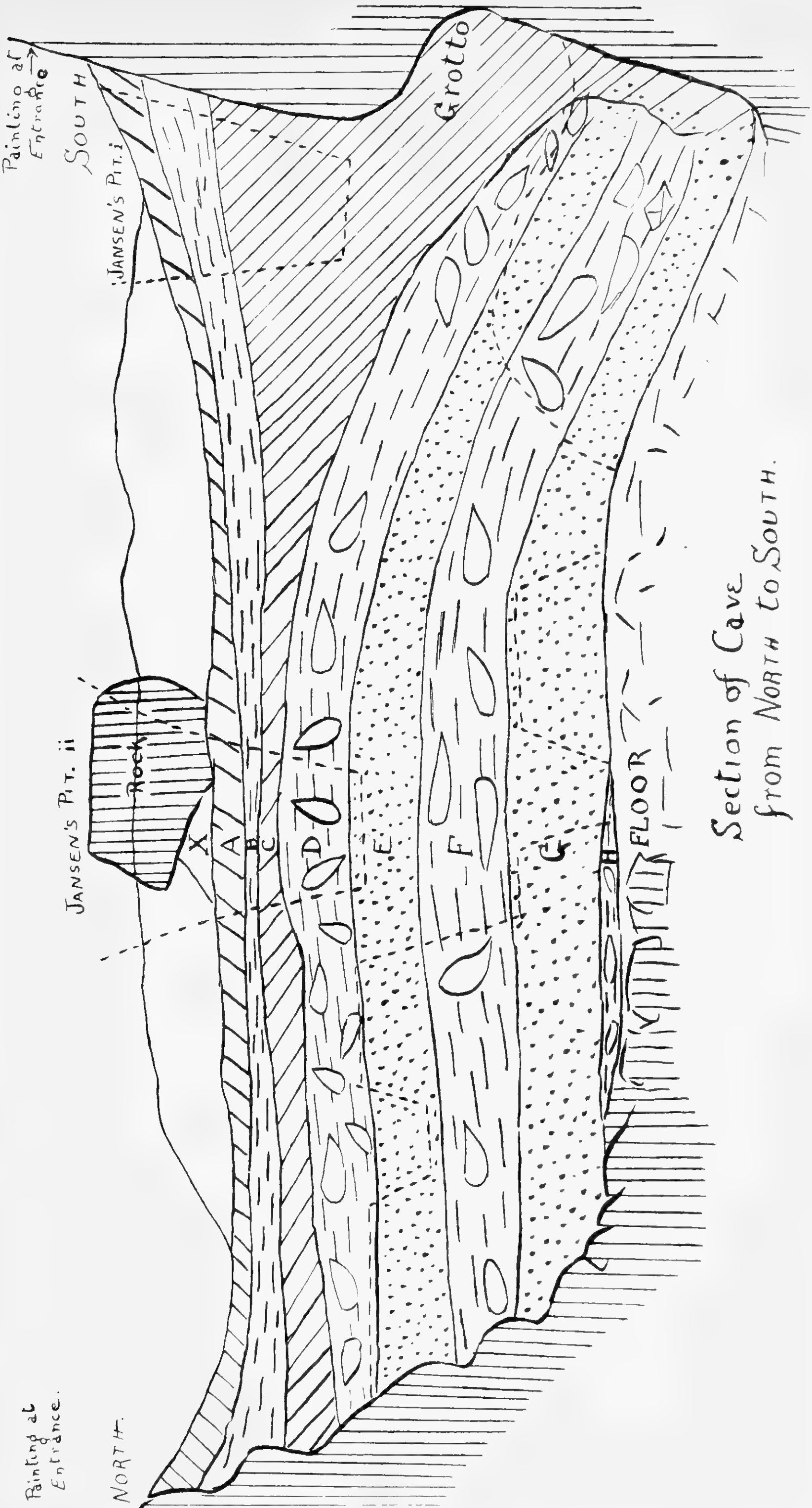
Painting at Entrance →
SOUTH
JANSEN'S PIT. i
Grotto
JANSEN'S PIT. ii
Rock
X
A
B
C
D
E
F
G
H
FLOOR
Painting at Entrance.
NORTH
Section of Cave from NORTH to SOUTH.

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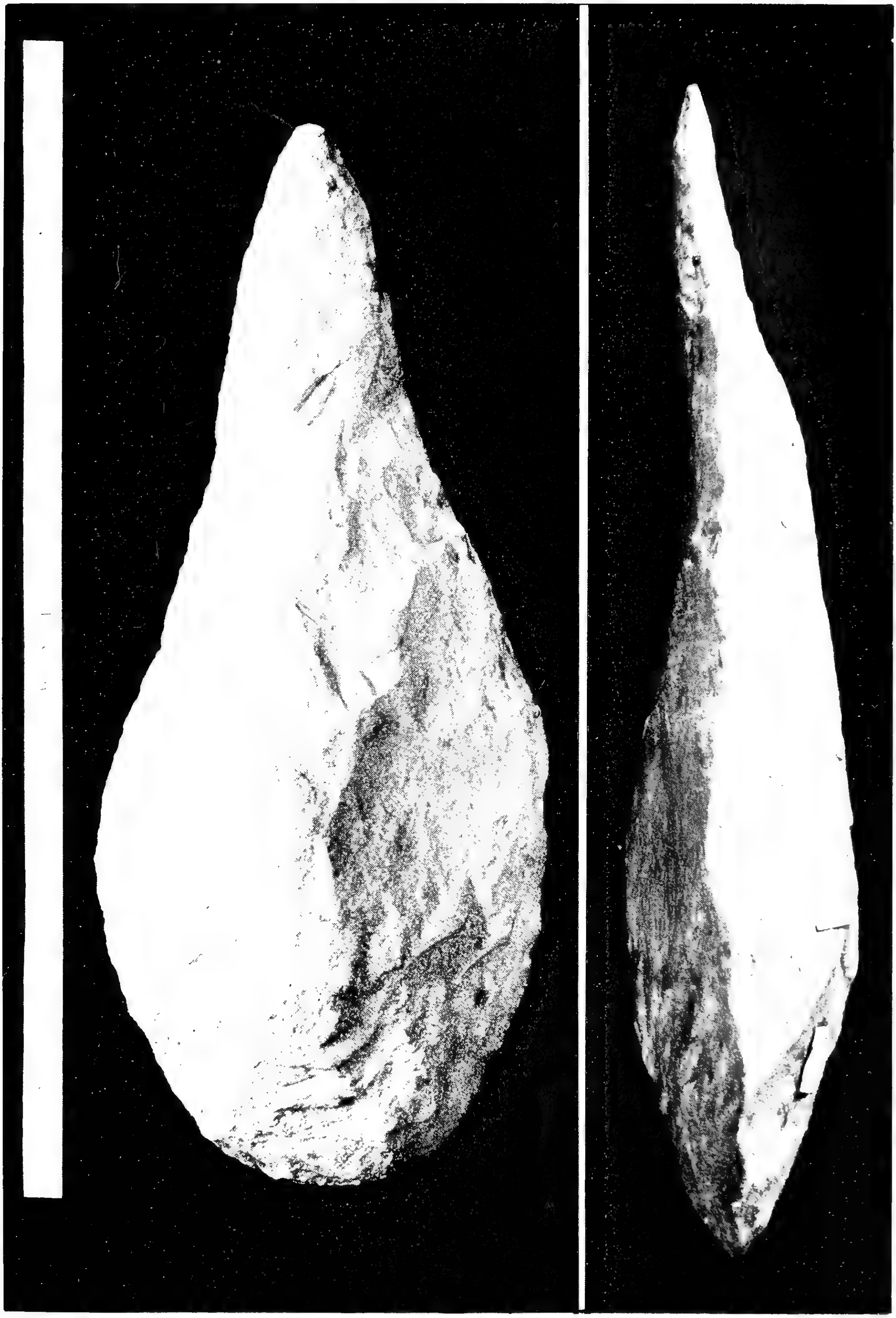

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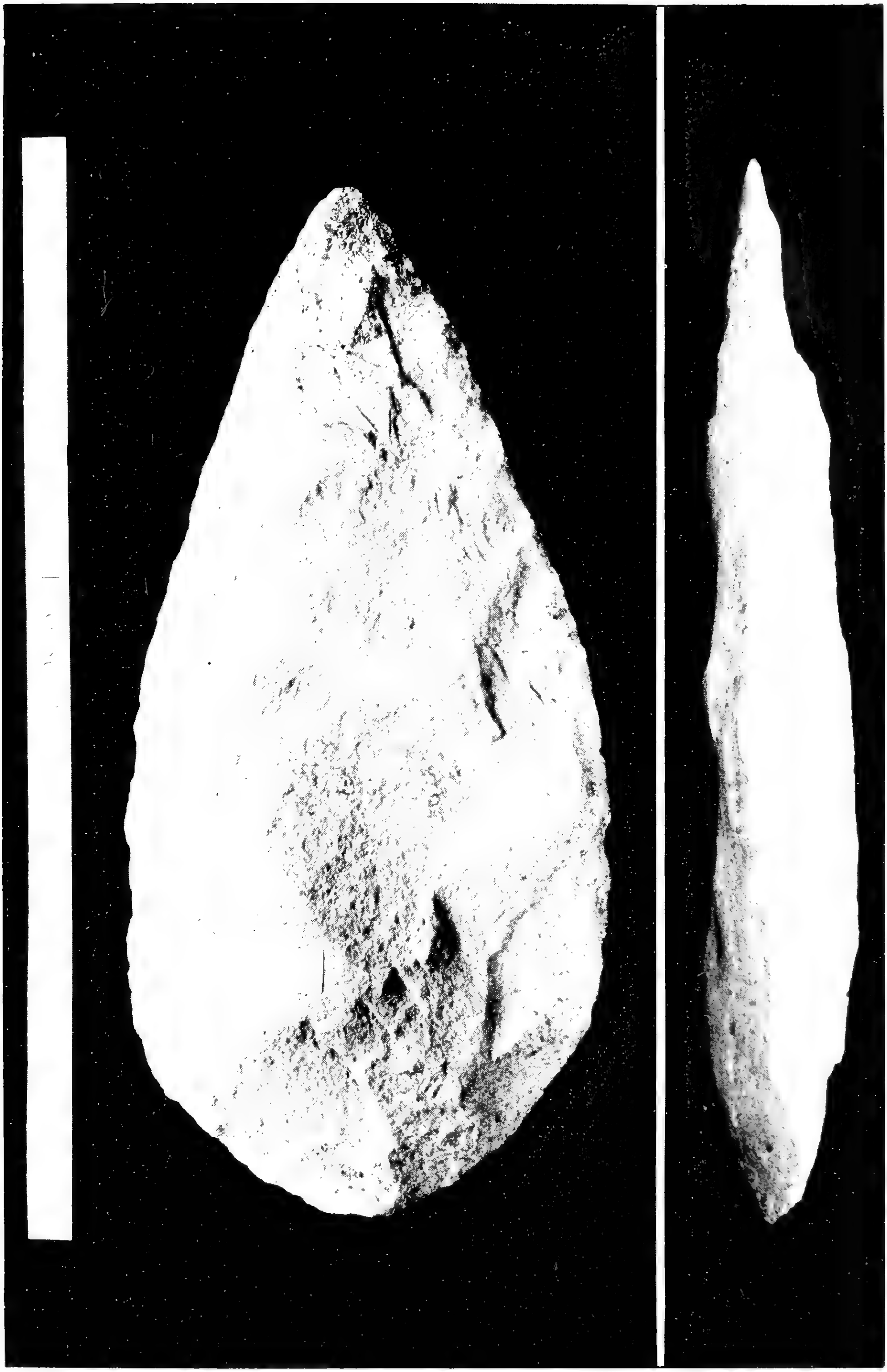

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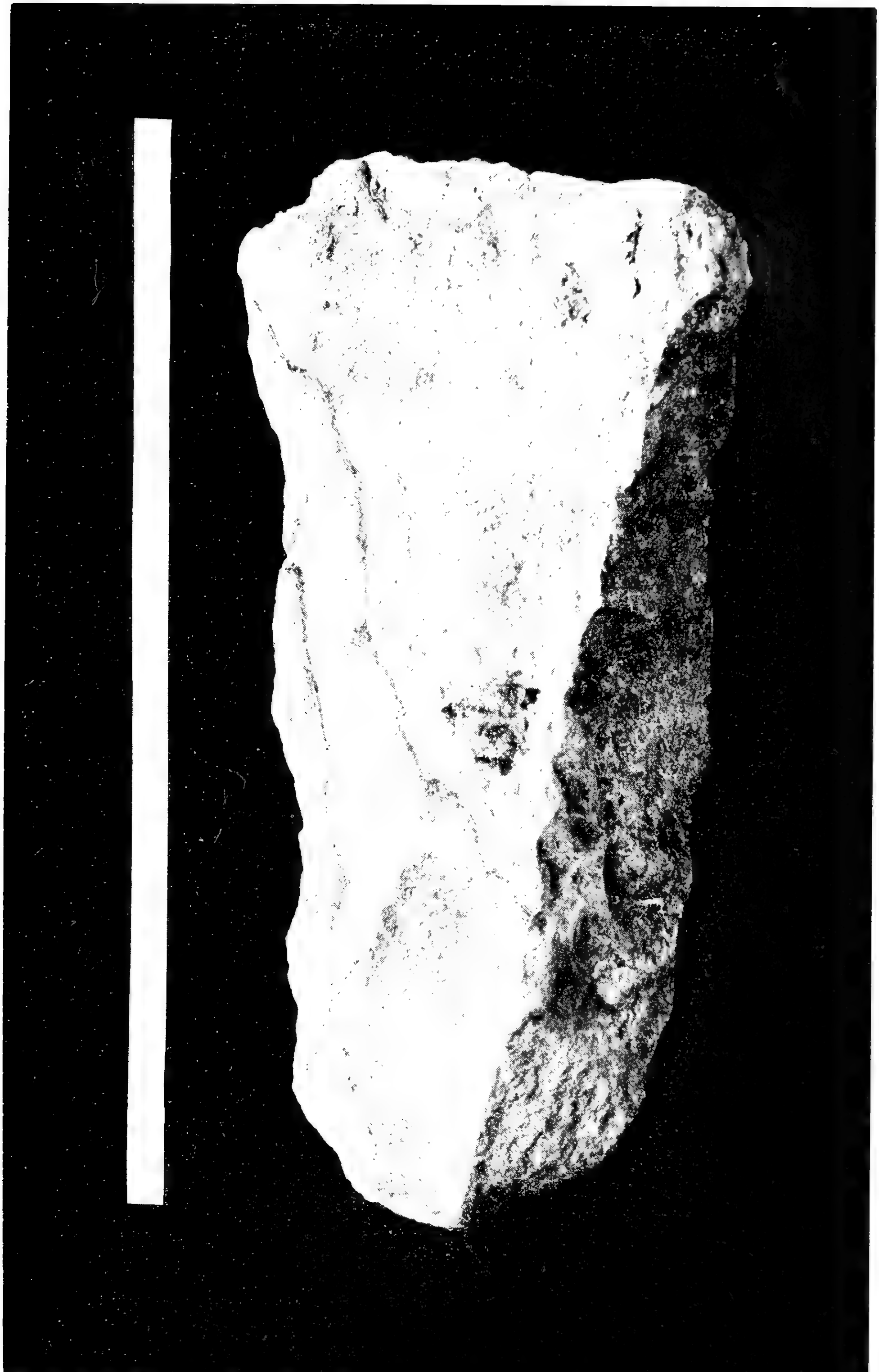

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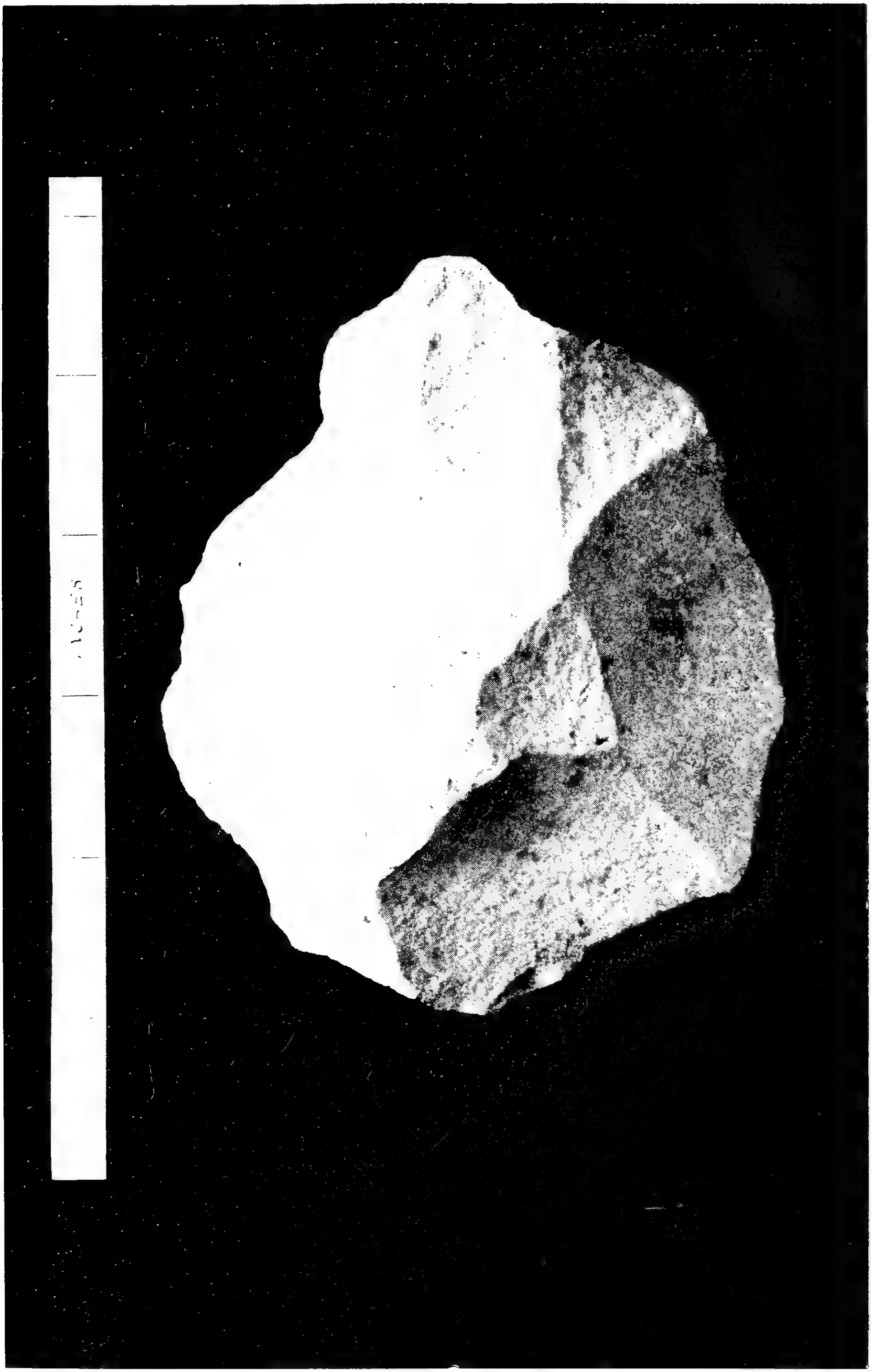

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2. *A Comparison between the Capsian and South African Stone Cultures.* —By A. J. H. Goodwin, B.A. (Cantab.), Research Assistant in Ethnology, University of Cape Town.

(With sixteen Text-figures.)

This paper is primarily a detailed comparison between the Capsian industry of North Africa as represented by a collection presented to the South African Museum by M. Paul Pallary of Algeria, and the South African stone industries as represented by material from various sources in the Museum collection.

The necessity for such a comparison is evident. Owing to the geographical form of Africa, it would be impossible for any culture to enter Africa overland, unless it passed over one of the great land-bridges existing across the Mediterranean and perhaps across the present Straits of Gibraltar. On the other hand, it would be impossible for a large influx of culture from the Eur.-Asiatic mainland to have thus entered without leaving distinct traces of that immigration in North Africa.

It would appear necessary in the first place to give an epitome of our knowledge of the archaeology of both the areas to be compared. It is already an accepted fact that the Lower Palaeolithic, Chellean, and Acheulean phases of European culture are present in Africa ; though whether both phases or only one appear is difficult to decide. Examples of South African parallels of this industry are given in the preceding paper on the Montagu Cave.

The Aurignacian industry proper is confined to an area in Europe which includes central and southern France and the southern coast of the Bay of Biscay ; but in Africa the Aurignacian is known as the Capsian culture, from Gafsa in Tunis ; it had a separate development of its own, lasting on through the Solutrean and Magdalenian stages in Europe, and forming, with these latter, the Azillean and Tardenoisian of France.

Here we come across a difficulty : M. Pallary appears from his book * to speak of the Getulian as the Early Capsian period, and of the Ibero-

* Paul Pallary, Instructions pour les recherches préhistoriques, Alger., 1909.

Mauretanian as the late Capsian period. On the other hand, Obermaier, in his book,* appears to have a different use for the terms. He divides the Capsian thus:

(*a*) Early Capsian, corresponding to European Aurignacian.

(*b*) Late Capsian, representing an evolution independent of the Solutrean and Magdalenian of Europe, but synchronous with these. It is subdivided thus:

1. Getulian of Eastern Algeria and South Tunis.
2. Ibero-Mauretanian of Western Algeria.

This places us in a difficult position, but in this paper it has been thought best to confine the terms used to M. Pallary's meaning, as he himself marked the implements in the collection he sent.

While the Aurignacian is represented in two distinct cultures, one in Africa and one in Europe, the Solutrean industry is more confined, and extends only through Southern France and North-West Spain, with various stations across Central Europe,† and must, therefore, be disregarded in searching for comparisons with the South African Stone industries.

In South Africa we are in the presence of two Stone Ages, but these are not to be confounded with the Palaeolithic and Neolithic of Europe, and for this reason the terms Later Stone Age and Earlier Stone Age have been chosen. The Earlier Stone Age consists of a *coup-de-poing* industry, which is probably an offshoot of the Chellean of Europe, but not contemporary with it, and not necessarily disseminated by the same people.

The Later Stone Age consists of three industries:

1. The Eastern culture, confined to Swaziland and the Eastern portion of the Union, and reaching as far West as Britstown and Victoria West. The typical implements are a point worked over both faces, and a large crescentic implement, some 4 inches long and 1½ inches in depth. The "axe-edge," as the writer has termed the second implement from its shape, is without parallel, so far as he has been able to discover.

2. An end-scraper industry, spread all over central South Africa, with exceptionally good centres at Smithfield and Cradock, and elsewhere in the Free State and Cape.

3. A Pygmy or microlithic industry, occurring in the Free State and in the Cape. It appears to be pure, except at the Cape Peninsula,

* Obermaier, Fossil Man in Spain, p. 114, Yale. 1924.

† Jacques de Morgan, L'humanité Préhistorique, L'évolution de l'humanité Series, p. 300, 1921. [Translated, 1924, "Prehistoric Man."]

where it seems to have acquired the so-called "Solutrean" worked point from the Eastern culture.

It is with these two last cultures that this paper endeavours to deal, and it has been thought best to deal with them by detailed comparison.

The specimens presented by M. Pallary consist of Ibero-Mauretanian artefacts from La Mouillah, near Marniah; and Getulian artefacts from Ain Kermah, South Tunis.

General Considerations.

All the cultures with which we have to deal are flake-cultures. In fracturing stones for implements a flake of stone is struck off, and this bears at the point of concussion a slight conchoidal mound. This is known as the bulb of percussion. On the block from which the flake was detached is a corresponding hollow; this is known as the negative bulb of percussion. The parent block is known as the core. The Chellean industry is a core industry, and the core is shaped, by the removal of flakes, to a convenient shape. On the other hand, the industries under consideration are based upon flakes struck off the core and trimmed for use. Obviously in the manufacture of such flakes many are merely trimming flakes, which shape the block before the final flake is struck off. Again, many of the flakes are useless owing to an ill-directed blow, or a flaw in the stone; these are termed refuse, and are left at the site of manufacture, which is termed a workshop site. Many acceptable flakes are spoilt in the trimming; these also are found on workshop sites, and are termed rejects or wasters.

It is obvious that where a small flake is used a finer-grained stone is necessary than when the large core is used. Hence in Europe and North Africa flint or chert are used; and in South Africa, where there is no true flint, chert or indurated shale are used.

Secondary working consists of a number of fine flakes struck or pressed off the implement along the edge to form a saw-edge or a comfortable back. Trimming, a pressure technique, consists of regular flakings over the whole of one or both faces of the implement to give it the desired shape. This last is completely absent in the Capsian cultures, and in South Africa except at the Cape Peninsula, where the Eastern culture appears to have had an influence.

The obverse face of a flake is that showing the bulb of percussion, the reverse is that showing the exterior of the boulder, or the marks of previous flakes having been removed.

A Comparison between the Getulian Industry of North Africa and the Smithfield Industry of South Africa.

The name "Smithfield type" has been taken, as it is from here that the greatest number of specimens at present at this Museum have been obtained.

The most typical implement is an end-scraper (duckbill). These vary in size and shape from a small rectangular implement about an

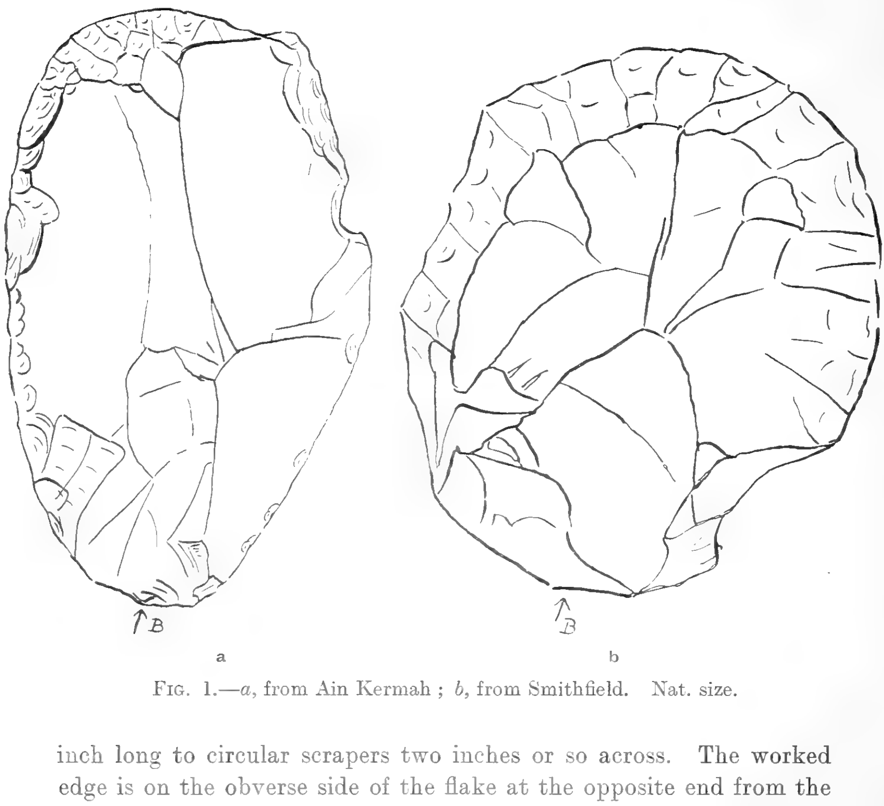

Fig. 1.—*a*, from Ain Kermah; *b*, from Smithfield. Nat. size.

inch long to circular scrapers two inches or so across. The worked edge is on the obverse side of the flake at the opposite end from the bulb of percussion. Some few freaks are found, as for instance the specimen depicted in the preceding paper, in which the bulb of percussion is at the side of the implement.

Fig. 1 shows a scraper from Ain Kermah of the Getulian industry, compared with a similar implement from Smithfield (O.F.S.). The front end of the implement is worked to an edge, and the sides of the implement are also shaped for hafting or for easier handling. This implement is typical of all South African sites of this culture. Fig. 2 gives a similar comparison from the same sites.

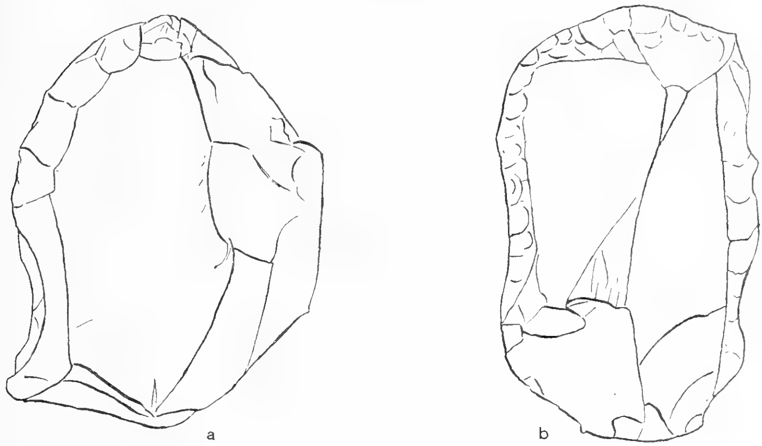

FIG. 2.—*a*, from Ain Kermah; *b*, from Smithfield. Nat. size.

Of the implements depicted in fig. 3, Nos. *a* and *d* are from Ain Kermah, *b* from Bloemfontein, *c* and *f* from Cradock, and *e* and *g* from

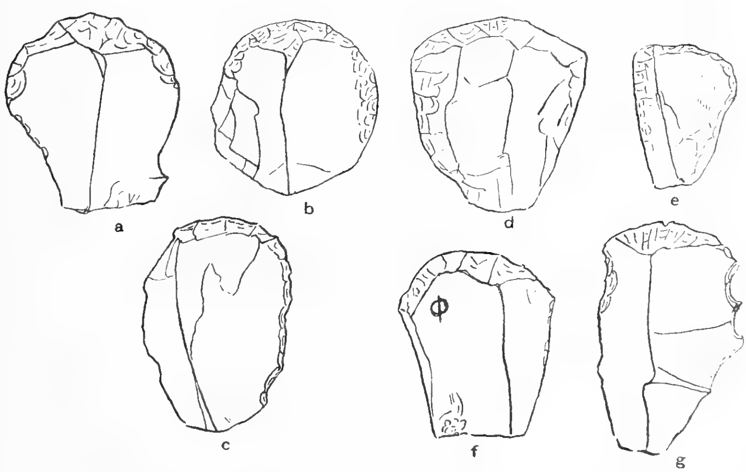

FIG. 3.—*a*, *d*, from Ain Kermah; *b*, from Bloemfontein; *c*, *f*, from Cradock; *e*, *g*, from Smithfield. One-half nat. size.

Smithfield. These are of the same type, but they tend to be of a better and cleaner shape than the Getulian examples. The sides are only shaped in a few instances.

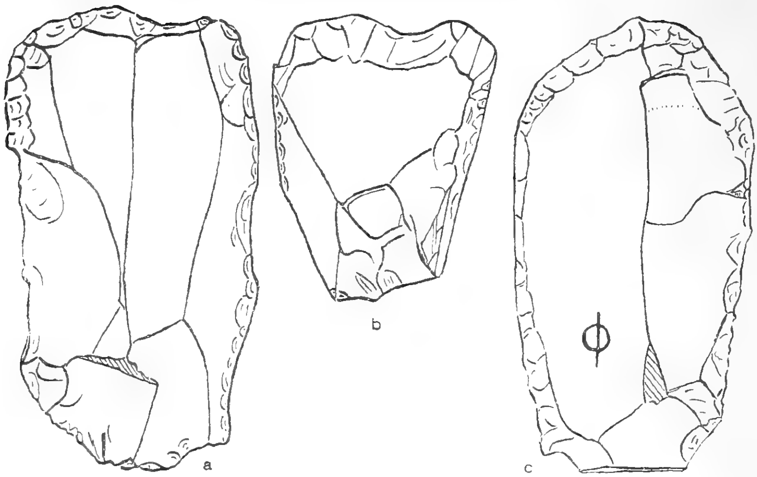

FIG. 4.—*a*, from Ain Kermah ; *b*, *c*, from Cradock. Nat. size.

Fig. 4 compares implements from Ain Kermah (*a*) and Cradock (*b* and *c*). Nos. *a* and *b* have a slight concavity on the worked edge, possibly accidental, though sometimes made purposely in the South African examples.*

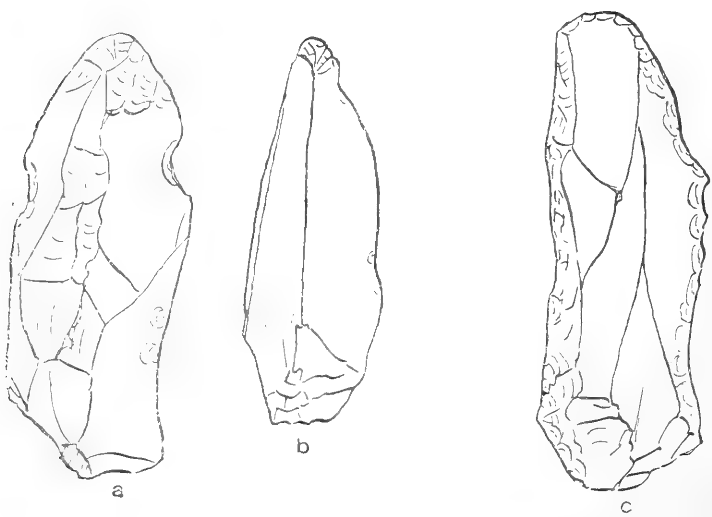

FIG. 5.—*a*, from Ain Kermah ; *b*, from Cradock ; *c*, from Smithfield. Nat. size.

* Note.—Figs. 3 *f* and 4 *c* are reproduced in Péringuey, "The Stone Ages of South Africa," Ann. S. Afr. Mus., vol. viii, 1911, p. 128, fig. 8, pl. xvi, and p. 123, fig. 5, pl. xvi, respectively. Other examples are also given.

Fig. 5 gives the same type of implement, but tending towards a point at the working end. Fig. *b* from Cradock is an obvious reject, but is worked at the point of the flake to form an edge.

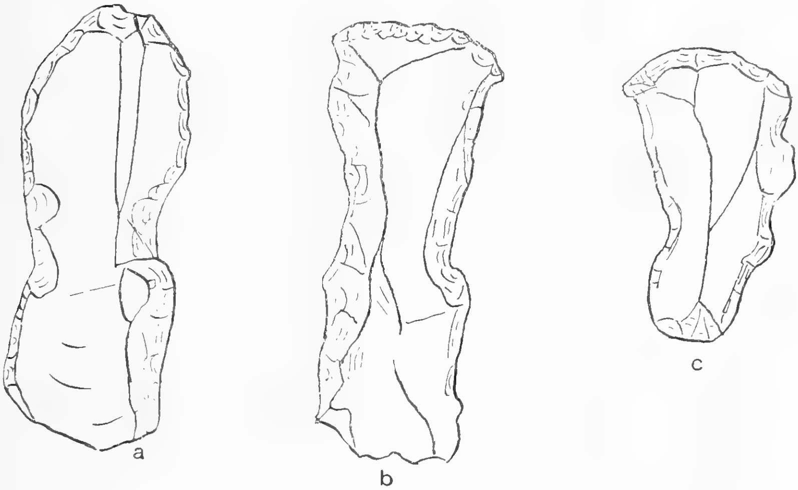

Fig. 6.—*a*, from Ain Kermah ; *b*, from Cradock ; *c*, from Douglas. Nat. size.

Fig. 6 shows a similar end-scraper, the sides of which are uneven, but worked the whole way down. None of the irregularities can be regarded as a concave scraper.

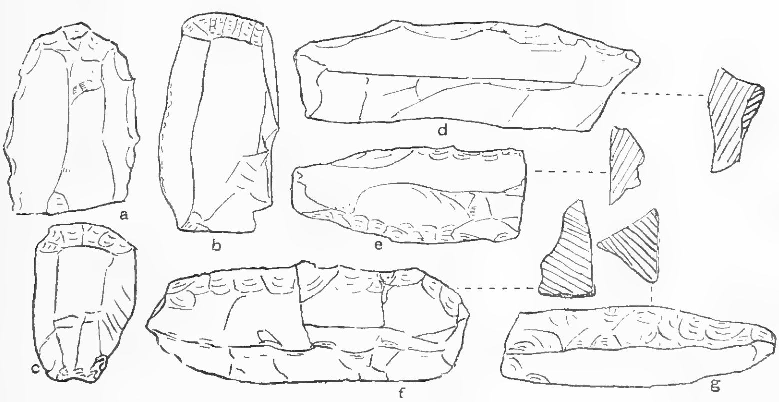

Fig. 7.—*a*, *d*, *f*, from Ain Kermah ; *b*, *c*, from Smithfield ; *e*, from Hanover (Cape) ; *g*, from Beaufort West. One-half nat. size.

Fig. 7 (*a*, *b*, and *c*) shows the same type of end-scraper, but in these cases they are not shaped to any extent. In the same fig. Nos. *d*, *e*, *f*, and *g* are thick side-scrapers, tending to be triangular in section. This implement is also on a flake, and is comparable with those shown in fig. 5 above. The flake is formed on the core before removal by the detachment of some two or three previous flakes. Nos. *d* and *f* are from Ain Kermah, while *e* is from Hanover (Cape) and *g* from Beaufort West.

In fig. 8 we come to what is generally termed a point, but is more likely to have been used as a pointed scraper. This type is not at all

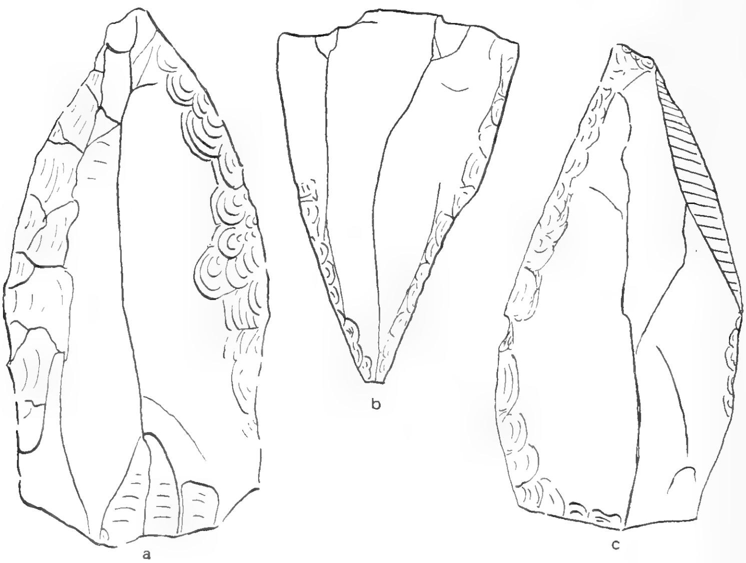

FIG. 8.—*a*, from Ain Kermah ; *b*, from the Cape Peninsula ; *c*, from East London. Nat. size.

common in South Africa ; several large pointed scrapers of this type come from Smithfield, but the two specimens chosen are from the Cape Peninsula and East London respectively (*b* and *c*) while *a* is from Ain Kermah. These are flakes worked on one face only along both edges, on the obverse side.

Fig. 9 depicts a peculiar scraper or perhaps a sort of borer. No. *b* is from Ain Kermah. It is on a flake and is worked precipitously on both edges on the obverse side, and is described by M. Pallary as a "Grattior." Specimens *a* and *c* are a little different. They are from Smithfield ; the first is apparently a borer used in the manufacture of the "Bushman" stone rings. It is also on a flake. No. *c*, on the other hand, is not made on a flake, but appears to consist of a long core-implement, quadrilateral in section, and worked on two diagonally opposite edges. Many similar implements come from Smithfield and other sites, but no others have the butt which appears in the Ain Kermah specimen.

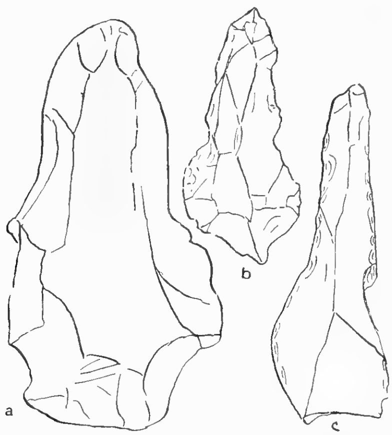

FIG. 9.—*a*, *c*, from Smithfield ; *b*, from Ain Kermah. One-half nat. size.

It is worth noting here that in similar precipitously worked implements from South Africa the technique is the same as in the Getulian industry.

It is much more difficult to discover the " Burin " blow in South Africa. It seems to appear in the Pygmy industry (see fig. 14 below), and is shown in Obermaier (*op. cit.*, p. 204).

Fig. 10 gives examples. No. *a* is from Ain Kermah, while *b*, *c*, and *d* are from Zwartkops (South-West Africa), Pomona (South-West Africa), and Grantberg (South-West Africa) respectively. Neville Jones, in his article in the Journ. Roy. Anthr. Soc., vol. liv, December 1924, states that he has found the " Burin " blow (in this same industry) at Sawmills, Rhodesia. But on looking up implements from a similar site close by (Sipopoma), the writer fails to find it. It was then found necessary to look further afield, and the doubtful specimens shown were discovered. The industry of South-West Africa seems to be a very deteriorated form of the Smithfield industry, if indeed it may be regarded as belonging to this industry at all. In *c* and *d* it will be seen that the burin blow is struck off from the same end as the bulb of percussion, thus casting a doubt on its validity, though even this is possible, as one of the examples from Ain Kermah shows the same peculiarity.

Example *d* has been retouched from the more usual end, but here again the specimen is too wind-worn to make it possible to identify

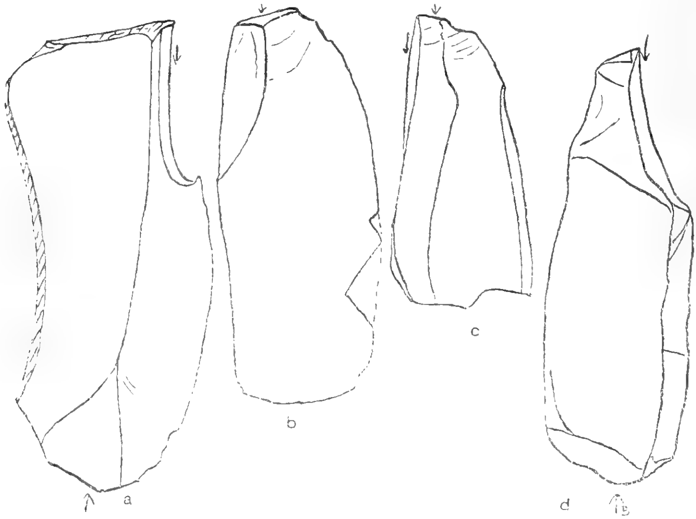

FIG. 10.—*a*, from Ain Kermah ; *b*, from Zwartkops ; *c*, from Pomona ; *d*, from Grantberg. Nat. size.

the working across the top edge. It would be perhaps safer to reject the occurrence of the burin blow in South Africa, at least for the present.

A Comparison between the Ibero-Mauretanian Branch of the Capsian Industry and the Microlithic or Pygmy Industry of South Africa.

It has so far been difficult to compare the South and North African Industries owing to lack of data. But the discovery of M. Pallary's interesting presentation opens up the field considerably, as little literature on the subject has hitherto been available in South Africa.

Fig. 11 shows small " planing tools " from North and South Africa. Nos. *a* and *b* are from the Cape Peninsula, and Nos. *c* and *d* from La Mouillah. Both the Ibero-Mauretanian and the South African examples consist of a flake, struck off the core, and worked to a roughly circular shape. A small platform is usually left in the centre on the obverse side. The implement is very similar to the Azilian tools depicted in Obermaier (*loc. cit.*, p. 346). A similar implement is depicted in Dr. Péringuey's paper (S. A. Mus. Annals, Vol. VIII), from Queenstown.

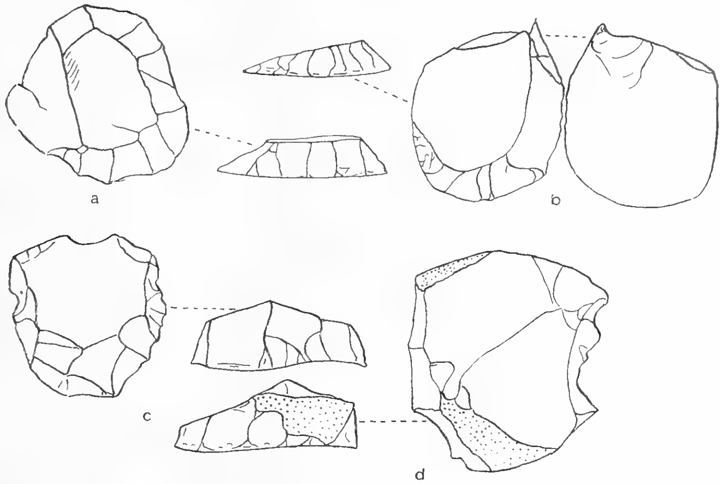

FIG. 11.—*a*, *b*, from the Cape Peninsula ; *c*, *d*, from La Mouillah. Nat. size.

Fig. 12 shows a number of " crescents." Nos. *a* and *b* are from the Cape Peninsula, No. *c* is from Smithfield Poort (O.F.S.), while Nos. *d*, *e*, and *f* are Ibero-Mauretanian from La Mouillah. Here again the

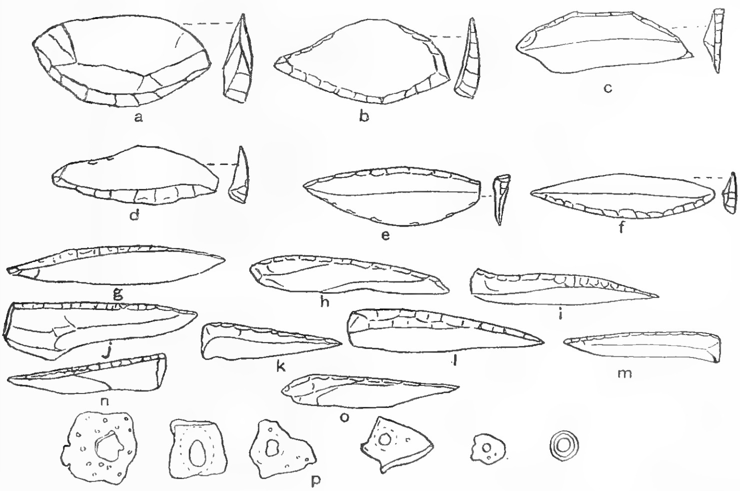

FIG. 12.—*a*, *b*, *j*, *k*, *m*, *n*, from Cape ; *c*, from Smithfield Poort ; *d*, *e*, *f*, *g*, *h*, *i*, *l*, from La Mouillah ; *o*, from Caledon ; *p*, ostrich egg-shell beads from Caledon. Nat. size.

similarity is extraordinary, the Cape specimens tending to be a little rounder than the North African. Nos. *g*, *h*, *i*, and *l* are from La Mouillah, and are not so symmetrical, tending more to the long borer type of implement. Nos. *j*, *k*, *m*, and *n* are parallels from the Cape Peninsula, and *o* is from Caledon. These are more definitely of the borer type, and the egg-shell beads in *p* are made with this type of implement. The series is from Caledon. These are apparently Pygmy parallels to the Châtelperran knife and La Gravette point of the Aurignacian of Europe.

Fig. 13 shows examples of microliths from the Cape Peninsula (Nos. *c*, *d*, and *f*) and from La Mouillah (Nos. *a*, *b*, and *e*). The technique

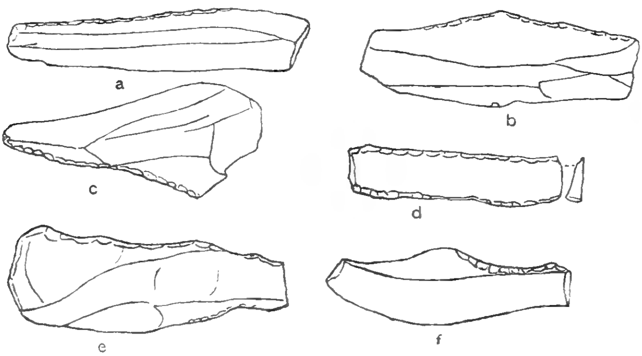

Fig. 13.—*a*, *b*, *e*, from La Mouillah ; *c*, *d*, *f*, from Cape Peninsula. Nat. size.

is the same throughout, consisting of small flakes never more than $\frac{1}{8}$ inch thick, worked to form a smooth edge or back along the deepest edge, again similar to the Aurignacian of Europe.

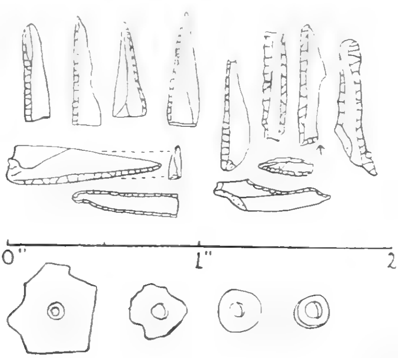

Fig. 14.—Pygmy implements, and ostrich egg-shell beads from the Cape Peninsula. Nat. size.

Fig. 14 is a series of Pygmy cherts from the Cape Peninsula. The shape is generally triangular, and the implement appears to be the borer used for perforating egg-shell beads. The accompanying beads are from the Cape Peninsula as well, and are of ostrich egg-shell. The delicacy of the maker is evident both from the extreme daintiness of the borer and the careful manufacture of the beads; these too are similar to the Gravette point.

Fig. 15 is a comparison between a peculiar scraper formed on a flake, the one edge being sometimes worked with resolved flaking.

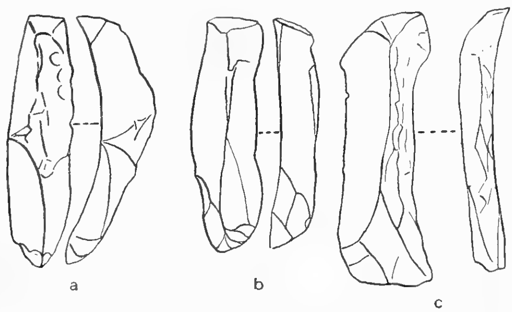

FIG. 15.—*a*, from La Mouillah; *b*, from Bloembosch; *c*, from the Cape Peninsula. Nat. size.

Whether it was used as it stands or not is a difficult question, but the extreme similarity between the La Mouillah specimen (*a*), the Bloembosch (Darling District) specimen (*b*), and the Cape specimen (*c*), is well worth noting.

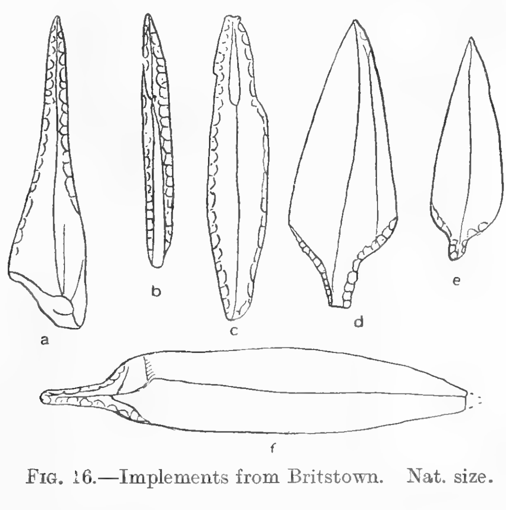

FIG. 16.—Implements from Britstown. Nat. size.

Mr. C. van Riet Lowe has in his possession a number of "notched flakes" similar to European Aurignacian specimens, definitely associated with the Smithfield industry, from various sites in the Orange Free State.

Fig. 16 brings us to an interesting collection of arrow-heads from Britstown. They are described as being found "in or near round stone enclosures," but nothing more is known of them. *a*, *b*, and *c* are borers, while *d*, *e*, *f* are tanged arrow-heads.

In the South African Industry a small end-scraper (known as a "duck-bill" from its shape) is also present. It is of the same type, but smaller than the specimens in the preceding paper found at Montagu. It appears to be a neater form of the Getulian end-scraper. How far this end-scraper has been found with the Ibero-Mauretanian industry the writer has been unable to discover; it is, however, present in its larger form, and in the Aurignacian of Europe.

The evidence in favour of the South African industry being an offshoot of the North African has here been set out without any other considerations, but these will be discussed, though not in detail, later.

This method of proof is unsatisfactory. It is necessary to see the implements and hold them, to look at the working, and compare the technique. The accompanying drawings are as accurate as possible, and in the examples taken the technique is similar in all examples grouped together.

The writer has attempted to prove a double case, that the Ibero-Mauretanian culture of Western Algeria is the same as the "Pygmy" industry of South Africa, and that the Getulian culture of Eastern Algeria and of Southern Tunis is the same as the Smithfield industry of Southern Africa. More precisely, the writer regards the South African industries (*i.e.* the Pygmy and Smithfield cultures) as being modern representatives of a form of Capsian culture which broke away from the North African group before the purely geometrical flints came into fashion.*

It will have been noticed in the preceding paper that the paintings at Montagu are associated with implements of the Smithfield type, and this is so in every case where paintings have been noted in the same cave as implements. Obermaier (*op. cit.*, p. 257) states that "The realistic paintings of Eastern and South-Eastern Spain came to

* A further link between these industries appears in Man, June 1925, vol. xxv, No. 6, p. 51, where Messrs. Dewey and Hobley announce the discovery of implements of the Smithfield and Pygmy types near Njoro, Kenya Colony.

an end no later . . . than the Magdalenian, and should be regarded as the regional equivalent of the realistic art of Northern Spain and Southern France. Their makers were people of Capsian culture." On the following page he remarks that "surprising similarities are found between these Capsian paintings and those in South Africa which are commonly ascribed to the Bushmen, and which certainly, for the most part, are very old." MacAlister remarks similarly.*

The question, however, still remains as to who were the artists of South Africa? The only definite answer is "A people with a Smithfield culture." The art has been attributed vaguely to the Bushmen, but no attempt has been made to define the term.

There are three possible explanations:

1. The present Bushmen are the same race that invented and disseminated the Capsian culture.

2. The original Bushmen obtained both the art and the culture from a Capsian source.

3. There is a racial element common to both the Capsian peoples and the Bushmen.

The first possibility is opposed to the fact that the modern Bushmen are a mixed race, the mixture varying in different parts of the country.

The second possibility might possibly be ruled out by the fact that the stone culture of South Africa is purely Capsian, and has no elements of pre-Capsian "Bushmen" culture, which would most certainly be retained.

The third possibility appears to the writer to be the only practical solution to the problem. But whether the Bush-Capsian people left North Africa as a mixed race, or whether they left as a pure race and became mixed further South, is a problem for the physical anthropologist.

CORRIGENDA AND ADDENDA.

These two papers on the Montagu Cave and the comparison between South African and Capsian cultures respectively, were written some three years ago, and were set up in print at that time. Owing to both the accumulation of material and the additional cost of printing brought about by the war, it has only been possible to publish them now.

During these three years a very considerable amount of work has been done on the subject of archaeology in this country, and as a

* MacAlister, Textbook of European Archaeology, Cambridge, 1921.

result some of the findings given in these two papers are of less value to-day, while certain fairly basic changes in nomenclature have had to be adopted.

I make no apology for the publication of these papers. The first stands with but little need for alteration. The elements described as of the " Earlier Stone Age " are to be regarded as of the Stellenbosch industry of that main period. The Later Stone Age cave-deposits are to be regarded as an atypical group representing a variety of the Wilton industry (then termed " Pygmy ").

Similarly in the second paper, the term Wilton should be substituted in every case for the word " Pygmy "; though the term Smithfield stands as in the text. As our conceptions of the inter-relations of the Capsian and Smithfield industries have altered very considerably, much of this part of the paper is of little use. It seems more feasible to regard the Wilton (" Pygmy ") as a fairly pure form of the Late Capsian industry, and the Smithfield as an early, localised, derived form, which apparently evolved convergently towards the Wilton.

The similarities existing between the Later Stone Age of the South and the Capsian industries of the North are still regarded as extreme, save for three elements:

(*a*) The apparent complete absence of the burin in the South African Later Stone Age industries.

(*b*) The complete absence of pottery in the Upper Capsian.

(*c*) The complete absence of the bored stone in the Upper Capsian.

On the other hand, the burin has now been definitely discovered by Mr. J. J. Hewitt in a cave in Howison's Poort, Grahamstown, among material showing strong Middle Stone Age affinities. In North Africa pottery of typical South African Later Stone Age facies and also bored stones have been found at a variety of non-Capsian sites.

The " Eastern Culture " has now had to be regarded as constituting a distinct " Middle Stone Age " with strong Mousterian affinities, and it has again been subdivided into a variety of industrial groups, the finest of which (the Still Bay) is apparently confined to the extreme southernmost littoral of the Cape.

A. J. H. Goodwin.

May 1928.

3. *The Osteology of a Bushman Tribe.* By D. Slome, B.A.

From the Anatomy Department of the University of Capetown.

(With Plates VIII–XI.)

The material which forms the subject of this work is a collection of fifty-three skulls, together with a number of skeletons, which were recently acquired by the South African Museum, Capetown, from a burial-ground near Colesberg in the Cape Province. I am greatly indebted to Dr. L. Gill, Director of the Museum, for his courtesy in permitting me to investigate these specimens.

Source of the Material.

The skeletons which have been studied were exhumed in November 1926, from graves situated near the town of Colesberg, by Mr. J. Drury, Modeller to the South African Museum, who is an experienced excavator. He has kindly supplied the following note in connection with this part of the work:

"These skeletons are the remains of what are supposed to have been Cape Bush people, who died during the smallpox epidemic of 1866. The graves were situated just below a small range of hills, and within about one hundred yards of the present Colesberg wash-houses, which are about a mile and a half from the village. The graves were arranged in irregular lines of one or two and sometimes three deep, and extended for about fifty yards. All the graves had a heap of stones on the top. Large heaps indicated adults, and small ones indicated children. All the bodies were buried in the extended position. In some cases two bodies were found in one grave, and in two cases there was no trace of bones in what had certainly been graves. In one grave (No. 29) there were traces of the remains of a wooden box or coffin.

"A few iron ornaments (bangles), glass beads, brass buckles, buttons, and pins were found in the graves, and there were traces of blankets and leather belts. In one grave a George IV shilling piece, dated 1826, was found.

"The depth of the graves ranged from two to four feet, but the majority were about two or three feet deep. The preservation of the skeletons was on the whole not too bad. In the majority, however, a dry rot had set in owing to the infiltration of plant roots, and these are tending to crumble away. The skeletons from these fifty-five graves seemed to belong to a somewhat mixed group of individuals. Many of them are good Bushman types, quite like the Kalahari Bushman and the Strandloper. A few are Bantu (Kaffir) in type, and there may be Hottentot types. It is possible that No. 29 had some European blood."

Part I.

The Crania.

A casual inspection of the general features of this group of skulls is sufficient to show that they do not all belong to one homogeneous racial group; nevertheless it is also clear that the majority of the skulls are very good representatives of the South African Bush race. Accordingly the skulls were separated into a relatively pure group of forty-five Bushman types, and a small group of eight alien, and for the most part Bantu types. The extraneous skulls, which were excluded from the main group, were numbers, 5, 20A, 21, 24, 28, 34, 37 and 45. Skull No. 29 has a somewhat long and narrow nasal aperture, but it presents very many characteristic Bushman features, so that it has been retained in the Bushman group. This subdivision of the skulls was substantiated by an examination of the remainder of the skeletons where such existed.

The skulls have not been classified according to sex, owing to the difficulty in doing this with any degree of certainty on cranial criteria alone. The male Bushman skull presents many of the infantile characters which one usually associates with the female sex. In those cases, however, where the other bones of the skeleton were present, it was relatively easy to determine the sex of the individual. This has, therefore, been indicated in dealing with the limb bones, and to this extent the results for these may be applied to the skulls if required.

A number of the skulls have suffered from posthumous deformation, so that only twenty-nine of the Bushman types were sufficiently free from distortion to permit of accurate measurements.

Two of the skulls of Bushman type must have belonged to sub-adults, so that they are omitted in determining the averages.

The greater part of this work has been devoted to a consideration of the characters of the Bushman representatives in the tribe, but the details of the measurements of all suitable skulls are given in the accompanying tables.

The Bushman Skulls.

The Cranium.

On the whole the crania present the type of curvature characteristic of the typical Bushman calvarium (1). The forehead is high and remarkably vertical. The supraorbital ridges are only slightly developed, and in some skulls are entirely absent. The vertex of the skull is flattened and depressed, and it passes back almost horizontally from the frontal region. The occiput protrudes in a characteristic manner. The contour of the norma verticalis is roughly ovoid. The frontal region is narrow, and the parietal eminences project prominently, especially in the female and sub-adult skulls.

In 40 per cent. of these skulls there are distinct grooves on the frontal squame for the supraorbital vessels and nerve. In some cases these structures tunnel the bone for a short distance.

The outline of the norma occipitalis of these skulls is pentagonal with the upper angle of the pentagon rounded off.

The sutures are very simple in character, presenting in many cases a simple wavy line. Only four of these individuals show any trace of sutural occlusion, and this affects portions of the coronal and sagittal sutures.

A patent metopic suture was noted in one skull (No. 23), and in another skull (No. 53) there was a trace of this suture.

The pterion is predominantly of the H type. Epipteric bones occur in two of the skulls (Nos. 29 and 39). Seven skulls show Wormian bones along the lambdoid suture, but in three of these there is only one insignificant ossicle.

On the base of the skull the planum nuchale is singularly free from rough muscle markings, and the external occipital protuberance is scarcely perceptible. The mastoid processes are characteristically diminutive, and the occipital condyles are small, short, and flattened. The glenoid fossae vary slightly in depth, but on the whole they are somewhat shallow.

Measurements and Indices of the Cranium.

The individual measurements on the various crania are given in Table I. The averages of the various dimensions and indices are set out below in tabular form, together with certain data for the Bushman and Hottentot, quoted from various papers by Shrubsall (2), Martin (3), and Broom (4), and indicated by S. M. B.

Linear Dimensions in Millimetres.

	Maximum Length.	Maximum Breadth.	Basion-Bregma Height.
Bushman tribe (23) .	174·2	130·6	122·2
Bushmen (S.) (29) .	178·8	134·7	126·4
Hottentots (S.) (19) .	183·2	133·5	130·6

The mean auricular height is 104·8 mm., the mean minimum frontal diameter is 88·0 mm., and the mean maximum bimastoid diameter is 112·3 mm.

Cranial Indices.

	Length-breadth I.	Length-height I.	Breadth-height I.
Bushman tribe .	(23) 74·7	(23) 70·4	(23) 93·6
Bushmen . .	(16) 74·9 (B.)	(16) 68·5 (B.)	(16) 91·6 (B.)
,, . .	(18) 75·5 (M.)	(18) 71·2 (M.)	(26) 91·1 (S.)
Hottentots .	(6) 69·3 (B.)	(6) 69·5 (B.)	(6) 100·3 (B.)
,, .	(15) 72·5 (M.)	(15) 69·5 (M.)	(19) 97·9 (S.)

With regard to the cephalic index this tribe is dolicho-cephalic, with regard to the altitudinal index it is chamaecephalic, and with regard to the breadth-height ratio it is metriocephalic. As regards absolute size these skulls are typically Bushman, but the proportions show a tendency in the Hottentot direction.

Cranial Capacity.

The cranial capacity of seventeen skulls was measured by Turner's shot method (5), and the results are tabulated below together with

TABLE I.—*Measurements of Crania in Millimetres.*

	Bushman Tribe.																		
Number of Skull	2.	3.	7.	11.	13.	15.	16.	17.	18.	19.	23.	24*a*.	29.	31.	32.	36.	39.	40.	42.
Maximum length	168·0	180·0	185·0	173·0	183·0	173·0	174·0	167·0	180·0	173·0	..	182·0	174·0	..	..	169·0	171·0	169·0	179·0
,, breadth	120·0	129·0	131·0	133·0	137·0	121·0	131·0	127·0	133·0	130·0	..	132·0	131·0	..	..	135·0	133·0	136·0	127·0
Basion-bregma height	123·0	125·0	132·0	117·0	126·0	117·0	123·0	121·0	121·0	120·0	..	103·0	124·0	..	..	126·0	135·0	127·0	130·0
Auricular height	99·0	104·0	107·0	99·0	110·0	99·0	105·0	101·0	108·0	104·0	..	110·0	105·0	..	..	108·0	112·0	103·5	107·0
Minimum frontal diameter	87·0	89·0	92·0	90·0	120·0	91·0	92·0	89·0	96·0	89·0	..	97·0	87·0	..	..	88·0	94·0	91·0	91·0
Maximum bizygomatic diameter	..	118·0	..	..	..	..	110·0	..	114·0	112·0	..	..	120·0	..	..	..	..	..	..
,, bimastoid ,,	105·0	106·0	118·0	116·0	118·0	111·0	117·0	111·0	114·0	108·0	..	107·0	..	..	..	..	107·0	122·0	118·0
Basion-nasion ,,	95·0	104·0	101·0	94·0	97·0	95·0	89·0	94·0	94·0	89·0	..	103·0	90·0	..	..	91·0	94·0	93·0	97·0
Basion-prosthion ,,	..	105·0	94·0	..	91·0	98·0	83·0	90·0	99·0	91·0	..	102·0	89·0	..	..	88·0	91·0	90·0	92·0
Nasion-prosthion ,,	55·0	61·0	69·0	..	58·0	52·0	48·0	47·0	63·0	57·0	..	58·0	63·0	..	..	56·0	57·0	58·0	53·0
Nasal height—right	..	47·0	47·0	40·5	47·0	42·0	39·0	40·5	43·5	40·0	43·5	43·0	50·0	46·5	43·5	40·0	45·0	42·5	43·0
,, ,, left	..	47·0	47·0	40·5	48·0	42·0	39·5	40·5	43·5	40·0	43·0	42·0	50·0	47·0	44·5	39·0	45·0	42·5	42·5
Nasal breadth	..	25·5	27·0	27·0	27·5	28·0	24·0	27·5	25·5	25·0	27·0	25·0	25·0	25·0	27·0	24·0	25·5	27·0	26·5
Interorbital breadth	..	26·0	24·0	22·5	28·0	25·0	25·0	25·5	24·0	22·0	..	..	..	..	23·0	..	..	22·5	24·5
Orbital breadth—right	39·0	38·0	37·0	37·0	38·5	36·5	37·5	36·0	37·5	37·5	..	38·5	40·0	..	37·5	38·0	37·5	39·0	38·0
,, ,, left	..	38·0	37·0	37·0	39·0	37·0	37·5	36·0	37·0	36·5	..	39·5	39·5	..	37·5	38·0	39·0	37·0	38·0
Orbital height—right	30·0	32·0	32·0	33·0	31·5	34·0	30·0	28·5	31·0	31·5	..	33·0	36·5	..	33·0	32·3	35·5	29·0	32·0
,, ,, left	..	33·0	33·0	32·0	31·5	34·0	29·5	28·0	30·5	30·0	..	33·5	37·5	..	33·0	32·3	35·5	29·0	32·5
Maxillo-alveolar breadth	..	60·0	58·5	60·0	58·0	59·0	55·0	56·0	59·0	59·0	53·0	59·0	59·5	55·0	56·5	55·0	60·5	60·0	60·5
,, ,, length	..	..	52·0	45·0	50·0	53·0	44·0	..	55·5	49·0	55·0	50·0	51·0	53·0	53·0	48·0	46·0	51·0	49·0
Sagittal arc—frontal	120·0	114·0	119·0	121·0	134·0	124·0	124·0	119·0	127·0	135·0	..	..	..	..	..	128·0	119·0	140·0	133·0
parietal	117·0	135·0	131·0	109·0	127·0	118·0	115·0	110·0	122·0	115·0		..	..	..	...	108·0	131·0	114·0	116·0
occipital	105·0	107·0	126·0	115·0	110·5	98·0	117·0	102·0	115·0	109·0		..	..	..	..	102·0	104·0	107·0	111·0
Total	341·0	356·0	..	345·0	372·0	340·0	356·0	331·0	364·0	359·0	..	..	..	..	..	348·0	354·0	361·0	360·0
Transverse arc	257·0	275·0	278·0	271·0	298·0	266·0	274·0	269·0	278·0	276·0	..	..	..	..	..	292·0	295·0	287·0	277·0
Horizontal arc	466·0	501·0	505·0	486·5	523·0	473·0	483·0	464·0	500·0	481·0	..	..	..	..	..	481·0	485·0	488·0	487·0
Capacity	995·0	..	..	1150	..	1040	1110	..	1165	1165	..	..	..	..	..	..	1370	..	1100
Cephalic index	71·0	71·7	70·8	76·9	74·9	69·9	75·3	76·0	73·9	75·1	..	72·5	75·3	..	..	79·9	77·8	80·5	70·9
Altitudinal index	73·2	69·4	71·9	67·6	68·9	67·6	70·7	72·5	67·2	69·4	..	56·6	71·3	..	..	75·8	78·9	75·1	72·5
Height-breadth index	102·5	96·9	100·8	88·0	92·0	96·7	93·9	95·3	91·0	92·3	..	78·0	94·6	..	..	91·9	101·5	93·4	102·4
Upper facial index	..	51·7	..	..	..	..	43·6	..	55·3	50·9	..	..	52·5	..	..	..	..	..	..
Nasal index	..	54·3	57·4	66·7	57·9	66·7	61·2	67·9	58·6	62·5	62·2	58·8	50·0	53·5	61·4	60·8	56·7	63·5	62·0
Orbital index	76·9	..	87·8	87·8	81·4	92·5	79·4	78·5	82·8	83·1	..	85·3	93·1	..	88·0	84·2	92·8	76·3	84·9
Maxillo-alveolar index	..	..	112·5	133·3	116·0	113·2	125·0	..	106·3	120·4	96·4	118·0	116·7	103·8	106·6	114·6	131·5	117·7	123·5

TABLE I.—*Measurements of Crania in Millimetres—continued.*

	Bushman Tribe.										Young Skulls.		Bantu Types.						
Number of Skull	43.	44.	46.	47.	48.	49.	50.	51.	52.	53.	1.	25.	20*a*.	21.	24.	30.	34.	37.	45.
Maximum length	177·0	168·0	165·0	..	178·0	171·0	..	174·0	..	173·0	171·0	166·0	181·0	181·0	184·0	..	186·0	182·0	..
,, breadth	130·0	133·0	129·0	..	133·0	134·0	..	124·0	..	128·0	131·0	130·0	134·0	135·0	138·0	..	139·0	137·0	..
Basion-bregma height	115·0	121·0	116·0	..	116·0	122·0	..	128·0	..	128·0	..	127·0	132·0	132·0	..	..	138·0	138·0	..
Auricular height	102·0	104·0	100·0	..	97·5	103·0	..	107·0	..	106·0	100·0	102·0	111·0	119·0	111·0	..	117·0	115·0	..
Minimum frontal diameter	93·0	93·0	89·0	..	94·0	91·0	..	91·0	..	90·0	88·0	86·0	87·0	94·0	92·0	..	93·0	91·0	..
Maximum bizygomatic diameter	120·0	119·0	109·0	..	..	..	..	113·0	..	..	..	..	..	..	130·0	..	..	139·0	..
,, bimastoid ,,	114·0	..	103·0	..	..	122·0	..	107·0	..	110·0	103·0	109·0	119·0	114·0	..	..	120·0	118·0	..
Basion-nasion ,,	88·0	91·0	88·0	..	98·0	93·0	..	92·0	..	93·0	..	96·0	106·0	94·0	..	..	102·0	100·0	..
Basion-prosthion ,,	..	88·0	88·0	..	99·0	89·0	..	89·0	..	89·0	..	95·0	90·0	97·0	..	..	102·0	104·0	..
Nasion-prosthion ,,	..	53·0	51·0	..	50·0	58·0	..	57·0	..	53·0	55·0	58·0	63·0	66·0	64·0	..	66·0	68·0	..
Nasal height—right	..	44·0	..	39·0	42·0	42·0	54·0	44·0	42·0	41·5	41·0	43·0	..	..	46·0	..	48·0	50·0	39·5
,, ,, left	..	44·0	..	38·0	41·0	42·0	54·0	43·0	42·0	41·5	41·0	43·0	..	..	47·0	..	48·0	49·0	40·0
Nasal breadth	..	28·0	..	21·0	28·0	24·0	30·0	29·0	27·0	29·0	26·0	27·0	..	..	25·5	..	26·0	30·0	25·0
Interorbital breadth	22·3	..	..	19·0	26·0	22·0	25·5	23·0	29·0	..	..	24·0	..	..	27·5	28·5	..	..	22·0
Orbital breadth—right	38·0	37·0	..	36·0	38·5	37·0	40·5	40·0	32·5	36·0	38·0	38·0	..	..	40·0	40·5	..	41·5	36·0
,, ,, left	38·0	38·0	..	36·0	39·5	36·0	41·0	39·0	32·0	35·0	39·0	38·0	..	..	39·0	41·0	..	41·0	35·5
Orbital height—right	..	35·0	..	31·3	28·0	30·0	35·5	30·5	29·5	35·5	33·0	33·0	..	..	33·5	35·0	30·5	38·0	29·0
,, ,, left	32·0	35·5	..	31·0	28·0	28·0	34·5	31·5	29·0	34·5	33·0	34·0	..	..	33·5	35·0	30·5	36·0	29·5
Maxillo-alveolar breadth	58·0	58·5	..	55·0	53·0	60·0	63·0	..	..	56·5	56·0	61·0	..	..	67·5	64·5	69·5	64·0	..
,, ,, length	..	47·0	..	..	51·0	46·0	55·0	47·0	..	48·0	45·5	49·5	..	..	57·5	49·0	57·0	55·0	..
Sagittal arc—frontal	131·0	121·0	..	122·0	..	125·0	..	135·0	130·0	128·0	120·0	121·0	..	..	..	..	137·0	123·0	..
parietal	122·0	104·0	..	118·0	..	120·0	..	115·0	121·0	117·0	122·0	107·0	..	..	..	..	133·0	131·0	..
occipital	106·0	117·0	..	..	..	104·0	..	115·0	110·0	105·0	107·0	108·0	..	..	..	..	106·0	114·0	..
Total	359·0	342·0	..	347·0	..	349·0	..	365·0	361·0	350·0	349·0	336·0	..	..	..	..	376·0	368·0	..
Transverse arc	269·0	281·0	..	..	..	275·0	..	282·0	..	280·0	265·0	269·0	..	..	..	..	310·0	302·0	..
Horizontal arc	487·0	476·0	..	..	..	493·0	..	482·0	..	480·0	474·0	466·0	..	..	..	..	512·0	512·0	..
Capacity	1080	..	1050	..	1100	1155	..	..	..	1180	1120	1085	..	..	..	..	1335	1390	..
Cephalic index	73·4	79·2	78·2	..	74·7	78·4	..	71·3	..	74·0	76·6	78·3	74·0	74·6	75·0	..	74·7	75·3	..
Altitudinal index	65·0	72·0	70·3	..	65·2	71·3	..	73·6	..	74·0	..	76·5	72·9	72·9	..	..	74·2	74·6	..
Height-breadth index	88·5	91·0	89·9	..	79·7	91·0	..	103·2	..	100·0	..	97·7	98·5	97·8	..	..	99·3	100·7	..
Upper facial index	..	44·5	46·8	..	..	..	..	50·4	..	..	..	..	..	..	49·2	..	..	48·9	..
Nasal index	..	63·6	..	54·5	67·5	57·1	55·6	66·7	64·3	69·9	63·4	62·8	..	..	54·8	..	54·7	60·6	62·9
Orbital index	85·3	94·0	..	87·6	71·9	79·4	85·9	78·5	90·7	98·6	..	88·2	..	..	84·8	85·9	..	89·7	81·8
Maxillo-alveolar index	..	124·5	..	..	..	130·4	114·5	..	..	117·7	123·1	123·2	..	..	117·4	131·6	121·1	116·4	..

certain data bearing on them. The capacity is the lowest which has so far been recorded for the Bushman. One of the skulls (No. 2) has the remarkably low capacity of 995 c.c.

	Males.	Females.	Both Sexes.
Bushman tribe	(2) 1165	(6) 1098	(15) 1126
Bushmen (26), (Shrubsall, 1898) .	1330	1255	. .
Strandlopers (7), (Shrubsall, 1907)	. .	. .	1345
Bushmen (24), (Shrubsall, 1907) .	. .	. .	1285
Kalahari Bushmen (Shrubsall, 1911)	1300	1100	. .
Cape Bushmen (Shrubsall, 1911)	1260	1200	. .
Strandlopers (Shrubsall, 1911) .	1500	1350	. .

The Face.

The face is broad, short, and retracted beneath the anterior part of the cranium. The upper part of the face is always flattened, but several of the skulls show a considerable degree of subnasal prognathism. In one skull (No. 11) there is a subdivision of the zygomatic bone into two (Os Japonicum). The upper facial index was determined in seven skulls and gave a mean value of 49·0, which is chamaeprosopic. This is almost identical with Ried's figure (3) of 49·2 for eighteen Bushmen, and differs from his figure of 51·5 for fifteen Hottentots.

The orbits are rectangular in outline, with the transverse axis directed laterally and downwards, and they are widely separated. This appearance of a wide interorbital interval is heightened by the flat nasal bridge.

The average orbital index for this group is 85·2, so that the orbits are mesosemic. This index varies greatly in the different crania, but the tendency is in the microsemic direction. Ried's figures for eighteen Bushmen and fifteen Hottentots are 81·4 and 79·6 respectively.

The nasal bridge is flattened and in line with the forehead. The lower margin of the nasal aperture is sharp in 50 per cent. of the skulls, in 11 per cent. there are well-marked subnasal fossae, and in the remainder there is a moderate degree of simian guttering. The anterior nasal spine is diminutive or absent.

The mean nasal index of 61·2 is markedly platyrhinic ; the maximum index is 69·9, and the minimum 53·5. Ried gives an index of 59·9 for eighteen Bushmen, and 57·9 for fifteen Hottentots.

The average breadth of the upper alveolar arch, measured from the outer alveolar border opposite the second molar teeth, is 60·2 mm. The average length of the arch, measured from the prosthion to the middle of a line joining the posterior extremities of the alveolar border, is 49·8. The absence of maxillary tuberosities is a characteristic feature of these and of Bushman skulls in general.

The average maxillo-alveolar index is 117·5, which is brachyuranic.

The dentition of this tribe has been made the subject of a special study by Professor M. R. Drennan (6).

The degree of prognathism is often expressed by the alveolar index, which is the ratio between the basion-prosthion length and the basion-nasion length. This does not, however, take into consideration the vertical displacement of the prosthion, which is a very important factor as regards the shape of the face. It is advisable therefore to take into consideration the three sides of the facial triangle, namely the basion-prosthion, nasion-prosthion, and basion-nasion lengths. In the following table the basion-prosthion length and the nasion-prosthion length are expressed as percentages of the basion-nasion length. This gives the degree of forward displacement or prognathism, and of the downward displacement or "subgnathism." The corresponding values for the Bushman, Hottentot, and Kaffir, calculated from Shrubsall's data, are added for comparison.

	Basion-prosthion.	Basion-nasion.	Nasion-prosthion.
Bushmen	98·5	100	63·4
Bushman tribe (20)	99·8	100	59·1
Hottentots	101·3	100	66·6
Kaffirs (40)	100·9	100	65·8

The Mandible.

In all the skulls of this tribe the lower jaws are small. The rami are low and almost square in appearance, and the mandibular notch is shallow. The condyles are flat, and roughly oval in outline. The inner surface of the symphysis slopes downwards and backwards, and the chin is poorly developed. Accordingly if one looks vertically down on the symphysis menti, there is more of the bone to be seen

TABLE II.—*Measurements of Mandibles in Millimetres.*

Number of Skull.	Bicondylar Breadth.	Bigonial Breadth.	Mandibular Length.	Length of Ramus.	Min. Breadth of Ramus.	Max. Breadth of Ramus.	Symphyseal Height.	Body Height.	Mandibular Angle.	Mandibular Index.
2	87·0	72·5	95·5	46·5	32·3	36·5	33·0	22·5	120·0	109·8
3	..	..	98·0	43·5	33·8	38·5	31·0	26·0	125·0	..
4	101·0	91·0	100·0	46·0	32·0	35·5	29·0	28·5	130·0	99·1
7	..	88·0	..	53·0	33·8	44·0	34·0	31·5	121·0	..
8	..	73·5	93·5	51·5	37·0	44·0	25·0	27·0	112·5	..
10	105·0	84·0	95·5	41·5	33·5	39·5	24·0	25·0	128·0	91·0
11	108·0	92·5	102·5	46·0	37·5	45·0	25·0	..	121·0	94·9
14	88·0	80·0	95·5	40·0	32·0	35·0	29·0	28·0	119·5	108·5
15	..	86·5	100·0	45·0	37·5	40·0	31·0	28·5	114·0	..
16	..	80·5	95·5	42·0	31·8	37·5	..	24·5	127·0	..
17	87·0	76·5	94·0	45·0	36·0	40·8	30·0	26·0	119·0	108·0
18	105·5	84·5	100·0	48·5	36·0	39·0	32·0	26·5	121·5	94·8
19	101·5	78·0	94·0	44·0	33·5	37·3	26·0	25·0	117·0	92·6
20*a*	..	97·5	..	..	31·0	..	31·0	..	117·0	..
24*a*	101·5	86·5	93·5	43·0	32·0	36·5	30·0	26·5	127·0	92·1
26	103·5	86·5	96·0	48·5	33·5	40·5	34·0	28·0	115·0	92·8
29	98·5	91·0	103·0	49·5	28·5	35·0	30·0	27·0	129·0	104·6
32	96·5	75·0	101·5	45·5	39·5	42·8	31·0	30·0	116·5	105·2
33	109·0	86·0	105·0	53·5	40·5	46·8	..	..	110·5	96·3
36	99·0	81·5	94·0	40·0	33·8	39·5	33·0	30·0	126·5	94·9
40	105·5	93·0	99·0	39·0	35·0	..	..	26·0	131·0	93·8
42	95·0	75·0	94·0	48·0	36·0	40·0	31·0	30·0	113·0	98·9
43	101·0	84·0	101·0	46·0	31·3	40·5	30·0	..	138·5	100·0
44	104·0	86·0	93·5	45·0	34·0	38·0	24·0	27·0	123·0	89·9
45	..	84·0	..	43·5	32·5	37·0	32·0	..	..	..
46	90·0	79·0	95·0	44·5	29·3	33·5	30·0	26·0	126·5	..
47	92·5	79·0	93·0	38·0	31·3	35·5	31·0	26·0	125·5	..
48	111·0	80·0	99·5	49·0	..	..	23·0	26·0	120·0	..
49	108·0	83·0	93·5	43·5	33·3	34·8	32·0	27·0	117·0	..
50	112·5	91·0	102·0	57·3	38·0	43·0	34·0	31·0	115·5	..
51	..	79·0	..	48·5	31·5	36·5	..	28·0	123·0	..
52	107·5	81·5	96·0	40·0	33·0	38·5	26·0	28·0	131·5	..
53	..	91·5	94·0	47·0	30·0	37·0	27·0	26·0	116·0	..
1	87·5	74·0	94·0	42·5	32·0	35·0	28·0	20·0	123·5	107·4
12	94·5	71·0	95·0	47·0	33·3	36·0	30·0	27·5	118·0	..
25	99·0	90·5	98·0	49·0	38·5	42·0	32·0	31·5	120·0	99·0
6	87·0	70·0	83·5	38·5	28·0	31·8	22·0	..	123·0	96·0
39	91·0	81·0	95·0	43·0	33·8	37·0	28·0	26·0	121·0	104·4
5	..	..	98·0	51·5	33·0	..	30·0	27·0	117·0	..
21	112·0	80·0	..	..	36·5	42·0	..	34·0	117·0	..
24	..	..	..	49·5	36·0	41·0	32·0	27·0	119·0	..
28	..	..	..	55·5	33·0	39·0	30·0	27·0	110·0	..
34	112·0	85·0	..	53·0	36·0	43·5	37·0	32·0	125·0	..

behind the teeth than in front. This is in contrast with the condition of the European, where there is more bone seen in front of the teeth than behind. Measurements of the individual mandibles are given in Table II.

Average Measurements of the Mandibles.

	Adults.	Subadults.
Bicondylar breadth . .	(24) 100·8	(5) 91·8
Bigonial breadth. . .	(32) 80·5	(5) 77·3
Mandibular length . .	(29) 97·2	(5) 93·1
Symphyseal height . .	(29) 29·6	(5) 28·0
Length of ramus . .	(32) 45·7	(5) 44·0
Minimum breadth of ramus .	(32) 33·8	(5) 33·1
Maximum ,, ,,	(30) 38·9	(5) 36·4
Body height . . .	(27) 27·2	(4) 26·3
Mandibular angle . .	(32) 121·6	(5) 121·1
,, index . .	(18) 98·2	(4) 101·7

The Limb Bones.

In addition to the skulls there were portions of the rest of the skeleton of thirty individuals. Some of the skeletons are practically complete, whilst others comprise merely a few fragmentary long bones. Of the available material three skeletons are subadults, so that the measurements of the bones of these and of four skeletons, which with their skulls show Bantu characters, are excluded from the averages. All the bones of the remaining group of individuals are small and delicate in character. This feature, together with the various proportions which are set out in what follows, confirms the view, already arrived at from an examination of the skulls, that these individuals must be regarded as Bushmen.

The Femur.

The femora are diminutive, and they appear to display a marked degree of torsion. The shaft has a pronounced forward curve, and there is a well-marked linea aspera. Only in one case was there a trace of a third trochanter. The measurements of the individual bones are given in Table III. The average length of paired bones irrespective of sex, and the results for the two sexes irrespective of side, are tabulated on p. 44.

TABLE III.—*Femur.*

Number of Skeleton.	Sex.	Length.				Upper Platymeria.				Superior Platymeric Index.		Pilastering.				Pilastering Index.	
		Maximum Length.		Oblique Length.		Ant-posterior Diameter.		Transverse Diameter.				Ant-posterior Diameter.		Transverse Diameter.			
		Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.
2	♀	386·5	397·0	386·0	392·5	19·5	19·0	22·5	23·0	86·7	82·6	24·0	24·0	22·0	22·0	109·1	109·1
3	♀	431·0	426·5	425·0	423·5	20·5	20·5	28·5	29·0	71·2	70·7	25·0	25·0	22·5	22·5	111·1	111·1
7	♀	433·0	429·0	427·0	426·0	22·5	22·5	29 0	27·5	77·6	81·8	26·5	26·5	25·5	25·0	103·9	106·0
8	♀	387·0	383·0	383·0	382·0	22·0	22·5	27·0	26·5	81·5	84·9	25·0	24·5	22·3	22·5	108·7	108·9
9	♂	415·0	423·0	411·0	421·0	28·0	27·5	22·0	25·5	127·3	107·8	32·5	32·0	24·0	24·5	135·4	130·6
10	♀	363·0	363·0	358·0	356·5	20·5	20·0	21·5	23·0	95·3	87·0	26·0	25·0	21·5	21·0	120·9	119·0
11	♂	413·0	419·0	412·0	417·0	23·0	21·0	27·0	26·0	85·2	80·8	29·0	26·0	24·0	24·0	120·8	108·3
13	♀	414·0	415·0	414·0	415·0	23·5	23·5	28·5	28·5	82·5	82·5	29·5	28·0	24·0	24·5	122·9	114·3
15	?	445·5	441·0	442·0	440·0	26·5	27·5	26·0	27·0	101·9	101·9	32·0	32·5	25·0	25·5	128·0	127·5
16	♀	395·0	396·0	394·0	395·0	23·0	24·0	29·0	29·0	79·3	82·8	23·5	24·5	24·0	24·0	97·9	102·1
18	♀	366·0	370·0	..	369·0	22·5	21·5	26·5	28·0	84·9	76·8	24·0	24·5	23·0	23·0	104·3	106·5
19	♀	366·0	361·0	361·0	359·5	19·5	19·0	24·0	24·5	81·3	77·6	23·0	23·0	22·0	21·5	104·5	106·9
26	♂	398·0	398·0	394·0	393·0	20·5	21·5	25·5	26·0	80·4	82·7	27·5	28·0	21·0	22·5	131·0	124·4
27	♂	433·0	431·0	430·5	426·5	25·0	26·0	29·5	30·0	84·7	86·7	33·5	33·0	26·0	26·0	128·8	126·9
33	♂	409·0	409·0	409·0	409·0	24·5	24·5	27·5	28·5	89·1	96·1	30·0	30·0	26·0	25·0	115·4	120·0
40	♂	408·0	407·5	407·0	407·0	21·0	22·0	28·5	29·5	73·7	74·6	27·0	28·0	23·5	23·5	110·6	119·1
44	♀	396·0	396·5	394·0	392·0	22·0	21·0	23·0	23·5	95·7	89·4	24·5	24·5	20·5	20·5	119·5	119·5
46	♀	382·0	384·0	379·0	381·0	19·5	20·5	23·5	23·5	82·9	87·2	29·5	25·0	21·5	21·5	137·2	116·3
47	♀	374·5	372·5	372·5	371·5	21·5	20·5	21·5	21·0	100·0	97·6	24·5	24·5	21·5	21·0	119·1	117·0
48	♀	416·0	412·0	413·0	406·0	19·5	20·0	24·5	25·5	79·6	78·4	25·0	26·5	21·5	23·0	116·3	115·2
51	?	381·5	382·0	381·0	380·0	22·5	24·0	24·0	23·0	93·8	104·3	30·0	31·0	23·0	22·5	130·5	137·8
53	♂	409·0	406·0	407·0	405·0	23·0	23·0	28·5	30·0	80·7	76·7	28·0	27·5	23·5	23·5	119·1	117·0
1	?	385·0	384·0	383·0	381·0	20·0	21·0	25·0	25·5	80·0	82·3	22·5	23·0	20·0	19·5	112·5	117·9
12	♀	383·0	381·0	378·0	378·0	21·5	21·0	25·0	23·5	86·0	89·4	25·5	24·5	22·0	21·0	115·9	116·7
25	♀	..	..	..	..	20·5	20·5	28·5	27·0	71·9	75·9	24·0	25·5	24·0	24·0	100·0	106·3
5	♂	450·5	452·0	448·0	450·5	28·0	25·5	27·0	27·5	103·7	92·7	32·0	32·0	25·0	25·0	128·0	128·0
24	♀	386·5	387·5	378·5	380·0	20·0	20·0	24·0	25·5	83·3	78·4	24·0	24·5	22·5	22·5	106·7	108·9
30	♂	481·5	481·5	480·0	478·5	28·0	29·0	30·0	28·0	93·3	103·6	31·5	31·5	25·0	25·0	126·0	126·0

	Right.	Left.	Males.	Females.
Maximum length	(22) 401·0	(22) 400·9	(14) 412·8	(26) 392·8
Oblique ,,	(21) 400·0	(21) 400·0	(14) 410·6	(25) 391·0

The average oblique length of forty-three bones irrespective of side and sex is 399·3 mm. This figure may be compared with Vermooten's results, quoted by Martin (3) :—

	Strandloper.	Inland Bushman.	Hottentot.
Bicondylar length .	(8) 407	(36) 419	(6) 433

The superior platymeric index in this group is 80·1, and the pilastering index is 115. This constitutes a marked degree of platymeria, and a moderately pronounced degree of pilastering. In one individual, No. 40, the upper half of the femur was so markedly flattened that a distinct flange-like border was produced on the medial side of the bone.

The Tibia.

The standard length, that is to say the maximum length without including the spine, was measured, and the results for the individual bones are given in Table IV. The average length of paired bones irrespective of sex, and the results for the two sexes irrespective of side, are tabulated below.

	Right.	Left.	Males.	Females.
Standard length	(21) 328·0	(21) 328·0	(14) 337·0	(25) 320·8

The average standard length of forty-three tibiae irrespective of sex or side is 327·7 mm. These measurements are remarkably low, and in great contrast to Vermooten's results, which were as follows :

Strandlopers.	Inland Bushmen.	Hottentots.
(8) 345 mm.	(35) 353 mm.	(8) 373 mm.

TABLE IV.—*Tibia.*

Number of Skeleton.	Sex.	Length. Maximum Length.		Length. Standard Length.		Platycnemia. Ant.-post. Diameter.		Platycnemia. Transverse Diameter.		Platycnemic Index.	
		Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.
2	♀	335·0	333·0	330·0	329·0	25·5	25·5	20·5	19·5	80·4	76·5
3	♀	355·0	355·5	345·5	347·0	32·0	32·0	21·5	21·0	67·2	65·6
7	♀	361·0	360·0	355·0	355·0	29·5	31·0	21·5	21·0	72·8	67·7
8	♀	309·0	303·0	302·0	297·0	28·0	27·0	19·5	19·5	69·6	72·2
9	♂	357·0	356·0	349·0	350·0	34·0	36·5	24·0	24·5	70·6	67·1
10	♀	306·0	320·0	305·0	314·0	25·0	27·0	17·0	18·5	60·7	64·8
11	♂	351·0	346·0	344·0	336·5	32·0	31·5	20·0	20·0	62·5	63·5
13	♀	345·0	342·0	335·5	337·0	35·0	33·0	22·0	23·0	62·9	69·7
15	?	373·0	373·5	367·5	366·5	32·0	33·0	25·0	23·5	78·1	71·2
16	♀	329·5	331·0	324·5	325·0	31·5	33·5	24·0	24·0	76·1	71·6
18	♀	..	319·0	..	313·5	27·5	28·5	23·0	23·0	83·6	80·7
19	♀	311·0	307·5	306·5	303·0	26·0	23·5	19·0	19·0	73·1	80·9
26	♂	329·0	328·0	313·0	313·0	35·0	34·5	21·0	20·5	60·0	59·4
27	♂	369·0	374·5	362·0	366·5	34·0	34·5	22·0	21·0	64·7	60·8
33	♂	346·0	348·0	335·0	338·0	33·5	35·0	21·0	21·5	62·7	61·4
40	♂	343·0	343·0	339·5	341·0	33·0	35·0	21·0	22·0	63·3	62·9
44	♀	316·0	316·0	310·0	308·5	25·0	26·5	19·0	18·0	76·0	67·9
46	♀	322·0	321·5	311·0	314·0	26·5	26·5	21·0	20·0	79·2	75·5
47	♀	302·5	305·0	297·0	299·5	26·5	26·0	20·5	19·5	94·3	75·0
48	♀	337·0	336·0	328·5	328·0	27·5	27·5	20·5	19·0	74·5	69·1
51	?	315·5	316·0	310·5	307·0	30·5	30·0	23·5	22·0	77·0	73·3
53	♂	325·5	319·5	317·0	313·0	32·0	30·5	25·5	20·0	69·7	65·6
1	?	317·5	319·0	310·0	312·0	27·5	27·5	19·5	19·5	70·9	70·9
12	♀	312·5	312·0	308·0	306·0	28·0	28·0	22·5	22·0	80·4	78·6
25	♀	..	349·0	..	..	28·0	27·5	20·0	20·5	71·4	74·5
5	♂	382·0	381·5	370·0	369·0	36·5	34·5	25·0	25·0	68·5	72·5
24	♀	320·0	317·0	315·5	310·5	29·0	28·0	22·0	22·0	78·9	78·6
30	♂	401·0	402·5	394·0	395·0	38·0	39·0	27·0	27·5	71·1	70·5

The diameters of the shaft at the level of the nutrient foramen were measured and compared, giving a platycnemic index of 71·9 for the right side and 69·4 for the left side. This constitutes a less pronounced degree of platycnemia than is usually given for the Bushman, and the figures may be compared with the index of 68·7 given by Shrubsall (2) for the Bushman, and with Vermooten's results, which were 64·6 for thirty-seven Bushmen, and 70·1 for eight Hottentots.

The tibiae of this tribe exhibit a marked degree of torsion. They also have facets on the anterior aspect of the distal end of the bone, which articulate with corresponding facets on the neck of the talus in the extreme dorsi-flexion of the ankle joint accompanying the habitual squatting posture.

The Fibula.

The fibula in this tribe is always very slender and delicate, so that in many cases it is quite fragmentary. The measurements of the individual bones are given in Table IX, and the results for the two sides and the two sexes are tabulated below.

	Right.	Left.	Males.	Females.
Maximum length	(4) 321·8	(4) 321·0	(8) 333·6	(8) 303·4

The average length of fifteen fibulae is 319·5, which may be compared with Vermooten's results :—

Strandlopers.	Inland Bushmen.	Hottentots.
(5) 336 mm.	(24) 340 mm.	(8) 360 mm.

The Patella.

The shape of the patellae shows the usual modification found in primitive races as the result of the habitual squatting posture. Thus there is a well-marked perpendicular facet. An interesting feature is the occurrence of a " vastus notch " for the attachment of vastus lateralis, which was present in nine cases. The mean maximum height of the patellae is 36·3 mm., the mean maximum breadth is 36·1, and the mean maximum thickness is 18·3 mm. The individual measure-

TABLE V.—*Patella.*

Number of Skeleton.	Sex.	Max. Length.		Max. Breadth.		Max. Thickness.	
		Right.	Left.	Right.	Left.	Right.	Left.
2	♀	..	34·0	..	32·0	..	15·0
3	♀	38·0	38·0	38·0	39·0	19·0	19·0
7	♀	35·0	..	34·5	..	18·0	..
8	♀	33·0	..	31·5	..	16·0	..
9	♂	..	38·0	..	37·0	..	16·0
11	♂	38·0	39·0	41·0	41·0	18·5	20·0
15	?	38·0	40·0	34·0	..	18·0	19·5
26	♂	38·5	38·0	37·0	37·0	20·0	20·0
27	♂	42·0	..	42·5	..	20·0	..
33	♂	31·5	..	35·0	..	17·5	..
40	♂	43·5	..	..	..	23·0	..
44	♀	32·0	35·0	..	33·0	17·5	19·0
47	♀	32·0	31·5	32·0	32·0	18·0	18·0
48	♀	38·5	39·0	39·0	39·0	18·0	19·0
51	?	35·5	36·0	39·5	39·0	18·0	18·0
53	♂	40·0	..	..	..	22·0	..
1	?	31·5	31·0	30·5	31·0	14·0	15·0
12	♀	..	34·0	..	35·0	..	17·0
30	♂	49·0	47·0	45·0	42·5	24·0	25·0

TABLE VI.—*Calcaneus.*

Number of Skeleton.	Sex.	Length		Breadth.		Height.	
		Right.	Left.	Right.	Left.	Right.	Left.
2	♀	68·0	68·5	21·0	21·0	30·5	30·5
3	♀	..	..	..	..	..	..
7	♀	75·0	76·0	23·0	22·0	31·5	32·0
8	♀	66·5	65·5	22·0	..	32·5	33·0
9	♂	..	72·5	..	24·0	..	..
10	♀	66·0	68·0	..	19·0	30·0	30·5
11	♂	69·0	69·0	22·0	22·5	34·0	34·5
15	?	74·0	73·0	..	..	33·0	33·0
16	♀	71·0	70·5	24·0	24·0	30·5	31·0
18	♀	66·5	..	..	..	..	..
26	♂	65·5	66·5	..	25·0	..	32·5
27	♂	71·0	73·0	22·0	24·0	31·0	32·0
33	♂	70·0	71·5	25·0	25·0	35·0	34·5
40	♂	72·5	70·5	23·0	24·0	32·5	34·0
44	♀	66·5	62·0	..	22·0	33·0	32·0
46	♀	..	64·5	..	20·0	..	30·5
47	♀	..	66·0	20·0	20·0	28·0	28·0
48	♀	..	67·0	..	22·0	..	32·0
51	?	68·5	72·0	22·0	23·0	31·0	31·0
53	♂	69·0	68·0	22·0	22·0	34·0	34·0
1	?	..	..	..	..	..	..
12	♀	..	64·0	..	20·5	..	29·5
25	♀	70·5	..	21·5	..	28·0	..
5	♂	..	..	26·5	28·0	36·5	37·0
24	♀	68·0	68·0	..	..	..	30·5
30	♂	83·5	84·5	30·5	30·0	43·0	43·0

ments are given in Table V, and the results for the two sides and the two sexes are tabulated below.

	Length.		Breadth.		Height.	
	Right.	Left.	Right.	Left.	Right.	Left.
Male .	(6) 38·9	(3) 38·3	(4) 38·9	(3) 38·3	(6) 20·2	(3) 18·7
Female .	(6) 34·9	(5) 35·5	(5) 35·0	(5) 35·0	(6) 17·8	(5) 18·0

The Calcaneus.

The proportions of thirty-two paired and seven single calcanei were determined. The average length of thirty-three is 69·3 mm., the average breadth of twenty-seven is 22·4 mm., and the average height of thirty-one is 32·0 mm. The smallness and relative narrowness is the feature of these dimensions. The measurements for the individual bones are given in Table VI, and the results for the two sexes and the two sides are set out below.

	Length.		Breadth.		Height.	
	Right.	Left.	Right.	Left.	Right.	Left.
Male .	(6) 69·5	(7) 67·8	(5) 22·8	(7) 23·8	(5) 33·3	(6) 33·7
Female .	(8) 69·3	(8) 70·1	(6) 22·0	(7) 21·1	(8) 31·0	(8) 30·9

Observations were made on the number and shape of the facets on the calcaneus, which articulate with the talus. In all the calcanei belonging to this Bushman group only two facets were found in place of the more usual number of three found in Europeans. According to Hrdlička (7) the percentage occurrence of two facets in Europeans is 25 per cent. in males, and 40 per cent. in females. The presence of only two facets in 100 per cent. of the Bushman calcanei is probably associated with postural habits and greater mobility of the foot. In two of the non-Bushman individuals there were three facets, the anterior and median facets being separated in one case by a wide gap and in the other case by a slight ridge.

The Talus.

These bones are very small. The mean length of thirty-four bones is 49·4 mm., the mean breadth of thirty-five is 35·7 mm., and the mean height of thirty-seven is 26·7 mm. The measurements of the individual bones are given in Table VII, and the average dimensions according to the side of the body and the sex of the individual are given on p. 50.

TABLE VII.—*Talus.*

Number of Skeleton.	Sex.	Length.		Breadth.		Height.	
		Right.	Left.	Right.	Left.	Right.	Left.
2	♀	48·5	50·0	35·0	35·5	26·0	..
3	♀	52·5	51·0	38·5	38·0	27·5	27·0
7	♀	..	49·0	..	34·5	..	26·0
8	♀	48·5	..	36·0	..	27·0	..
9	♂	..	42·0	..	31·0	..	23·5
10	♀	47·5	47·0	33·0	33·0	24·5	24·0
11	♂	49·0	52·0	37·5	37·0	26·5	28·0
15	?	50·5	52·5	..	36·0	27·0	27·0
16	♀	49·0	48·0	34·5	35·0	26·0	26·0
18	♀	..	44·5	35·0	35·0	23·5	23·5
26	♂	50·0	51·5	36·5	38·0	27·5	27·0
27	♂	55·5	58·0	39·5	40·5	30·0	31·0
33	♂	52·5	52·0	38·5	37·5	28·0	28·0
40	♂	49·0	49·0	35·0	36·0	26·5	27·0
44	♀	51·5	48·5	34·0	34·5	28·0	27·5
46	♀	43·0	42·0	32·0	32·0	24·5	25·0
47	♀	45·5	44·5	33·5	35·0	25·0	25·0
48	♀	49·0	48·0	35·5	34·5	27·0	28·0
51	?	54·0	52·0	36·0	37·0	27·0	28·0
53	♂	..	..	37·0	..	29·0	28·5
1	?	48·5	50·0	36·0	37·0	24·0	24·0
12	♀	44·0	45·0	33·0	34·0	24·0	24·0
25	♀	..	..	..	..	..	..
5	♂	53·0	53·5	40·5	41·5	30·5	31·5
24	♀	49·0	49·5	35·0	35·0	28·0	27·0
30	♂	62·0	62·5	46·0	46·5	35·5	35·0

	Length.		Breadth.		Height.	
	Right.	Left.	Right.	Left.	Right.	Left.
Males .	(5) 51·2	(6) 52·5	(6) 37·3	(6) 37·8	(6) 27·9	(7) 28·3
Females	(9) 48·3	(10) 46·8	(10) 34·7	(10) 35·6	(10) 25·9	(10) 25·6

Both the talus and the calcaneus show deep grooves, which, when these bones are articulated, bound a well-marked sinus tarsi. In one case the sinus is shut off laterally by the two articular facets coming in contact.

The Clavicle.

The clavicles are specially delicate bones, and the mean length of twenty-five of them is 133·5. The results for the two sides and the two sexes are tabulated below.

	Right.	Left.	Males.	Females.
Maximum length	(9) 134·8	(9) 137·1	(12) 141·0	(10) 125·2

The measurements of the individual bones are given in Table IX.

The Scapula.

The scapulae are in a fragmentary condition.

The Humerus.

The measurements of the individual bones are given in Table VIII, and the average results for the two sides and the two sexes are tabulated below.

	Right.	Left.	Males.	Females.
Maximum length	(15) 282·9	(15) 278·8	(12) 285·8	(16) 271·5

TABLE VIII.—*Humerus.*

Number of Skeleton.	Sex.	Maximum Length.		Maximum Diameter.		Minimum Diameter.		Index.	
		Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.
2	♀	268·0	263·0	16·0	15·0	12·5	12·0	78·1	80·0
3	♀	303·0	295·0	18·0	18·0	13·0	12·5	72·2	69·4
7	♀	303·0	299·5	20·0	19·0	13·5	14·0	67·5	73·7
8	♀	273·0	269·0	17·0	17·0	17·0	15·0	100·0	88·3
9	♂	..	..	22·0	20·0	18·0	17·0	81·8	85·0
10	♀	..	..	19·0	20·5	14·0	15·5	73·7	75·6
11	♂	283·5	283·5	20·0	21·0	14·0	14·0	70·0	66·7
13	♀	..	..	..	21·5	..	17·0	..	79·1
15	?	308·0	298·0	20·5	20·0	16·0	15·5	78·0	77·5
16	♀	271·0	266·0	19·5	19·0	18·5	18·5	94·9	97·4
18	♀	..	247·5	..	19·0	..	14·0	..	73·7
19	♀	256·0	250·0	17·5	18·5	13·0	13·0	74·3	70·3
26	♂	284·5	283·0	21·0	18·5	17·0	15·5	81·0	83·8
27	♂	315·0	306·5	23·5	23·0	19·0	17·0	80·9	73·9
33	♂	285·0	282·0	21·5	21·0	17·0	17·5	79·1	83·3
40	♂	278·5	276·5	21·0	19·5	15·5	15·0	73·8	76·9
44	♀	..	..	..	..	..	..	..	..
46	♀	249·0	..	18·0	17·5	14·0	12·5	77·8	71·4
47	♀	259·0	264·5	16·0	16·0	13·0	13·5	81·3	84·4
48	♀	280·0	270·5	20·5	19·0	14·0	14·0	68·3	73·7
51	?	253·0	..	18·5	..	16·5	..	89·2	..
53	♂	276·5	275·5	20·0	18·0	16·5	15·0	77·5	83·3
1	?	..	263·5	18·5	18·0	13·0	13·0	70·3	72·2
12	♀	..	..	..	..	..	..	..	..
25	♀	278·0	276·5	19·0	18·0	15·0	16·0	78·9	88·9
5	♂	311·0	..	22·5	22·0	18·5	17·0	82·2	77·3
24	♀	269·5	262·5	17·0	16·5	14·0	14·0	82·4	84·8
30	♂	334·5	337·0	22·0	20·5	20·0	18·0	90·9	87·8

The average length of thirty-three bones is 278·1 mm. They are thus much shorter than those measured by Vermooten, whose results were as follows :—

Strandlopers.	Inland Bushmen.	Hottentots.
(7) 289 mm.	(33) 288 mm.	(7) 308 mm.

The transverse and antero-posterior diameters of the shaft of the humerus are also recorded in Table VIII, and the relation between these two diameters is expressed as the " index of robustness." The value of this index is 79·4 on the right side and 78·3 on the left side, which may be compared with the index of eighty-three for the more robust European humerus.

The lower half of the humerus has a very definite forward concavity. A definite supratrochlear foramen occurred in fifteen of the fifty-two humeri examined with regard to this feature. This incidence of 28·8 per cent. is less than the incidence of 52·8 per cent. found by Vermooten in seventy-two Bushman humeri. The number of foramina depends, however, to a certain extent on the degree of weathering to which the bones have been subjected. There was no trace of a supracondylar foramen.

The Radius.

The radius is short and slender and well curved. The measurements of the individual bones are given in Table IX, and a comparison between the bones of the two sides and of the two sexes is submitted below.

	Right.	Left.	Males.	Females.
Maximum length	(7) 223·5	(7) 219·6	(12) 223·7	(12) 202·8

The average length of twenty-six bones, irrespective of side or sex, is 213·8 mm. This figure is again much smaller than the corresponding figures arrived at by Vermooten, which were as follows:—

Strandlopers.	Inland Bushmen.	Hottentots.
(6) 224 mm.	(35) 222 mm.	(6) 242 mm.

The Ulna.

The maximum length of the individual bones is given in Table IX, and a comparison between the averages of the bones from the two sides and the two sexes is given below.

	Right.	Left.	Males.	Females.
Maximum length	(3) 239·3	(3) 236·5	(6) 246·2	(6) 221·5

TABLE IX.

Number of Skeleton.	Sex.	Clavicle. Maximum Length.		Radius. Maximum Length.		Ulna. Maximum Length.		Fibula. Maximum Length.	
		Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.
2	♀	125·0	123·0	205·0	..	217·0	214·5	..	341·0
3	♀	128·5	..	225·0	..	239·0	..	..	..
7	♀	133·0	137·5	241·0	..	..	..	..	..
8	♀	..	..	195·0	..	..	..	294·0	..
9	♂	141·0	..	224·5	227·5	..	..	339·0	340·0
10	♀	132·0	..	..	..	..	..	..	300·0
11	♂	136·5	136·5	..	..	..	..	331·0	329·0
13	♀	..	..	214·5	..	..	..	..	..
15	?	136·0	135·5	232·0	..	..	..	..	..
18	♀	..	..	..	194·0	..	..	..	..
19	♀	..	..	185·0	..	..	..	..	..
26	♂	132·0	132·0	228·0	221·5	..	236·0	..	320·0
27	♂	136·0	142·0	247·0	245·0	273·0	269·5	..	359·5
33	♂	165·0	167·0	223·0	218·0	239·0	..	..	..
40	♂	..	126·5	217·0	218·0	228·5	..	326·0	324·0
44	♀	..	..	193·0	..	..	..	310·0	..
46	♀	116·5	116·0	..	185·0	..	..	..	297·0
47	♀	115·5	..	..	189·0	..	205·0	291·0	291·0
48	♀	125·0	..	211·0	206·0	228·0	225·5	..	..
51	?	..	125·0	198·0	..	..	..	..	..
53	♂	133·5	144·0	214·0	201·0	231·0	..	..	..
12	♀	..	..	..	..	..	..	298·5	..
25	♀	120·5	126·0	..	..	..	..	326·0	..
5	♂	..	139·0	245·0	..	..	..	361·0	361·5
30	♂	144·5	147·0	254·0	..	249·0	..	379·5	381·5

The mean length of twelve ulnae irrespective of side or sex is 233·9 mm., which is again shorter than the corresponding results ascertained by Vermooten.

Strandlopers.	Inland Bushmen.	Hottentots.
(7) 237 mm.	(32) 237 mm.	(5) 260 mm.

Proportions of the Limbs and Limb Segments.

In the following table the results for the intermembral, radio-humeral, tibio-femoral, and humero-femoral indices are given for the Bushman tribe, together with other data from Shrubsall (2), and Vermooten (3) for comparison.

	Inter-membral Index.	Radio-humeral Index.	Tibio-femoral Index.	Humero-femoral Index.
Bushmen (Vermooten) .	(22) 66·7	(30) 77·6	(33) 83·8	(32) 68·2
,, (Shrubsall) .	68·1	78·3	84·1	70·0
Bushman tribe . .	67·4	77·1	82·5	70·0
Hottentots (Vermooten) .	(4) 68·2	(5) 79·3	(6) 87·2	(5) 72·4
,, (Shrubsall) .	68·8	..	79·3	72·0
Kaffirs (Shrubsall) . .	69·4	78·7	81·5	70·6
Europeans (Shrubsall) .	69·7	72·3	80·8	72·5

The Sacrum.

The maximum height, maximum breadth, the curved length, and the maximum height of the sacral curve are recorded in Table X. The average sacral index in five females is 103·4, and the corresponding

TABLE X.—*Sacrum.*

Number of Skeleton.	Sex.	Length.	Breadth.	Length Curved.	Maximum Height of Curve.	Sacral Index.	Sacral Curve Index.
3	♀	89·0	99·0	100·0	22·5	111·2	89·0
7	♀	108·0	112·0	117·0	21·0	103·7	92·3
10	♀	100·0	94·0	102·0	11·0	94·0	98·0
13	♀	99·0	98·0	107·0	16·5	99·0	92·5
18	♀	87·0	95·0	97·0	17·5	109·2	89·7
27	♂	85·0	93·5	95·0	20·5	107·5	89·5
40	♂	97·0	91·0	102·0	13·0	93·8	95·1
53	♂	88·5	92·0	95·0	18·0	104·0	93·2
25	♀	96·0	94·5	102·0	18·0	98·4	94·1

index in three males is 101·8. The sacral curvature index, which expresses the relation of the breadth to the curved length, was also determined. This index is 92·6 for three male sacra, and 92·3 for five females.

A striking feature of these sacra was the extent to which abnormalities occurred in them. Thus in four sacra the first coccygeal segment was incorporated in the sacrum, whilst in an equal number of instances there were only four pieces composing the sacrum. In no case was ossification quite complete, and gaps could therefore be seen between the bodies of the sacral segments. In one case the first piece of the sacrum was free, and articulated with the rest of the sacrum at the body and on the lateral masses. A male sacrum showed a unilateral alar articulation with the last lumbar vertebra. In another case the sacro-iliac joint was synostosed. These marked variations are probably associated with the low morphological position of the Bushman, and with a high degree of flexibility of the vertebral column.

Eighteen of the twenty-five sacra showed a distinct "sacral notch," that is to say, a very definite narrowing of the width of the bone in the region of the second segment. This is a simian feature, which is rarely met with in Europeans. The posterior third of the ala is slightly raised, giving a distinctness to the transverse process element, which is not found in other races as a rule. It is as if the first sacral segment had not altogether undergone its transformation from an isolated vertebra into a sacral element.

The Innominate Bones and the Pelvis.

Although relatively few measurements could be obtained from the innominate bones, yet they were useful in determining the sex of the individuals. The average maximum length of the innominate bones of nine males is 186·8 mm., and of the corresponding bones of five females is 164·3.

The average pelvic index is 85·5.

The individual measurements of the bones are given in Table XI, and the mean dimensions of the pelvic brim and the pelvic brim indices in the two sexes are set out below.

	Antero-posterior Diameter.	Transverse Diameter.	Index.
Males . .	(5) 86·6	(5) 97·2	89·2
Females .	(2) 104·8	(2) 105·2	99·7

Comparison between the length of the long bones of the two sides of the body :—

Table XI.

Number of Skeleton.	Sex.	Innominate Bone.				Pelvis.				
		Maximum Height.		Maximum Breadth.		Maximum Breadth.	Breadth-height Index.	Supr. Aperture.		Pelvic Brim Index.
		Right.	Left.	Right.	Left.			Length.	Breadth.	
2	♀	162·0	161·0	..	..	..	..	..	..	..
3	♀	180·0	..	..	..	229·0	78·6	108·0	110·5	97·7
9	♂	192·0	..	..	..	194·0	99·0	..	..	..
10	♀	168·0	166·0	..	..	187·0	89·3	108·5	102·0	106·4
11	♂	174·0	180·0	..	..	199·0	88·9	84·0	88·0	95·5
26	♂	176·5	176·5	..	..	208·0	84·9	78·0	93·5	83·4
27	♂	198·0	198·0	137·5	137·5	234·0	..	89·0	101·0	88·1
40	♂	184·0	184·0	..	..	214·0	86·0	88·0	97·0	90·7
47	♀	165·0	164·0	..	..	207·0	79·5	98·0	103·0	95·1
12	♀	159·0	159·0	..	..	176·0	..	86·5	93·5	92·5
25	♀	..	171·0	132·0	130·0	189·0	..	106·5	91·0	117·0
5	♂	185·0	..	..	..	..	..	94·0	106·5	88·2
30	♂	208·0	..	..	..	..	..	..	..	..
24	♀	..	..	131·0	131·0	..	..	..	..	..

As regards the femur there is no difference between the average lengths of the two sides, which is in agreement with Vermooten's findings. In this group the right exceeded the left in 62 per cent., as compared with Vermooten's results, which showed that 47 per cent. were longer on the right side in thirty pairs of Bushman femora.

There is no difference in this group between the lengths of the right and left tibia. The average length of twenty-nine right tibiae, measured by Vermooten, exceeded the length of the left by 1 mm. Right exceeded length of left in 43 per cent. of instances, and according to Vermooten in 52 per cent.

Vermooten found no difference in the lengths of the right and left fibulae of nineteen Bushmen, but in this group there is an excess of the right over the left of 8 mm. The right exceeded the left in 50 per cent. of instances, and according to Vermooten's results in 32 per cent.

In this group and in Vermooten's group of twenty-six paired humeri the right exceeded the left in length by 4 mm. The right exceeded the left in 86 per cent. and 81 per cent. of instances respectively.

The right radius exceeded the left in this group by 4 mm., and in

Vermooten's group of twenty-seven pairs of radii by 2 mm. The right radius is longer than the left in 71 per cent. of instances in this group, and in 63 per cent. of instances in Vermooten's group.

The right ulna exceeds the left by 3 mm. in this group, and by 2 mm. in Vermooten's group of twenty-six pairs of ulnae. The right exceeded the left in 100 per cent. and 73 per cent. of instances respectively.

The average length of the left clavicle exceeded that of the right by 3 mm., and in 33 per cent. of instances the length of the right clavicle exceeded that of the left.

On the whole, therefore, where there is any difference between the two sides, the right bone exceeds the left, with the exception of the clavicle. The bones of the right and left legs are approximately equal in length, but the bones of the right arm, except the clavicle, are decidedly longer than those of the left arm.

Stature.

The stature has been estimated by Manouvrier's tables from the average lengths of the various long bones, and the following results were arrived at :—

	Males.	Females.
Femur . . .	(14) 1577	(24) 1480
Tibia . . .	(16) 1582	(24) 1506
Humerus . .	(12) 1481	(17) 1446
Radius . .	(12) 1589	(12) 1469
Average stature .	1557	1475

The stature was also determined by the use of Pearson's formulae (8).

		Males.		Females.
Femur . .	(S=81·306+1·880 F)	1589	(S=72·844+1·945 F)	1492
Tibia . .	(S=78·664+2·376 T)	1588	(S=74·774+2·352 T)	1503
Humerus .	(S=70·641+2·894 H)	1534	(S=71·475+2·754 H)	1467
Radius . .	(S=85·925+3·271 R)	1591	(S=81·224+3·343 R)	1493
Average stature	..	1575	..	1489

Pearson has shown that in the dwarf races the above methods tend to overestimate the stature. The stature was therefore calculated according to his method for dwarf races.

	Males.	Females.
Femur . . .	(14) 1525	(14) 1447
Tibia . . .	(16) 1525	(16) 1447
Humerus . .	(12) 1448	(17) 1399
Radius . .	(12) 1525	(12) 1459
Average stature .	1506	1438

It is difficult to say, with our present knowledge, which of the above figures is the best approximation. In the meantime the results may be compared with Shrubsall's findings.

	Strandlopers.	Cape Bushmen.	Kalahari Bushmen.	Hottentots.
Males . .	1544	1565	1561	1611
Females .	1512	1422	1431	1491

Skeletons of the Extraneous Individuals.

The skeletons of only two of the non-Bushman individuals were available. The average dimensions and indices of the long bones of these, No. 5 and No. 30, are tabulated below.

Femur. (Oblique length) . . .	464·3 mm.
Tibia. (Standard length) . . .	382·0 mm.
Fibula. (Maximum length) . .	370·9 mm.
Humerus. (Maximum length) . .	327·5 mm.
Radius. (Maximum length) . .	249·5 mm.
Ulna. (Maximum length) . . .	249·0 mm.
Clavicle. (Maximum length) . .	143·5 mm.
Superior platymeric index . . .	98·3
Pilastering index	127·0
Platycnemic index	70·7
Intermembral index	80·0
Radio-humeral index	77·2
Tibio-femoral index	82·3
Humero-femoral index . . .	69·8

Summary and Conclusions.

(1) This work is an anthropological survey of the skeletons of a tribe of aborigines exhumed at Colesberg by the South African Museum, Capetown.

(2) Fifty-three skulls were available for study, and these were first of all separated into a group of forty-five relatively pure Bushman types, and into a remainder of definitely mixed types. A number of these skulls were fragmentary and deformed, so that the Bushman types which were suitable for study numbered twenty-nine.

(3) The limb bones and the sacrum were also studied, and details of the measurements are given in separate tables. The average results for the two sides of the body and for the two sexes are tabulated for each bone.

(4) Indices expressing the proportions of the limbs and limb segments to each other were also determined, and compared with appropriate figures from other workers.

(5) The stature was estimated by various formulae.

(6) The conclusion is arrived at that the larger group is composed of relatively pure Bushmen, more typically Bushman, especially as regards the smallness of their bones, than many other groups which have been described as Bushmen. Nevertheless there appears to be a strain of what might be termed Hottentot blood in them, as evidenced by the narrowing of the skull, and the apparent subnasal prognathism.

(7) The smaller group presents a mixture of types, two being Hottentot in type, two are quite negroid, one may have European blood, whilst the others are fragmentary.

(8) The measurements used are those which have been sanctioned by international agreement.

In conclusion, I wish to express my thanks to Professor M. R. Drennan of the Anatomy Department, University of Capetown, under whose supervision this investigation was carried out, and to Mr. A. A. Lamb for the photographs used in the Plates.

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TITLES OF PLATES VIII–XI.

PLATE VIII.

1. Female skull (No. 44).
2. Female skull (No. 19).
3. Male skull (No. 53).
4. Male skull (No. 40).

PLATE IX.

1. Female skull (No. 44).
2. Female skull (No. 19).
3. Male skull (No. 53).
4. Male skull (No. 40).

PLATE X.

1. Female skull (No. 44).
2. Female skull (No. 19).
3. Male skull (No. 53).
4. Male skull (No. 40).

PLATE XI.

Limb-bones from the Bushman tribe compared with corresponding bones from Europeans.

1, Female skull (No. 44); 2, female skull (No. 19); 3, male skull (No. 53); 4, male skull (No. 40).

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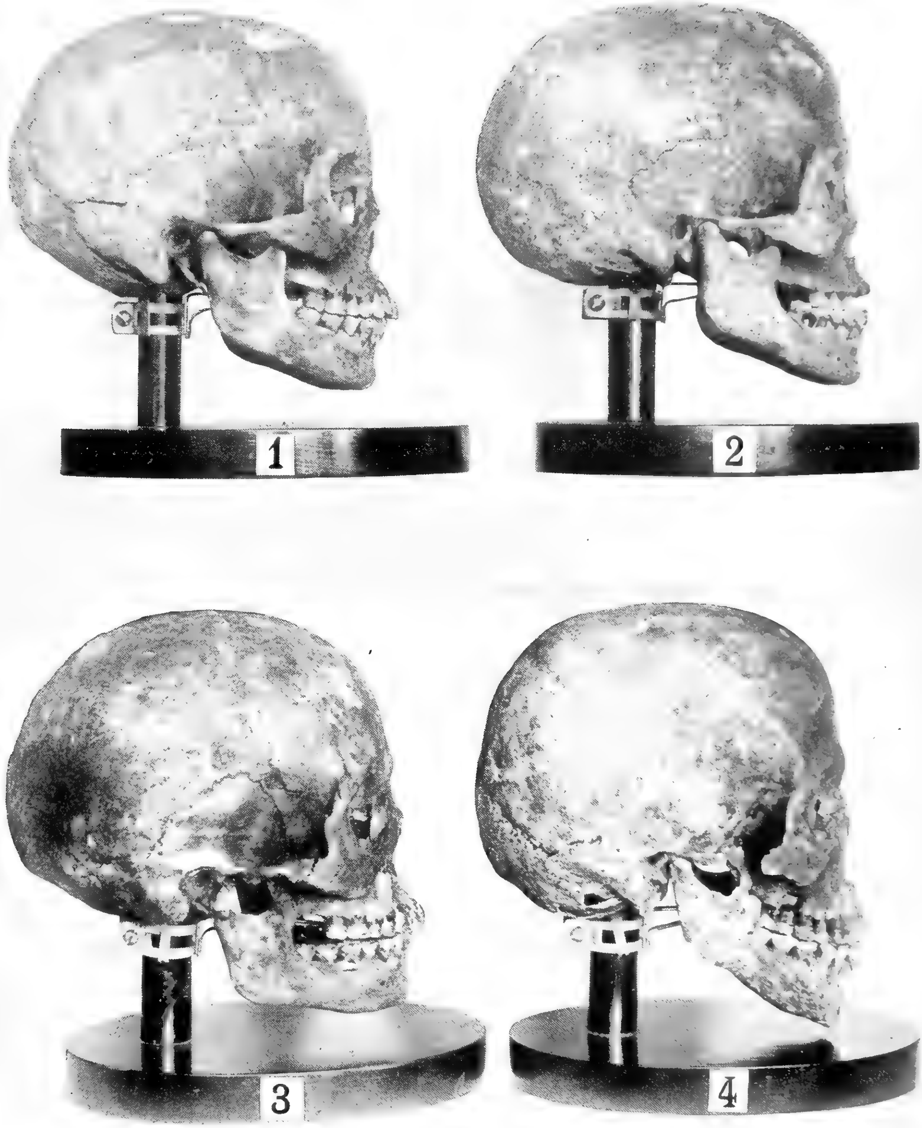

1, Female skull (No. 44) ; 2, female skull (No. 19) ; 3, male skull (No. 53) ; 4, male skull (No. 40).

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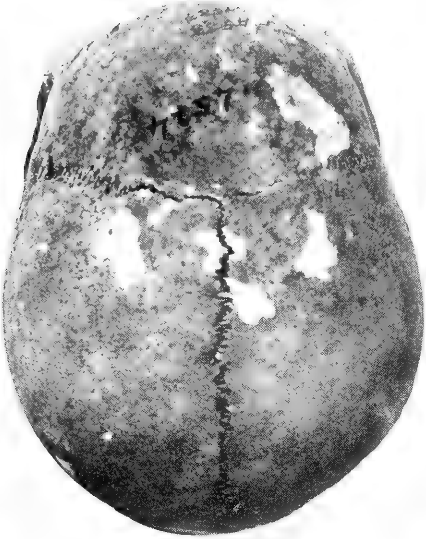

1

2

3

4

1, Female skull (No. 44); 2, female skull (No. 19); 3, male skull (No. 53); 4, male skull (No. 40).

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Shows limb-bones from the Bushman tribe, selected as being of about average length, and compared with corresponding bones from Europeans also of approximately average length.

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4. *The Dentition of a Bushman Tribe.*—By Professor M. R. Drennan, Anatomy Department, University of Capetown.

Through the courtesy of Dr. Leonard Gill, Director of the South African Museum, Capetown, I have been permitted to study the skeletal remains of a tribe of South African Bushmen, which have recently been acquired by that Institution. The general results of this research on the skulls and other bones are being incorporated in another paper, but it seemed to me to be advisable to report the special results of the study of the teeth of this group of individuals in a separate paper, where they could be available to those who are specially interested in these organs.

The work follows the lines adopted by T. D. Campbell, D.D.Sc., in his monograph on "The Dentition and Palate of the Australian Aboriginal," although, owing to the small amount of material available, it has not been considered advisable to aim at approaching the comprehensiveness of this excellent monograph (1). I wish to take this opportunity of thanking Dr. Gill for the material, and Dr. Campbell for the plan of the work and for his comparative data.

As the work proceeded it became clear to me that it would help to elucidate the results if data from the uncivilised Bushman and from the Bantu tribes of South Africa could be used also for comparison. Unfortunately I could not find any reference to any special work on the teeth of the Bushman or of the South African Bantu groups, and I doubt if anything at all has been done on them. I have attempted, therefore, to remedy this defect to a certain extent by making a preliminary examination of the dentition of fifty Bushman skulls in the Anatomy Department of the University of Capetown. Unfortunately, however, many of the teeth of these skulls have dropped out, and many of the skulls are fragmentary and without mandibles. I have also examined ten fairly typical Kaffir dentitions, and also four baboons and two gorillas, in order to get approximate figures for comparison. The main work, however, has been directed towards making as thorough an examination as possible of the dentition of the Bushman tribe.

Source of the Material.

The skeletons which have been studied were exhumed in November 1926, from graves situated near the town of Colesberg, by Mr. J. Drury, modeller to the South African Museum, who is an experienced excavator. Mr. Drury's account of the circumstances of the burial and exhumation is quoted by Mr. Slome in the preceding paper.

Preliminary Discussion.

The first point which has to be decided is how far one is justified in calling this group of individuals a Bushman tribe. So far no history of the group has been ascertained, but this is not any drawback in connection with the settlement of the question of the race to which they belonged. The only reliable criterion of race is physical features, and all the observations and measurements which have been made so far point to the conclusion that the great majority of these individuals were relatively pure representatives of the Bushman race. It is generally conceded nowadays that there is no such thing as a pure race, and it is probable that many of the variations from type, which occur in connection with every character under consideration in this and in other groups of skulls, are an expression of a mixed origin in it may be a remote past.

This does not account for all the variations in the present group. Several of the skulls are practically pure Bantu in type, and there are others which are so far removed from the Bushman type and in the Bantu direction that it has been considered advisable to remove them from the tables of measurements. The numbers of the skulls which have been excluded are 5, 20 (*a*), 21, 24, 28, 30, 34, 37, and 45. Skull No. 29 does show traces of European blood, especially in its nasal aperture, but it has many other Bushman characters, and its teeth present the usual Bushman dimensions, so that it has been retained in the calculations.

By this process of selection it is hoped that the figures ascertained will be of more value in connection with future studies on the Bushman teeth. The results for the teeth corroborate the view ascertained otherwise that this was a Bushman tribe. The figures differ only slightly from those derived from the small collection of Bushmen in the Anatomy Department. In this connection, however, it must be noted that this tribe had obviously been living under at least semi-civilised conditions, so that their teeth are therefore not reduced in size by attrition, and, on the other hand, the measurements on them are far more numerous than those on the uncivilised Bushmen, so that they may therefore be a more accurate representation of the Bushman dentition. In the investigation of the physiological and pathological conditions, such as the degree of attrition and the incidence of caries, the tribe was treated as a unit, and all the skulls were included in the survey of the dentition.

No attempt has been made in dealing with the dentition to distinguish between the Bushman and Hottentot types in the present group. No agreement has been arrived at as to just what are the critical physical differences (if any) between the Bushman and Hottentot tribes. This difficult question has become complicated by the frequent use of the term Hottentot in reference to almost any kind of crossing amongst the native races. There is evidence that there was a constant intermingling of the Hottentots and Bushmen in the early days of the European occupation. It is going to be difficult, therefore, to get sufficiently pure representatives of either type from which to dogmatise as regards criteria of difference. In an important paper published recently by the late Professor Rudolf Martin, entitled "Zur Anthropologie der Buschmänner" (2), the literature on this vexed problem is exhaustively quoted, and the opinions of the various authorities on the subject are summarised. Shrubsall (3), who devoted considerable attention to this subject, concluded that "The Hottentots are intermediate in character between the Strandlopers or primitive Bushmen and the Bantu tribes. It appears that if the Hottentots are a cross between these two races, the intermingling must have taken place a long time ago, as the Hottentots' skulls form a very homogeneous series." This homogeneity, however, might also simply mean that cross-breeds breed true, without necessitating the intermingling to have taken place a long time ago. At any rate, if approaching the Bantu in a slight degree is a criterion of being a Hottentot, some of this tribe may well be regarded as Hottentots.

In a recent paper dealing with this question by Dr. R. Broom, F.R.S., on "The Yellow-Skinned Races of South Africa" (4), he comes to the conclusion that it is relatively easy to distinguish between a Bushman and a Hottentot. He states that "One of the most striking differences in the cranial measurements of the Bushmen from those of the Hottentots and Bantus is that the height is invariably less than the breadth (in the Bushman), and generally much less." According to this criterion 75 per cent. of this tribe were pure Bushmen, as in this percentage of the skulls the height is less than the breadth, and in another 4 per cent. the height was just equal to the breadth. It is not possible, however, to define a race by one single character.

The sexing of Bushman skulls with any degree of accuracy is a matter of very great difficulty, so that following the precedent of Dr. Campbell, who found an equal difficulty in sexing the Australian aboriginal, no attempt has been made to give results for separate sexes.

Nor has any effort been made to classify the skulls according to age, except that the average measurements of the permanent teeth of all young skulls, that is to say, of all whose third molars had not completely erupted, was calculated separately. The difference between the size of these larger young teeth and that of the teeth as a whole is regarded later on as being an indication of the degree of interproximal attrition, which takes place as the individuals grow older.

Measurements Adopted.

Following on the same lines as Dr. Campbell, the maximal mesio-distal and the maximum labio-lingual diameter of the crown of each tooth was measured with fine calipers. The root length and total length of those teeth which were loose in their sockets were also measured, and the material was specially favourable from this point of view, so that the results for these quantities are specially valuable. In the case of the incisors, canines, and premolars there was little dubiety as to how these root and total measurements should be taken, the root length being measured from the enamel edge of the crown at the cervix on the labial aspect to the apex of the root, and the total length being the maximum one. The crown length was calculated by subtraction. In the case of the molar teeth, where the roots varied in length and divergence, not knowing of any standard procedure, I took the average length of the roots. The total length of the molars was measured by placing the occlusal surface of the crowns flat on the blade of the calipers and sliding the movable blade along to touch the longest root. This gives a projected or physiological total length, and the crown length calculated by subtraction can therefore only be approximate for the molars. (*See table at end.*)

All the measurements were read to the nearest quarter of a millimetre, and the calculations are taken to the nearest decimal point in the tables. The terms mesial, distal, labial, and lingual are expressed in the tables by the capital letters M., D., L., and L.

The averages of the various measurements of the individual teeth are set out in tabular form. The figure in brackets refers in every instance to the number of observations made. In addition to the six sets of measurements which I have made on the Bushman tribe, the South African Bushman, the Bantu types in the tribe, the Kaffir, the gorilla, and the baboon (*Papio porcarius*), I have availed myself of the data collected by Campbell for the European, Japanese, and Australian aboriginal for purposes of comparison. Valuable comparative data from Australian and prehistoric molars can be found in a paper by Nicholls (9).

Discussion of the Measurements.

An analysis of the figures obtained for the various dimensions of the teeth of these different types compared, as set out in tabular form for the individual teeth, presents many interesting problems for discussion. Owing, however, to the lack of suitable standards for comparison, especially in connection with the South African native races, it has not been considered advisable to submit a discussion on each individual type of tooth. For the present preliminary survey the figures must speak for themselves, and they can be used at a later date, if necessary, for further discussion.

As regards the general size of the teeth, the gorilla has easily the largest teeth, being followed at a considerable distance by the baboon. In the human series the Australian aboriginal comes next, having wonderfully large teeth, exceeding even the baboon in thirteen out of the thirty-two measurements. Next in order of size stand the Japanese and Kaffirs, the teeth of these two races being on the whole about equal in size. It is an interesting fact that, of the sixteen measurements taken on the upper teeth, six are greater in the Japanese than in the Kaffir, whereas, of the sixteen measurements on the lower teeth, ten are greater in the Japanese than in the Kaffir. The Bantu types of the Bushman tribe have teeth which differ very little from the European's teeth as regards size, and these two groups therefore stand next in order of size. Next in size are the teeth of the Bushman tribe, which are just a little larger than those of the uncivilised South African Bushman. The teeth of these latter are the smallest in the series, but a certain amount of this inferiority in size of the teeth of the uncivilised Bushman may be due to the greater degree of attrition in the uncivilised than in the civilised Bushman. Although the general order as regards size is as stated, it is found that as regards the individual teeth there are many exceptions to this sequence.

The question arises as to how far the size of the teeth can be taken

Average Measurements of the Teeth in the Upper Jaw.

Upper Central Incisor.

	M.D.	L.L.	Index.	Root length.	Total length.	Crown depth.
S.A. Bushmen	(4) 7·8	(4) 6·4	82·5	..	..	..
Bushman tribe	(25) 8·3	(27) 6·5	78·4	(19) 12·5	(19) 21·8	9·3
Bantus in tribe	(3) 9·1	(3) 7·0	77·1	(3) 13·5	(3) 23·3	9·8
Kaffirs . .	(5) 8·7	(5) 7·0	80·4	..	..	..
Europeans .	9·0	7·0	77·8	12·0	22·5	10·5
Japanese .	8·4	7·4	88·1	11·3	22·9	11·6
Australians .	(56) 9·4	(93) 7·9	84·0	(18) 14·6	(4) 24·5	9·9
Gorillas .	(2) 13·8	(2) 10·3	74·6	..	..	..
Baboons .	(4) 10·1	(4) 9·4	93·2	..	..	..
Upper Lateral Incisor.						
S.A. Bushmen	(4) 6·9	(4) 6·1	89·1	..	..	..
Bushman tribe	(24) 6·7	(26) 6·0	89·1	(18) 12·5	(18) 20·4	7·9
Bantus in tribe	(4) 6·8	(4) 6·0	88·1	(2) 13·5	(2) 23·0	9·5
Kaffirs . .	(7) 7·1	(7) 6·6	92·4	..	..	..
Europeans .	6·4	6·0	93·8	13·0	22·0	9·0
Japanese .	7·0	6·5	92·9	11·7	21·7	10·0
Australians .	(78) 7·7	(126) 6·9	89·6	(15) 15·6	(5) 24·5	8·9
Gorillas .	(2) 9·0	(2) 9·5	105·6	..	..	..
Baboons .	(4) 7·8	(4) 8·6	109·6	..	..	..
Upper Canine.						
S.A. Bushmen	(8) 6·9	(8) 7·4	107·7	..	..	..
Bushman tribe	(26) 7·5	(26) 7·8	104·1	(20) 16·3	(20) 24·2	7·9
Bantus in tribe	(5) 7·6	(5) 8·1	107·3	(5) 16·1	(5) 25·1	9·1
Kaffirs . .	(7) 7·6	(7) 8·5	112·8	..	..	..
Europeans .	7·6	8·0	105·3	17·3	26·5	9·2
Japanese .	7·9	8·6	108·9	15·4	26·4	11·0
Australians .	(116) 8·4	(159) 9·0	107·1	(41) 19·9	(7) 27·5	7·6
Gorillas .	(2) 16·3	(2) 13·0	80·0	..	..	..
Baboons .	(4) 16·1	(4) 11·1	68·9	..	..	..
Upper First Premolar.						
S.A. Bushmen	(8) 6·6	(8) 8·7	132·5	..	..	..
Bushman tribe	(27) 6·8	(25) 8·6	126·9	(17) 14·5	(17) 21·1	6·6
Bantus in tribe	(5) 6·9	(5) 9·1	131·2	(3) 14·9	(3) 22·0	7·1
Kaffirs . .	(8) 7·1	(8) 9·5	134·4	..	..	..
Europeans .	7·2	9·1	126·4	12·4	20·6	8·2
Japanese .	7·3	9·5	130·1	12·2	21·0	8·8
Australians .	(124) 7·8	(163) 10·3	132·1	(35) 16·3	(6) 22·6	6·3
Gorillas .	(2) 11·0	(2) 16·0	145·5	..	..	..
Baboons .	(4) 7·8	(4) 7·4	95·3	..	..	..

Average Measurements of the Teeth in the Upper Jaw—contd.

Upper Second Premolar.

	M.D.	L.L.	Index.	Root length.	Total length.	Crown depth.
S.A. Bushmen	(8) 6·3	(8) 8·7	138·2	..	..	..
Bushman tribe	(28) 6·5	(26) 8·5	131·1	(15) 14·8	(15) 21·1	6·3
Bantus in tribe	(5) 6·7	(5) 9·1	136·8	(2) 14·6	(2) 21·1	6·5
Kaffirs . .	(8) 6·7	(8) 9·8	146·4	..	..	..
Europeans .	6·8	8·8	129·4	14·0	21·5	7·5
Japanese .	7·0	9·3	132·9	12·9	20·7	7·8
Australians .	(89) 7·2	(168) 10·1	140·3	(36) 16·9	(13) 22·3	5·4
Gorillas .	(2) 10·5	(2) 15·0	142·9	..	..	..
Baboons .	(4) 7·9	(4) 9·1	114·1	..	..	..
Upper First Molar.						
S.A. Bushmen	(18) 9·6	(18) 10·7	111·9	..	..	..
Bushman tribe	(33) 9·9	(33) 10·6	107·2	(15) 11·6	(15) 17·6	6·0
Bantus in tribe	(7) 10·2	(7) 11·0	107·7	(5) 12·5	(5) 18·9	6·4
Kaffirs . .	(8) 10·1	(8) 11·4	113·1	..	..	..
Europeans .	10·7	11·8	110·3	13·2	20·8	7·6
Japanese .	10·7	11·3	105·6	13·2	20·2	7·0
Australians .	(198) 11·4	(255) 12·8	112·3	(5) 13·5	(1) 19·5	6·0
Gorillas .	(2) 14·1	(2) 15·1	107·1	..	..	..
Baboons .	(4) 11·0	(4) 9·9	89·8	..	..	..
Upper Second Molar.						
S.A. Bushmen	(18) 9·6	(18) 10·8	111·6	..	..	..
Bushman tribe	(30) 9·7	(30) 10·6	110·2	(14) 12·6	(14) 18·4	5·8
Bantus in tribe	(7) 10·0	(7) 11·6	115·9	(1) 10·0	(1) 16·3	6·3
Kaffirs . .	(9) 10·2	(9) 11·7	114·6	..	..	..
Europeans .	9·2	11·5	125·0	13·0	20·0	7·0
Japanese .	9·9	11·1	112·1	13·1	20·7	6·9
Australians .	(168) 10·9	(241) 13·1	120·2	(15) 13·6	(8) 19·6	6·0
Gorillas .	(2) 15·0	(2) 15·5	103·3	..	..	..
Baboons .	(4) 13·9	(4) 11·6	83·4	..	..	..
Upper Third Molar.						
S.A. Bushmen	(13) 8·0	(13) 10·4	130·0	..	..	..
Bushman tribe	(26) 8·2	(26) 10·3	125·7	(10) 12·6	(10) 18·0	5·4
Bantus in tribe	(7) 9·0	(7) 11·0	122·7	(2) 12·6	(2) 17·6	5·0
Kaffirs . .	(6) 9·5	(6) 11·5	120·6	..	..	..
Europeans .	8·6	10·6	123·3	11·4	17·1	5·7
Japanese .	8·9	10·6	119·1	10·5	16·9	6·4
Australians .	(142) 10·0	(193) 12·3	123·0	(22) 13·9	(10) 19·7	5·8
Gorillas .	(2) 14·3	(2) 14·3	100·0	..	..	..
Baboons .	(4) 15·1	(4) 11·5	76·0	..	..	..

Average Measurements of the Teeth in the Lower Jaw.

	M.D.	L.L.	Index.	Root length.	Total length.	Crown depth.
Lower Central Incisor.						
S.A. Bushmen	(4) 5·1	(4) 5·4	104·9	..	..	..
Bushman tribe	(22) 5·0	(22) 5·2	104·6	(20) 12·0	(20) 18·8	6·8
Bantus in tribe	(4) 5·1	(4) 5·6	108·4	(4) 12·8	(4) 19·6	6·9
Kaffirs . .	(4) 5·4	(5) 5·9	108·7	..	..	..
Europeans .	5·4	6·0	111·1	11·8	20·7	8·9
Japanese .	5·4	5·8	107·4	9·7	19·2	9·5
Australians .	(43) 6·0	(77) 6·3	105·0	(4) 13·4	(1) 21·0	7·6
Gorillas .	(2) 6·8	(2) 8·9	131·6	..	..	..
Baboons .	(4) 8·3	(4) 8·9	107·6	..	..	..
Lower Lateral Incisor.						
S.A. Bushmen	(4) 5·6	(4) 5·6	101·3	..	..	..
Bushman tribe	(24) 5·6	(23) 5·6	99·6	(24) 13·4	(24) 20·6	7·1
Bantus in tribe	(5) 5·9	(5) 6·0	102·6	(5) 13·7	(5) 21·7	8·0
Kaffirs . .	(8) 5·6	(8) 6·0	106·4	..	..	..
Europeans .	5·9	6·4	108·5	12·7	21·1	8·4
Japanese .	6·0	6·3	105·0	11·6	21·3	9·7
Australians .	(51) 6·7	(92) 6·6	98·5	(8) 14·7	(3) 24·5	9·8
Gorillas .	(2) 9·0	(2) 10·1	112·5	..	..	..
Baboons .	(4) 7·1	(4) 8·2	116·0	..	..	..
Lower Canine.						
S.A. Bushmen	(5) 6·5	(5) 7·0	107·8	..	..	..
Bushman tribe	(29) 6·8	(28) 7·0	103·7	(26) 15·3	(26) 23·6	8·3
Bantus in tribe	(6) 7·2	(6) 7·4	102·9	(5) 16·1	(5) 25·5	9·4
Kaffirs . .	(9) 6·9	(9) 7·8	112·0	..	..	..
Europeans .	6·9	7·9	114·5	15·3	25·6	10·3
Japanese .	6·8	7·9	116·2	13·6	24·5	10·9
Australians .	(88) 7·6	(120) 8·3	109·2	(17) 18·1	(4) 28·0	9·9
Gorillas .	(2) 10·5	(2) 14·5	138·1	..	..	..
Baboons .	(4) 7·5	(4) 11·5	153·3	..	..	..
Lower First Premolar.						
S.A. Bushmen	(6) 6·9	(6) 7·3	106·0	..	..	..
Bushman tribe	(27) 6·9	(26) 7·6	110·0	(26) 14·1	(26) 20·2	6·2
Bantus in tribe	(5) 7·3	(5) 7·9	109·0	(5) 15·0	(5) 21·9	7·0
Kaffirs . .	(8) 7·1	(8) 8·1	114·4	..	..	..
Europeans .	6·9	7·9	114·5	14·0	21·6	7·6
Japanese .	7·6	8·3	109·2	12·2	21·5	9·3
Australians .	(93) 7·6	(120) 8·8	115·8	(23) 16·3	(5) 22·6	6·3
Gorillas .	(2) 14·0	(2) 10·4	74·1	..	..	..
Baboons .	(4) 25·1	(4) 6·3	24·9	..	..	..

Average Measurements of the Teeth in the Lower Jaw—contd.

Lower Second Premolar.

	M.D.	L.L.	Index.	Root length.	Total length.	Crown depth.
S.A. Bushmen	(3) 6·8	(3) 7·8	114·8	..	..	..
Bushman tribe	(30) 7·0	(30) 7·8	110·8	(27) 14·8	(27) 20·7	5·9
Bantus in tribe	(5) 7·1	(5) 8·2	115·6	(5) 15·3	(5) 21·6	6·3
Kaffirs . .	(9) 7·2	(9) 8·3	116·0	..	..	..
Europeans .	7·1	8·0	112·7	14·4	22·3	7·9
Japanese .	7·3	8·2	112·3	12·8	20·8	8·0
Australians .	(79) 7·7	(109) 8·9	115·6	(16) 16·5	(2) 22·5	6·0
Gorillas .	(2) 11·0	(2) 12·6	114·7	..	..	..
Baboons .	(4) 9·6	(4) 7·3	75·9	..	..	..

Lower First Molar.

	M.D.	L.L.	Index.	Root length.	Total length.	Crown depth.
S.A. Bushmen	(10) 10·3	(10) 9·9	95·6	..	..	..
Bushman tribe	(33) 10·9	(33) 10·2	93·7	(27) 12·4	(27) 17·4	5·0
Bantus in tribe	(6) 11·0	(6) 10·3	93·9	(4) 13·0	(4) 17·8	4·8
Kaffirs . .	(7) 11·3	(7) 10·6	93·6	..	..	..
Europeans .	11·2	10·3	91·9	13·2	21·0	7·8
Japanese .	11·5	10·7	93·0	12·1	19·3	7·2
Australians .	(139) 12·3	(186) 11·9	96·7	(7) 14·2	(3) 21·9	7·7
Gorillas .	(2) 15·0	(2) 13·3	88·3	..	..	..
Baboons .	(4) 10·4	(4) 8·5	81·4	..	..	..

Lower Second Molar.

	M.D.	L.L.	Index.	Root length.	Total length.	Crown depth.
S.A. Bushmen	(11) 10·4	(11) 9·8	95·0	..	..	..
Bushman tribe	(32) 10·6	(32) 10·1	94·8	(22) 13·1	(22) 18·6	5·6
Bantus in tribe	(7) 11·1	(7) 10·3	93·0	(4) 12·9	(4) 18·4	5·5
Kaffirs . .	(7) 11·0	(7) 10·6	96·4	..	..	..
Europeans .	10·7	10·1	94·4	12·9	19·8	6·9
Japanese .	11·1	10·2	91·9	11·3	18·4	7·1
Australians .	(152) 12·5	(184) 11·7	93·6	(8) 15·0	(2) 22·2	7·2
Gorillas .	(2) 16·8	(2) 14·9	88·8	..	..	..
Baboons .	(4) 13·5	(4) 10·0	74·1	..	..	..

Lower Third Molar.

	M.D.	L.L.	Index.	Root length.	Total length.	Crown depth.
S.A. Bushmen	(10) 9·2	(10) 9·2	99·5	..	..	..
Bushman tribe	(33) 9·9	(33) 9·6	97·0	(21) 12·5	(21) 17·6	5·1
Bantus in tribe	(8) 11·2	(8) 10·4	92·5	(7) 13·3	(7) 18·6	5·3
Kaffirs . .	(5) 11·4	(5) 10·7	93·9	..	..	..
Europeans .	10·7	9·8	91·6	11·8	18·3	6·5
Japanese .	10·5	9·8	93·3	10·5	17·2	6·7
Australians .	(136) 11·0	(152) 11·1	93·3	(6) 14·0	(1) 19·0	5·0
Gorillas .	(2) 16·4	(2) 14·0	85·5	..	..	..
Baboons .	(4) 17·6	(4) 10·7	60·6	..	..	..

as a criterion of the morphological position of the types under consideration. Whilst it is probably true that large teeth indicate a simian tendency, yet mere size of teeth has to be discounted in several directions. The gorilla has much larger teeth than the baboon, yet the latter is undoubtedly a lower form than the former. A great deal of the size of the gorilla's teeth must be due to the fact that the gorilla is a larger animal than the baboon, and the size of the teeth is necessarily strongly correlated with bodily size. Just as the gorilla is handicapped morphologically on the score of absolute size of teeth, so the Bushman is enhanced in status by the smallness of his teeth, although a considerable degree of this absolute smallness of the Bushman's teeth must be due to the correlation of his small teeth with his small stature. Nevertheless it is quite conceivable that the Bushman's teeth may be both absolutely and relatively small, and that in respect of his teeth the Bushman presents a much less simian condition than even the European (see later under Flower's dental index). There are quite a number of features, notably the length of the limbs, in which the Bushman is less simian than the so-called higher races.

In order to get rid of the difficulty as regards absolute size, anthropologists are accustomed to form an index or ratio between two measurements. I have therefore used as an index for each tooth the relationship between the labio-lingual and the mesio-distal dimensions. The former is expressed as a percentage of the latter thus :—

$$\text{Dental index} = \frac{\text{Labio-lingual diameter} \times 100}{\text{Mesio-distal diameter}}.$$

This gives a figure by means of which it is possible to compare corresponding teeth of different sizes. It has the advantage in this case of giving an idea of the shape of the tooth, which obviously has a morphological significance as well as size in any comparison. This index has accordingly been calculated for each type of tooth in each of the groups. Although in itself it might not be a sufficient criterion of morphological sequence, nevertheless taken in association with size and other features it has considerable value. It should be noted that owing to the different dimensions of the different types of teeth, the index sometimes rises and sometimes falls to indicate morphological ascent. As was the case in connection with absolute size, there is no constant morphological order followed by the individual teeth according to this criterion. Sometimes an individual tooth in an otherwise high or low series assumes an altogether anomalous position.

This seems to indicate that, morphologically speaking, the various teeth are somewhat plastic, and assume a shape which best suits the physiological needs. These variations in shape will repay further investigation. In the meantime it is only necessary to note that, as determined by this index, the teeth of the Bushman are on the whole of a high morphological type.

Degree of Reduction in the Bushman Molars.

In the lower primates the three molars increase in mesio-distal diameter from before backwards. In the baboon the ratio is 11 : 14 : 15 in the upper jaw, and 10 : 13 : 17 in the lower jaw. In the gorilla the ratio is approximately 14 : 15 : 14 in the upper jaw, and 15 : 16 : 17 in the lower jaw, showing that reduction has commenced in the upper wisdom tooth. In higher races there is a diminution in size of the molars from before back in both jaws, but the reduction is more marked in the upper jaw.

In the Australian the relative size of the molar teeth is 11·4 mm. : 10·9 mm. : 10 mm. in the upper jaw, and 12·3 mm. : 12·5 mm. : 11·9 mm. in the lower jaw. That is to say, the second lower molar is still larger than the first, and both wisdom teeth are still actively functioning members of the dentition. In the Bushman tribe, excluding the Bantu types, the relative size of the molars is 9·9 mm. : 9·7 mm. : 8·2 mm. in the upper jaw, and 10·9 mm. : 10·6 mm. : 9·9 mm. in the lower jaw. That is to say, there is a reduction from before backwards as in the higher races, and as in them it is more marked in the upper than in the lower jaw.

There is also an absolute reduction in the breadth of the molars from before backwards, and this reduction is greater in the lower than in the upper jaw. Relative to the length, however, the breadth, as indicated by the dental index, increases from before backwards, and much more so in the upper than in the lower jaw.

On comparing the individual teeth it was found that in the upper jaw the first molar was larger than the second in 43 per cent., equal to it in 50 per cent., and less than it in only 7 per cent. of the thirty dentitions compared. The first and second upper molars were both larger than the third in 96 per cent., and smaller than it in 4 per cent. of the twenty-five dentitions compared in this respect.

In the lower jaw the first molar was larger than the second in 51 per cent., equal to it in 26 per cent., and less than it in 23 per cent. of the thirty-one dentitions compared. The first molar was larger than the third in 93 per cent., and equal to it in 7 per cent. of the thirty dentitions compared. The second molar was larger than the third in 90 per cent., and equal to it in 10 per cent. of the thirty instances compared.

Molar Cusp Patterns.

An investigation of the cusp pattern of the teeth of the Bushman tribe, excluding the Bantu types, was also undertaken. As regards the number of cusps on the occlusal surface of the molar teeth, the upper molars were classified into those having four well-developed cusps, those having three well-developed cusps and a cusplet or tubercle, and those having three cusps or less. The lower molars were classified into those having five well-developed cusps, those having four and a cusplet, and those having four or less cusps. The results are tabulated below, the number of teeth showing the different types of cusp formation being expressed as a percentage, and the number of observations is given, as usual, in brackets. Campbell's figures for the Australian, slightly adapted, are given for comparison.

	4 cusps.	3½ cusps.	3 cusps.	
	Per cent.	Per cent.	Per cent.	
1st upper molar	100·0	. .	. .	Bushman tribe (32).
,, ,,	100·0	. .	. .	Australians (88).
2nd upper molar	100·0	. .	. .	Bushman tribe (31).
,, ,,	100·0	. .	. .	Australians (208).
3rd upper molar	12·0	38·0	50·0	Bushman tribe (26).
,, ,,	77·0	20·5	2·5	Australians (156).

	5 cusps.	4½ cusps.	4 cusps.	
	Per cent.	Per cent.	Per cent.	
1st lower molar	100·0	. .	. .	Bushman tribe (28).
,, ,,	94·0	2·5	3·7	Australians (88).
2nd lower molar	85·0	7·5	7·5	Bushman tribe (27).
,, ,,	32·0	4·8	63·4	Australians (125).
3rd lower molar	76·0	10·0	14·0	Bushman tribe (29).
,, ,,	72·7	. .	27·3	Australians (110).

The results show that the first upper molar invariably shows the four cusps characteristic of the rest of the hominidae. The second upper molar in the Bushman tribe also invariably presents four cusps, which is in marked contrast to the fact that four cusps are only present to the extent of 58 per cent. on this tooth in civilised races (Duckworth, 5).

The measurements have already shown that the third upper molar is strikingly reduced in size in this Bushman tribe and in Bushmen in general. The results as regards cusp reduction bear this out, and are in marked contrast to the results for the corresponding tooth in the Australian. According to Duckworth, 37 per cent. of all races still have four cusps on their upper wisdom tooth, so that it would appear that this tooth is more degenerate in the Bushman than in most other races.

Five cusps are invariably present on the first lower molar of the Bushman tribe. This is in contrast to the presence of five in 94 per cent. of Australians (Campbell), and in only 77 per cent. of highly civilised races (Duckworth).

The second lower molar of the Bushman tribe has five cusps in 88 per cent. of cases, which is also in marked contrast to the 32 per cent. occurrence in Australians and other primitive races.

Equally striking is the presence of five cusps on the lower wisdom tooth in this tribe to the extent of 76 per cent. of instances, and in this respect there is agreement with the Australian aboriginal. According to Duckworth, even "four cusps are rare in the lower wisdom, and three are found in as many as 64 per cent. of highly civilised races, so that three cusps may thus be considered the normal number in these races. Even in primitive races, such as the Melanesians, three cusps occur in 28 per cent. of cases."

One seems justified, therefore, in drawing the general conclusion that in the upper jaw there is a very considerable and very sudden reduction in size of the last molar and in the number of its cusps, whereas in the mandibular teeth the reduction is much more gradual and much less extensive both in regard to size and to the number of cusps.

Root Form and Size.

The average dimensions of the roots of the various teeth of the Bushman tribe, excluding the Bantu types, are set out in tabular form together with the other dimensions of the teeth, and the root lengths of other types are given for comparison. In the table at the end the maximum and minimum length of the root of each type of tooth is also given.

It may be noted that the roots of the upper teeth are on the whole about the same length as those of the European, but they are very much shorter than those of the Australian. In the lower jaw, however, the roots of the Bushman teeth are considerably longer than those of the European, in keeping with the better development of the mandibular teeth in the former than in the latter, but they are still much shorter than the corresponding roots of the Australian's teeth.

Anything which might be classed as abnormal divergence of the roots was noticeably absent. The maximum divergence of the upper roots was 14·7 mm., measured between the apices of the two roots widest apart, which is far from being extreme, and there was no abnormal divergence of the lower roots.

The roots of the whole tribe, including the Bantu types, were classified into those which were normal and into those which showed a more or less pronounced degree of fusion. The percentages of teeth belonging to each class are tabulated below.

	Normal.	Fused
	Per cent.	Per cent.
1st upper molar roots . .	94	6
2nd ,, ,, . .	50	50
3rd ,, ,, . .	33	67
1st lower molar roots . .	100	. .
2nd ,, ,, . .	65	35
3rd ,, ,, . .	27	73

Flower's Dental Index.

Attempts have been made to use the size of the teeth as one of the criteria of race, and for this purpose anthropologists frequently employ a dental index, devised by Flower. This index expresses the ratio or relationship between the length of the teeth measured "from the most anterior point on the first upper premolar to the most posterior point on the third molar," and the length of the base of the skull from the basion to the nasion. It is usually expressed as a percentage:

$$\text{Dental index} = \frac{\text{Premolar-molar length} \times 100}{\text{Basion-nasion length}}.$$

According to the value of this index skulls are classified as follows:—

Microdont . . .	up to 41·9, *e.g.* Europeans.
Mesodont . . .	42·0 to 44·0, *e.g.* Chinese.
Megadont . . .	above 44·0, *e.g.* Australians.

As the basion-nasion length varies with the length of the skull, it follows that the relative value of teeth of the same size to it must vary inversely with this quantity. Thus the Polynesians, who have large teeth, but also a great length of skull, are classed as microdont, and the Andamans, although they have small teeth, are classed as megadont, because of the shortness of the base of the skull. The index, however, is useful in the majority of races if used with caution. The Bushman has a short base to his skull, which must tend to increase the relative size of his teeth according to this index; but in spite of this the index is fairly low, showing the smallness of his teeth. The data derived from this investigation are tabulated below.

Average length of premolars + molars:		*Bushman.*	*Australian.*
	Upper arches . .	(24) 41·0 mm.	(159) 45·8 mm.
	Lower arches . .	(30) 45·1 mm.	(105) 49·6 mm.
Range.	Upper maximum . .	44·0 mm.	50·5 mm.
	Upper minimum . .	38·0 mm.	40·0 mm.
	Lower maximum . .	47·5 mm.	55·0 mm.
	Lower minimum . .	41·0 mm.	41·0 mm.

Dental Index.

Megadont.	Baboons	(4) 58·9 (Drennan).
	Gorillas	(2) 53·9 (Drennan).
	Australians	(86) 46·1 (Campbell).
	Kalahari Bushmen . . .	(4) 44·5 (Broom).
Mesodont.	Kaffirs	(4) 43·6 (Drennan).
	Bushman tribe . . .	(13) 43·5 (Drennan).
	Cape Colony and Griqualand W. Bushmen .	(5) 42·1 (Broom).
Microdont.	S.A. Bushmen . . .	(7) 41·3 (Drennan).
	Europeans	(99) 41·2 (Flower).
	Hottentots	(6) 40·3 (Broom).
	Bushmen	(7) 39·6 (Shrubsall).
	Koranas	(7) 38·5 (Broom).

The following table sets out a comparison between the average mesio-distal and linguo-labial diameters of the teeth of young skulls and the corresponding measurements of the teeth of the whole tribe, including the young individuals but excluding the Bantu types. A young skull is defined as one in which the third molars have not completely erupted into their adult positions. The teeth of the young individuals are almost invariably larger than the corresponding teeth in adults, probably because they have not been worn away to the same extent as the latter.

		Upper jaw.		Lower jaw.	
		Young skulls.	Adult skulls.	Young skulls.	Adult skulls.
Central incisor,	M.D.	(4) 8·8	(25) 8·3	(3) 5·3	(22) 5·0
,, ,,	L.L.	(4) 6·7	(27) 6·5	(3) 5·2	(22) 5·2
Lateral incisor,	M.D.	(4) 7·1	(24) 6·7	(3) 5·8	(24) 5·6
,, ,,	L.L.	(4) 6·0	(26) 6·0	(3) 5·6	(23) 5·6
Canine,	M.D.	(4) 7·7	(26) 7·5	(4) 6·9	(29) 6·8
,,	L.L.	(4) 8·0	(26) 7·8	(4) 7·3	(28) 7·0
1st premolar,	M.D.	(5) 7·1	(27) 6·8	(4) 6·9	(27) 6·9
,,	L.L.	(5) 8·9	(25) 8·6	(4) 7·5	(26) 7·6
2nd premolar,	M.D.	(5) 6·8	(28) 6·5	(4) 7·2	(30) 7·0
,,	L.L.	(5) 8·8	(26) 8·5	(4) 7·6	(30) 7·8
1st molar,	M.D.	(7) 10·4	(33) 9·9	(7) 11·3	(33) 10·9
,,	L.L.	(7) 10·8	(33) 10·6	(7) 10·2	(33) 10·2
2nd molar,	M.D.	(4) 9·8	(30) 9·7	(4) 11·0	(32) 10·6
,,	L.L.	(4) 10·9	(30) 10·6	(4) 10·0	(32) 10·1
3rd molar,	M.D.	(3) 8·7	(26) 8·2	(1) 10·0	(33) 9·9
,,	L.L.	(3) 10·8	(26) 10·3	(1) 9·3	(33) 9·6

Physiological Considerations.

Attrition.

One of the most characteristic features of the dentition of the prehistoric and of the primitive modern races is the wearing away of the crowns of the teeth as the result of mastication. This attrition is most noticeable on the surface of the crowns, where it is referred to as "occlusal attrition," but it also occurs between the teeth, when it is called "interproximal attrition." The former is due to the friction between the opposing tooth surfaces, and it is generally regarded as being associated with the use of hard, gritty foods by these people, but it is probably largely due to the use of soft foods contaminated with sand. It is also associated with the characteristic edge-to-edge bite of these races. The latter interproximal attrition is due to the friction between adjacent teeth as the result of the slight lateral movements of the teeth in mastication.

With a view to estimating and comparing the amount of occlusal attrition in different races, Broca has suggested classifying such dentitions into four groups according to the degree of wear :

1. Those with enamel worn without cusp obliteration or exposure of dentine.
2. Those with cusps worn down and dentine exposed.
3. Those in which quite an appreciable amount of the crown is worn away.
4. Those in which most of the crown has disappeared and the wear has extended to the neck of the tooth.

Campbell has adopted this classification in his monograph on the dentition of the Australian aboriginal, and his results in an abridged form are given below, together with the results for this Bushman tribe as a whole, and for the S.A. Bushmen in the Anatomy Department of the University of Capetown.

	I.	II.	III.	IV.
	Per cent.	Per cent.	Per cent.	Per cent.
Australian aboriginals (168)	23	39	26	12
Bushman tribe (51) . .	27	51	22	..
S.A. Bushmen (28) . .	11	32	25	32

From the table it can be seen that the great majority of the dentitions of the Bushman tribe are only moderately worn away. There are no instances of extreme attrition, such as seems to be present in the Australian group, and such as is shown by about a third of the Bushman skulls in the Anatomy Department. These latter Bushmen have come from rock-shelters and caves on the sea-coast and in the interior, and there is no doubt that for the most part they were quite uncivilised in their habits of diet, etc. On the other hand, the Bushman tribe had certainly reached a semi-civilised condition of life, with more modern habits of diet. We know that, in Europe, people who were identical in features to the present-day races presented extreme degrees of attrition, but that with the gradual so-called progress of civilisation the attrition has become less and less, until it has practically disappeared in the course of centuries. The present results, however, point to the fact that the degree of attrition can be very much reduced in a few generations.

This is not altogether unexpected, because, whilst in Europe the progress of civilisation has been very gradual, it has been relatively sudden in its impact on the South African aboriginals. Inasmuch also as attrition is to a considerable extent due to functional causes, such as the use of hard, gritty foods, one cannot expect it to persist to the same extent once the chief exciting cause has been removed. The acquired results of use alone are not likely to be perpetuated indefinitely. "If use had any effect here," states Sir Arthur Keith in an interesting paper on the adaptational machinery concerned in the evolution of man's body (6), "it would be to produce teeth with eroded crowns"; that is to say, the teeth would tend to erupt with such crowns! Nevertheless there may be hereditary factors sufficient to account for the special tendency towards attrition found in some races and in some individuals, which have been brought about as the result of some evolutionary mechanism modifying the relative proportions of the upper and lower teeth and jaws, and this will be referred to again in connection with the bite.

In functioning, the great majority of these incisor and canine teeth must have met edge to edge, as they mostly show quite considerable evidence of wear. The nature of the wear on the molars is interesting. The first and second molars have become worn down on the lingual aspect in the case of the upper teeth, and on the labial aspect in the lower jaw. The third molar does not show anything like the same degree of attrition as the first and second in either of the jaws, but what little wear there is affects the lingual aspect in the upper wisdom tooth and the labial aspect of the lower one. This seems to be a different state of affairs from that found by Campbell in the Australian aborigines.

Most of these skulls, however, show in a very definite manner the twisted occlusal plane between the opposing molars, as described by Campbell in the Australian. This plane slopes downwards and outwards between the first molars, and downwards and inwards between the third molars, instead of there being a gentle downward and outward slope between all three molars, as in Europeans.

The plane of attrition coincides with this plane between the first two molars, but not in the case of the third. The downward and inward slope behind is due to a most pronounced inward tilt on the part of the third lower molars, and to an opposite outward and upward tilt on the part of the third upper molars.

The few temporary teeth, which were still present in the dentitions of some of the young individuals of this tribe, all showed quite a definite degree of attrition. In these same young skulls it was also observed that the permanent incisors showed the characteristic crenated edge as they erupted through the alveolus. This feature seems to be absent in the Australian, since Campbell states that "From the material available, it would seem that the three developmental tubercles on the unworn incisal border, which are often seen in white children's teeth, are either absent or not well accentuated."

It is worth noting in connection with attrition that, although it often seems to involve serious destruction of the teeth, it does not seem to predispose to caries. In fact, races showing the most extreme degrees of attrition are particularly immune to this disease. There is hardly an example in this tribe of definite caries affecting the worn-down surfaces. It would seem therefore that, given teeth which are sound in structure and composition, mechanical injuries are not sufficient to give rise to caries. In fact, the smoothing out of the fissures between the cusps may be a factor in the prevention of caries.

On the other hand, it will be pointed out in a later section how frequently the wearing down of the teeth far enough to expose the pulp cavity leads in these races to apical abscesses and periodontitis.

The Bite.

The bite in the great majority of the individuals of this tribe is on the whole of an edge-to-edge type. There is, however, a slight tendency towards overlapping, when compared with the more accurate edge-to-edge bite of the uncivilised Bushman, but in no case is there anything like the degree of overlapping which is so prevalent in European dentitions.

The association of this type of bite with the attrition introduces morphological conceptions into these questions, because the nature of the bite must be determined to a large extent by the relative sizes of the teeth in the two jaws, and by the relative sizes of the teeth and jaws themselves.

It has been already shown how much less degenerate the mandibular teeth of this tribe appear to be when compared with the condition of the maxillary teeth. This points to a relative diminution of the maxillae relative to the mandible. The presence of relatively well-developed mandibular teeth would seem, therefore, to be sufficient to account for the edge-to-edge bite manifested by this tribe.

One has still to explain the slightly greater overlap in this group when compared with the more accurate edge-to-edge bite of uncivilised Bushmen. I think this can be accounted for to a large extent by the fact that the attrition in this tribe has not advanced to the same degree as in the uncivilised Bushmen. Sim Wallace, in a recent monograph on "The Variations in the Form of the Jaws" (7), states: "Until growth has stopped (say about the age of twenty-one), the amount of wear of the cusps never permits of edge-to-edge bite. We have seen that in a well-developed jaw the forward growth tends towards this when there has been attrition of the teeth. We know, too, that in prehistoric times our ancestors had generally edge-to-edge bite. But they did not have it till adult life and until the wearing of the cusps of the teeth permitted it. The overlap of the incisors was normal with Neolithic man, just as it still is with savages until they wear the cusps of the teeth down."

It is possible, however, that in presenting the slight overlap as opposed to the more definite edge-to-edge bite of the uncivilised Bushman, this tribe has begun to show a variation of a more inherent character. It is still a somewhat moot point how far these modern tendencies in the dentition are variations which are the result of definite modifications of the germ plasm, and are therefore truly hereditary, and how far they have simply been acquired as the result of environmental influences which have been imposed perhaps very early in the development of the teeth. The majority of authorities are of opinion that for some unexplained reason and by some as yet obscure mechanism the size of the teeth and the size of the jaws are diminishing, but to what extent, if any, the reduction in teeth and jaws is correlated is not yet clear. Humphreys in a paper on "Function in the Evolution of Man's Dentition" (8) states: "The plastic character of the teeth from the evolutionary standpoint is well illustrated by the extreme rapidity with which the decline of the third molar . . . has become established in modern races."

Sim Wallace (7), on the other hand, whilst admitting that hereditary variation as regards size of teeth, etc., cannot be doubted, is of opinion that "hereditary degeneracy in the civilised cannot be admitted until it is proved that lack of the trophic stimuli of mastication and normal healthy development is not sufficient to account for the abnormally small jaws and crowded dental arches generally seen among those in whom these stimuli have been in abeyance." He also states that "we have thus evidence that the germ plasm has not been permanently injured with regard to the possibility of the civilised having as regular teeth as prehistoric man."

Until we are able to distinguish the great modifications of the teeth and jaws which are undoubtedly acquired as the result of defective diet, imperfect function, and other environmental causes, from the normal hereditary variations; and until we have more knowledge as to whether or not these acquired variations are in any way transmitted, and as to the cause and mechanism of ordinary variations, it cannot be said that the slightly greater overlap in the bite, and the slightly greater degree of irregularity in the dentition of this tribe, when compared with that of the uncivilised Bushman, constitute evidence of any morphological change in the "Bushman" dentition in the short time under consideration.

Interproximal attrition is also a very noticeable feature in the majority of the dentitions of this Bushman tribe, and as it is rarely met with in the highly civilised races, it is worthy of some consideration. There can be little doubt but that it is brought about by a slight lateral movement taking place in the vigorous mastication of very hard foods. It does not appear to be at all pathological, nor does it seem to be the result of the slight alteration of the shape of the teeth due to occlusal attrition.

The loss of tooth substance due to this mutual attrition does not leave open spaces between the worn teeth, but these are brought into close contact and almost interlocked. As a consequence the measurement from premolar to molar as taken for Flower's dental index is less than the sum of the ordinary measurements of the individual teeth taken, where the attrition is less marked. Campbell used this difference to denote the extent of the interproximal attrition in the premolars and molars. He found the difference to be 1·6 mm. in the upper jaw and 2·4 mm. in the lower jaw. In the present group the following is the result:—

	Upper.	Lower.
Sum of the average M.D. diameters of the individual premolars and molars . .	41·1	45·3
Average premolar-molar length . .	41·0	45·1
Difference (*i.e.* wear)	0·1	0·2

The result is a very insignificant difference, and I feel confident that it does not express anything like the amount of attrition which takes place. The method is further open to the objection that the premolar-molar length is the measurement of the chord of a flat arc, and that the individual measurements of the teeth as taken may be compared to measuring five small segments of the arc and adding them together. The result is bound always to exceed the single measurement of the chord, apart from the presence or absence of attrition. I have therefore decided to take the difference between the sum of the averages of premolars and molars of all the Bushmen in the tribe, and the sum of the averages of those of all the young Bushmen in the tribe, as a better indication of the premolar and molar attrition. This gives 1·7 mm. for the upper jaw and 1·1 mm. for the lower jaw.

Pathological Conditions.

Caries.

The incidence of caries in this little group of skulls, including all the types, and the incidence in a small group of uncivilised Bushmen, is given in the subjoined tables, together with a selection of data from Campbell's work for comparison.

Race.	Percentage of persons or skulls showing carious teeth.
Esquimaux . . .	1·4
Maoris	3·0
Indians of N.W. American coast	3·9
Fiji Islanders . . .	5·2
North American Indians .	9·5
Australians . . .	(583) 13·5 (Campbell).
Zulus	14·2
Bushmen	20·6
Negroes (slaves) . . .	20·8
Bushman tribe . . .	(53) 22·6 (Drennan).
S.A. Bushmen . . .	(34) 32·4 (Drennan).
English and Scottish school-boys and girls . . .	(10,500) 86·0 (British Dental Association).
North German school children	(19,725) 95·0 (Schleswig-Holstein Dental Association).

Race.	Number of teeth examined.	Percentage of carious teeth.
Australian aborigines	10,561	1·6
Bushman tribe	1,211	2·6
S.A. Bushmen	397	5·5
Europeans	3,422	40·4

The incidence of caries in the teeth, which were present in the skulls of this tribe, amounted to 2·6 per cent.; and there was a total dental defect of 12 per cent. in the dentition due to pathological and senile losses and to caries. As the group of uncivilised Bushmen examined showed an incidence of 5·5 per cent. of caries, and a total dental defect of 16 per cent., the influence of civilisation does not appear to have damaged their dentitions.

Of the skulls of the Bushman tribe 22·6 per cent. showed caries, usually in a very few teeth in each case, whilst 50 per cent. of the skulls had dental deficiency with pathological or senile loss of teeth or caries. This is a better state of affairs than in the case of the uncivilised Bushman skulls, 32·4 per cent. of which showed a degree of caries, and 70 per cent. of which showed dental deficiency.

From such a small amount of material it is impossible to draw any dogmatic conclusions as to the significance of the site of incidence of the caries in this tribe. The back teeth were definitely more affected than the front teeth, the wisdom teeth, especially the lower ones, presenting about half the instances of caries.

The caries occurs twice as often in the interproximal situation as it occurs on the occlusal surface, and it is usually low down, affecting crown and neck.

About half the dentitions of the Bushman tribe showed evidence of "food-packing," a depression of the alveolus between and around the teeth, without being necessarily associated with alveolar absorption, but only about one-third of the uncivilised Bushman dentitions showed evidence of this.

Erosion.

If we define "erosion," as Campbell does, as "a condition characterised by tooth cavities situated near the gingival margin, and typified by a wedge or saucer-shaped shallowness and a dense polished surface," this condition was absent from the Bushman tribe. It was present, however, to a considerable extent in the uncivilised Bushman skulls. There was a fair amount of evidence of an unhealthy state of many of the dentitions in this tribe in the gingival region. Compared with European dentitions there was a remarkable absence of tartar deposit. The tissue of the necks of many of these teeth was soft and friable, and even the enamel was in many instances soft and brittle, suggesting a defective composition of the teeth or an unduly inimical medium in which they were buried.

Periodontitis.

About a quarter of the mouths showed a more definite pathological condition, with alveolar absorption, loosening of the teeth, and considerable evidence of ante-mortem losses. This generalised condition is in marked contrast to the condition met with in the uncivilised Bushmen, 50 per cent. of whose skulls show one or more examples of isolated typical apical abscess. These abscesses are the result of infections spreading from the exposed pulp cavity or root canal up to the apex. In many of these cases the teeth are worn down to the roots, and the pin-hole opening into the root canal is patent. The deepest part of the socket for such a tooth shows a nest-like cavity surrounded by condensed alveolar tissue, and in many of such cases there is a sinus opening through the alveolus.

Crowding.

The alignment, although rarely perfect, was good in thirty of the dentitions examined, slightly irregular in twenty-one skulls, and in one skull there was considerable displacement of the teeth. The alignment of the teeth is much better in the uncivilised Bushman dentition, twenty out of twenty-five arcades being regular, four being slightly irregular, and one with several of the teeth zigzagging.

Variations.

The general form of the crowns and roots of all the teeth in this Bushman tribe shows no variation from what is characteristic for the hominidae. The characteristic feature is the general smallness in size, which is brought out in the tables. Nor does there appear to be anything unusual in the range of variation.

Three of the skulls in this tribe, namely, skulls numbered 18, 19, and 29, show a reduction in the number of the teeth, in that they lack the two upper third molars. These skulls seem to have definitely completed their growth, and Mr. Leslie G. Gray, L.D.S., has kindly verified their absence by radiography. This reduction in the number of teeth in the upper jaw is in harmony with the general tendency towards lack of full development of the upper teeth already noted.

One skull, No. 34, shows signs of having had three definite upper left incisor teeth. This skull also shows a remarkable mandibular torus, and it has a peculiar opening in the supero-medial angle of the left orbit communicating with the anterior cranial fossa.

In skull No. 5 there is a small enamel nodule on the labial surface of the crown of the upper right wisdom tooth.

Skull No. 11 has a deficiency in the floor of the left orbit, so that this cavity communicates with the maxillary antrum.

Summary.

1. This paper contains an anthropometric survey of the teeth of a Bushman tribe, the skeletons of which were kindly loaned to the author for this work by Dr. L. Gill, Director of the South African Museum, Capetown.

2. Mr. J. Drury, modeller to the South African Museum, has supplied the data regarding the excavations.

3. The collection comprises the remains of fifty-three individuals, reputed to be Bushmen, and reasons are given in the text for classifying them into a group of approximately forty-four Bushman and nine Bantu types for purposes of study.

4. With a view to providing the necessary comparative data, which, with the exception of Campbell's work on the Australian aboriginal, seems to be entirely wanting, the author also includes a preliminary examination of the dentitions of the uncivilised South African Bushman, of the Kaffir, and of a few gorillas and baboons.

5. The author follows to a great extent the plan of work adopted by Campbell. The various dimensions of the crowns and roots, etc., are set out in a tabular manner for comparison. The morphological conclusions arising from this data are then dealt with. This is followed by notes on :

6. The size and cusp pattern of the molars, and the condition of the roots.

7. Flower's dental index.

8. A comparison between the size of the permanent teeth in young and older skulls.

9. Physiological considerations, such as attrition and the bite.

10. Pathological considerations, such as caries, erosion, periodontitis, apical abscesses, and crowding.

11. Variations.

In conclusion I wish to thank Mr. A. A. Lamb, my technical assistant, for checking the various calculations. I am also indebted to Sir J. F. Colyer, who examined these dentitions, for valuable criticism and suggestions regarding the pathological section.

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Tooth Measurements.

	Mesio-distal diameter.				Labio-lingual diameter.				Total length.				Root length.			
	Observations.	Average.	Max.	Min.	Observations.	Average.	Max.	Min.	Observations.	Average.	Max.	Min.	Observations.	Average.	Max.	Min.
Upper Arch.																
1st incisor	(25)	8·3	9·5	8·0	(27)	6·5	7·5	6·0	(19)	21·8	25·5	18·5	(19)	12·5	15·5	10·0
2nd ,,	(24)	6·7	8·5	6·0	(26)	6·0	6·8	5·3	(18)	20·4	25·0	19·0	(18)	12·5	16·0	11·0
Canine .	(26)	7·5	8·3	7 0	(26)	7·8	8·8	7·0	(20)	24·2	28·8	21·8	(20)	16·3	19·5	13·3
1st premolar	(27)	6·8	7·8	6·0	(25)	8·6	9·5	7·8	(17)	21·1	25·3	19·0	(17)	14·5	18·0	12·0
2nd ,,	(28)	6·5	7·3	5·8	(26)	8·5	9·3	7·3	(15)	21·1	25·0	19·0	(15)	14·8	18·3	13·0
1st molar .	(33)	9·9	11·3	8·5	(33)	10·6	11·3	9·5	(15)	17·6	20·5	15·5	(15)	11·6	13·5	10·0
2nd ,, .	(30)	9·7	10·8	8·8	(30)	10·6	12·0	9·8	(14)	18·4	21·0	16·3	(14)	12·6	14·3	10·0
3rd ,, .	(26)	8·2	9·8	7·0	(26)	10·3	12·0	9·3	(10)	18·0	21·0	14·8	(10)	12·6	16·8	8 0
Lower Arch.																
1st incisor	(22)	5·0	6 0	4·3	(22)	5·2	6·0	5·0	(20)	18·8	22·0	16 0	(20)	12·0	14·5	9·5
2nd ,,	(24)	5·6	7·0	5·0	(23)	5·6	6·5	5·0	(24)	20·6	24·0	18·0	(24)	13·4	16·0	11·3
Canine .	(29)	6·8	8·3	6·0	(28)	7·0	8·0	6·0	(26)	23·6	29·3	21·0	(26)	15·3	19·3	12·5
1st premolar	(27)	6·9	7·5	6·3	(26)	7·6	9·0	6·3	(26)	20·2	25·0	17·3	(26)	14·1	20·0	11·3
2nd ,,	(30)	7·0	8·0	6·3	(30)	7·8	9·0	7·0	(27)	20·7	26·0	18 0	(27)	14·8	20·0	11·5
1st molar .	(33)	10·9	12·0	10·0	(33)	10·2	11·3	9 0	(27)	17·4	20·5	15 0	(27)	12·4	16·0	9·8
2nd ,, .	(32)	10·6	11·5	9·3	(32)	10·1	11·3	8·5	(22)	18·6	22 0	17 0	(22)	13 1	15·0	10·5
3rd ,, .	(33)	9·9	11·0	8·0	(33)	9·6	10·5	8·0	(21)	17·6	20·3	15 0	(21)	12·5	16·5	9·0

ANNALS

OF THE

SOUTH AFRICAN MUSEUM

VOLUME XXIV.

PART II, *containing* :—

5. *Preliminary Report on the Anthropological Researches carried out by Mr Drury of the South African Museum in South West Africa.* (With Plates XII–XXII and 1 Text-figure.)

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5. *Preliminary Report on the Anthropological Researches carried out by Mr Drury of the South African Museum in South West Africa.*

(With Plates XII–XXII, and 1 Text-fig.)

[In 1919 the South African Museum was enabled to extend to the region embraced in the mandated territory of South West Africa the Anthropological Researches on the Bushmen and other native races which it had been pursuing in past years in other parts of South Africa. Every facility was extended to the Museum Expedition by the Administration and the late Sir Howard Gorges.

In 1920–21 the Administration of South West Africa voted a grant-in-aid to the Museum for the purpose of continuing these researches, and the trustees desire to take this opportunity of expressing their thanks to the Administration and the then Administrator, Mr. Guys Hofmeyr. To Dr. Fourie, ex-Medical Officer of Health at Windhoek, who is a keen student of the Bushmen and other native races, the Museum is under a debt of gratitude for the interest he took in the work, and the considerable amount of time and trouble he spent in helping to organise these expeditions.

The task of obtaining anthropological and ethnological data was entrusted to Mr. J. Drury, the Museum taxidermist and modeller, who has had considerable experience of the primitive peoples. In 1919 Mr. Drury visited the Grootfontein district, taking casts, photographs, and measurements at Grootfontein, Nuragas, and Otjituo. Mr. Drury then visited Gaub, between Grootfontein and Tsumeb, for the purpose of obtaining casts of rock gravings.

In 1921 Mr. Drury carried out a further and more extensive expedition. After casting a large number of the natives of various tribes employed in the prison at Windhoek, he went out to Sandfontein, where Dr. Fourie had reported a tribe of Bushmen still living in their primitive manner, and apparently but little influenced, physically or culturally, by Bantu or other races. On this expedition a number of casts and measurements, a large number of still-life photographs, and some hundreds of feet of cinematograph film were taken. All this material is preserved in the South African Museum.

In addition to the material and data obtained by Mr. Drury, other members of the Museum staff obtained useful information in the course of the Zoological and Botanical Survey which was carried out on behalf of the Administration. In 1921 and 1923 Dr. K. H. Barnard, Assistant Director, obtained photographs, a large number of measurements, and many notes on the customs of the various tribes of Ovambos. In 1925 Mr. R. F. Lawrence, in the course of an expedition to Zesfontein in the Kaokoveld, visited the rock gravings on the farm of Mr. C. Schlettwein at Otjitambi, north-west of Outjo.

In the following report I have endeavoured to give, for the most part in Mr. Drury's own words, the substance of the very valuable observations which he made on the habits, customs, occupations, and physical characteristics of the tribes which he visited.

Mr. A. J. H. Goodwin, Research Assistant in Ethnology at the University of Cape Town, has read through the original notes and has helped in various ways in preparing them for publication. I am indebted to him also for the drawings reproduced in the text-figure.

It should be understood that the photographs, both still-life and cinematograph, accompanying this paper are only a selection of those which the Museum possesses. A more comprehensive and fully illustrated account of the physical characteristics of these peoples, based on Museum material, especially of certain features which are outside the scope of the present report, will be published on a future occasion.

Miss Bleek, who accompanied the 1921 expedition, studied the language and folk-lore of these tribes, and has published a work on this aspect of the subject.*—Editor.]

The Bushman Tribes at Sandfontein.

Sandfontein lies due east of Windhoek on the border-line between South West Africa and Bechuanaland. The railway now runs as far as Gobabis. (See map: Ann. S. Afr. Mus., vol. xxix, pl. 4, 1931.)

Two tribes were found living in this locality: the Auen and the Naron. The latter appeared to be the true local Bushmen, whereas the former had wandered over from another district some miles away. Mr. Drury was unable to discover exactly whence they had come.

These tribes were the most interesting with which members of the Museum staff have come into contact. They appear to be by no means pure in blood, having apparently a strain of Bantu in them.

* The Naron, a Bushman Tribe of the Central Kalahari. By D. F. Bleek. Publicat. School Afr., Life and Language, University of Cape Town. 1928.

Their language and culture, however, appear to have been but little influenced.

The two tribes were at first sight indistinguishable, and it was only after they had been studied for some considerable time that the differences between them were noted; even so, the differences are difficult to state in concrete terms. The pigmentation of the skin, the material culture, and the language are similar, but on the whole the Auen are slightly taller and more powerfully built, and appear to be more adept in the manufacture of utensils and implements. In demonstrating the manufacture and use of any article, the demonstrator was nearly always one of the Auen.

Physical Characteristics.

In colour these people are of a dirty mahogany. Some are darker than others, and some show a slight yellowish tinge, but not exactly like that found in the Cape Bushmen. The following table gives an idea of the colours of different parts of the body according to the colour-chart of von Luschan:—

	Chart No.	Cast No.	Face.	Neck.	Upper Trunk.	Lower Trunk.	Upper Limbs.	Lower Limbs.
Auen	1	16	25	..	25	28	..	..
	2	15	25	..	28	..	..	31
	3	14	25	..	26	..	..	28
	9	22	25	..	25–26	..	26	29
	10	18	24	..	25	24	..	26
Naron	12	4	28	33	..	..	..	..
	13	2	24–26	26	24	24	25	30
	15	12	22	..	..	..	25–26	28
	28	21	21–22	21–22	23	23	25	30
	29	17	29	32	30	30	..	..
	14	13	22	..	..	..	25–26	28

The hair is a dirty brownish-black. It is usually short and thick, but in some cases, both among the men and the women, it was worn in plaits which hung down round the ears and back of neck, resembling a mop (Plate XIV, fig. 1, and Plate XVIII). The eyes were of a rich brown colour, with a ring round the iris, varying from dark brown to pale grey, or sometimes blue.

The chart at the end of Mr Drury's report gives the comparative measurements of forty of these people taken on the living subject, from which it appears that the average height of the Naron is 150 cm., while that of the Auen is 158 cm.*

Dress and Ornamentation (Plates XIV, XVII, XVIII).

Dress.—The costume of both peoples is similar, the material used being skin brayed to the consistency of chamois leather, the hair having been removed. The men wear a loin skin, only sufficient to cover the genitalia, and this is usually the only garment. In some cases, however, the men wear a mantle. This would consist of a large skin, hair removed and dressed soft, which is slung from the shoulders. This skin would serve as a mantle by day and a blanket by night. The boys often made use of this skin as a protection against the sun's rays.

The women, like the men, wear a loin skin, though not always, and an undermantle hung from the shoulders, over which lies a still larger skin, serving the same uses as the man's garment. A few of the women wear a small semi-circular pendant apron, often edged with beads, and sometimes laced, through cuts in the fabric, with pieces of leather and string. The women almost invariably carry a powder-puff (Plate XIV, fig. 2); the outfit consisting of a tortoise-shell, sealed at the one end, a small puff of soft fur from a hare or other animal, and a sweet-smelling powder of herbs, brown in colour. The women powder their faces with the puff.†

Ornamentation.—This consisted of strings of ostrich egg-shell beads for the most part, and in a few instances of European trade beads. A well-dressed woman would have bangles, and pendants of ostrich egg-shell beads tied to the hair and suspended to hang between the eyes. Besides these, thin medallions or short strings of beads are hung all round the head. Round the neck, arms, and legs would be a few strings of beads; on the arms and legs would also be bracelets and armlets cut solid from raw hide and slipped over the member to dry in place, in some instances indenting the flesh to a considerable degree. These were usually cut in such a way that two tassels hung down from the bracelet, one inside the limb and one on the outside.

The older women are not so fond of dressing, their karosses being in most instances old, having acquired the gloss and smell of a well-

* *Cf.* Schapera, The Khoisan Peoples of South Africa, London, 1930, chap. iii, and frontispiece.

† *Cf.* Schapera, *loc. cit.*, plates vii and viii.

worn garment. It is customary for the older women to give all their good things to the daughters on their marriage.

The men wear very little in the way of ornamentation, such finery being confined to the unmarried men, who would wear a few bangles at most. The older men content themselves with a few leather bangles similar to those worn by the women. These are usually worn on the legs, glass beads being preferred for the arms.

Huts (Plate XII).

The Naron huts (the huts of the Auen were not seen) are constructed of a number of light branches, the thicker ends of which are trimmed and forced into the earth. When sufficient have been erected, they are brought over to form an arch, and tied. The hut is formed on a ground plan which consists of the greater portion of a circle, the one side being left entirely open on the east as an entrance. The whole is then covered with grass, little attempt being made at thatching. The hut is usually 6 or 7 feet across, and some 5 to 6 feet high. In summer this shelter is comfortable and holds off the west winds, which are prevalent. In winter, however, which is the rainy season, they cannot be of much use. The opening faces the east to allow of the morning sun entering. Such a hut would be inhabited by a family of three to five, consisting of the parents and two or three younger children. These tribes have seldom more than two children to a family. The elder children are separated from their families until they marry.

It was noted that each hut was sacred to its owners, and that visitors were always received outside.

Contents of Hut.

The furnishing is slight. The beds consist of dry grass along the back of the hut. Besides this, there are a few ostrich egg-shells for holding drinking water, and a few skins. In warm weather the fire is made just outside the hut. This fire consists of a few sticks of burning wood resting on the accumulated ashes of past fires. In the cold weather, however, which here coincides with the rainy season, the fire is brought into the hut, where the inhabitants sit and sleep round its blaze.

Near the entrance to the hut are to be found two or three large stones used as anvils or for grinding berries, and a few smaller hammer-stones and rubbing-stones.

Village.

There would appear to be no village form, but the huts are scattered about in a clearing in the bush, the distance between them varying from 10 to 20 paces.

One very poor hut, merely a shelter, was occupied by two unmarried girls under the charge of an old woman. These two girls were awaiting marriage. Youths of suitable age are similarly segregated in bachelors' quarters. They were in a worse condition, having only a tree with a few bunches of grass stuck in the branches to protect themselves. Here they stayed until such time as they should marry and erect their own huts.

Utensils.

These are few, being governed by their needs as a hunting people. Ostrich egg-shells are laid on their side, the blow-hole being made on the one side towards the end to allow of the egg being placed in a position of greater stability.

In the hut was usually a pointed stick for digging roots and bulbs, and very often a wooden pestle and mortar, used for pounding up the dry Rasyntje * (*Grewia cana*) berries. Nets for carrying their belongings, made of string, with a mesh of some 4 inches, were also present. These would be packed with eggs, bags, etc., when on the move, and slung on the back, on the digging stick in most instances. There was often a reed sieve, a mat woven of slender reeds in such a way as to leave a fine mesh, suitable for sifting termite larvae. Drills for the manufacture of the ostrich egg-shell beads, and others for making their soapstone smoking-pipes, and a gemsbok horn for the making of string were also present.

For the work of braying and dressing skins they had a piece of iron inserted into a piece of wood, the whole 18 inches long (text-fig. 3), and pegs for stretching out the drying skin. Wooden spoons, and wooden scoops for hoeing (text-fig. 1), completed their outfit as a rule.

Ostrich egg-shells were sucked dry through a hole made in the side towards one end; what was wanted was eaten, and what was to be kept was spat out into another vessel. Each hut would have from two to three of these vessels, and in one case as many as six. They would constitute the Bushman's most valued possession, and would be stood against the edge of the hut, hidden in the grass, out of harm's way and cool. To steal water is considered a criminal offence, and is sometimes punishable by death where water is scarce.

* Afrikaans = a little raisin.

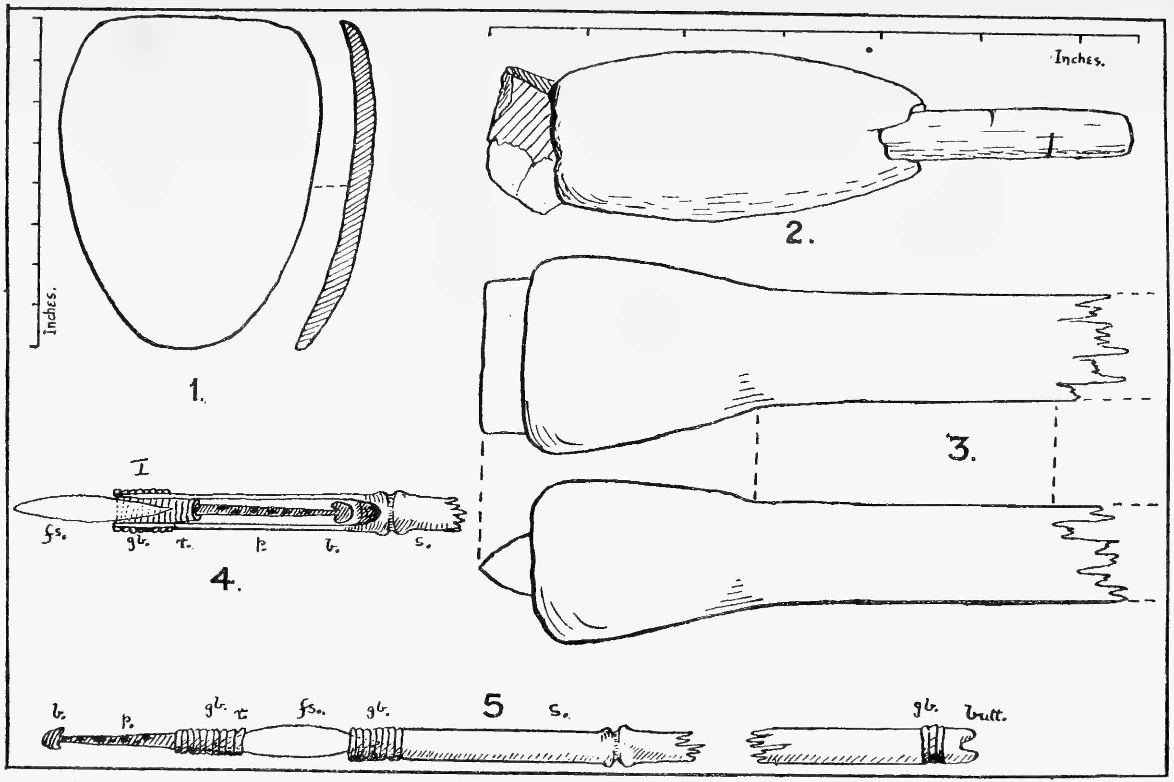

FIG. 1.—Plaque for "hoeing" (with scale alongside). FIG. 2.—Instrument from Plettenberg Bay (stone) (with scale alongside).
FIG. 3.—Naron skin scraper (iron) (to same scale). FIG. 4.—Auen arrow (reversed) (slightly englarged).
FIG. 5.—Auen arrow (ready for use) (slightly enlarged). *b.*, barbed-iron tip; *p.*, poison; *gb.*, gutt binding; *r.*, reed grip; *fs.*, foreshaft of bone or wood; *s.*, shaft (of reed).

In dry country, water is obtained from spots known to the Bushman, where he can dig in the sands to find it. Sometimes he is driven to seek further, and will take a reed, remove the pith, and tie fibres round the end to act as a filter. This done, he inserts the wad into the ground at some chosen spot and sucks the end of the reed until water comes up. This is spat into an ostrich egg-shell. In some cases, so great is the suction necessary to draw the first water that blood is drawn from the mouth.

The stick used for digging bulbs is usually from 2 to 3 feet long and a little over an inch in diameter; one end is sharpened to a point. The stick is often used for carrying burdens over the shoulder, for a walking-stick, a weapon, a lever, in fact almost anything, but primarily it is intended for digging. They use no pierced stones for weighting this digging stick, nor do they know the use of these.

The pestle and mortar are of wood, and in most instances have a block of stone inside, as the wood is not sufficiently hard to grind the pips of the Rasyntje berry, which are usually ground. The mortar is a hollowed block of wood some 15 inches high, and 7 inches in diameter (Plate XII, fig. 2). The pestle is about 2 feet long, of hard wood, and similar in shape to the European implement. The person pounding would hold the mortar before him, with his feet, or letting it stand and steadying it with the one hand. The pestle would be held in both hands or the free hand.

Scoop or Primitive Hoe (Text-fig. 1).

In one of the huts was found a flat piece of wood, very similar in shape to bone and stone specimens obtained from cave sites, as at Coldstream (Cape). These latter the late Dr. Péringuey termed "palettes." They were used, according to his theory, for preparing ochre for smearing the body (Ann. S. Afr. Mus., vol. viii, p. 160, pl. xxvi, fig. 196). The interest of Mr. Drury was aroused by the instrument, and he asked for a demonstration of its use. The owner of the object proceeded to dig with his digging stick, then taking the wooden plaque in his right hand, in the bend of the finger, the thumb controlling it from behind, he proceeded to scrape out the earth. On being asked why this was used, the man replied that the constant digging of roots and bulbs was wearing to the fingers, and such an implement was necessary. One is thus brought to the view that the so-called palette of the Strandloopers is in reality, perhaps, the earliest form of the hoe.

Weapons (Text-figs. 4, 5).

The only weapons possessed by these tribes are bows and arrows, though they occasionally obtain assegais from Bantu tribes by bartering ostrich egg-shell beads. Quite young children have bows and arrows of proportionate size, and learn to use them by playing games and shooting birds with them.

The bowmaker (it is not a special trade) had the string ready prepared beside him, and had cut a suitable length of Rasyntje bush (*Grewia cana*). He removed the bark of the branch and marked off the required length of the bow by two rings, cut round the stick, one towards each end. These ends were not, however, removed at this stage. The stick was first shaped, the two ends being thinned down as far as the marked rings. When the taper towards the ends was complete, the thick portions past the marked rings was removed, the ends trimmed, and the bow was ready for stringing. In some instances pieces of gut were slipped over the ends of the bow and round the middle in a raw state, where they would dry in position and prevent the bow splitting, and also form a grip. The string would then be tied to one end, the bow bent by holding it firmly between the legs and pressing the end on the ground, then the other end would be attached in such a manner that the string was just taut.

Arrows.—As reeds were scarce there was no chance of seeing these being made. The arrows actually seen, however, were composite.

The foreshaft consisted of a piece of bone, some 2½ inches to 3 inches in length, sharpened to a point at each end. The hinder end fitted into the reed shaft, the end of which was bound with gut, but not sufficiently to grip the bone foreshaft. The fore end fitted into a short section of reed, in which was a small iron point, sometimes barbed, but more usually merely a spike. In most cases these arrows were poisoned. When not in use, to protect the user, the bone foreshaft, together with the head, is removed from the socket in the reed shaft and reversed into the socket, thus concealing the poisoned portions (fig. 4). The arrows are quite unfeathered. In the large collection of arrows in the South African Museum the examples most nearly approaching this type are from N'Gamiland and the Grootfontein district. They are of a different type from "Bushman" arrows from Namaqualand. In using the bow and arrow the man would have no difficulty in shooting an arrow with considerable force a distance of over 100 feet. These tribes do not use quivers.

Manufacture of Beads and other Articles (Plates XV and XX).

Unique opportunities were obtained of observing the method of manufacture of ostrich egg-shell beads, rope, string, and soapstone pipes, and the dressing of skins.

As varying accounts, mostly based on conjecture and not actual observation, have been given regarding the manufacture of ostrich egg-shell beads, I give Mr. Drury's notes here *in extenso*. It is possible that the details of manufacture may vary in different tribes and localities. One of the casts in the Museum shows a woman engaged in the work, together with the actual objects used by her.

Ostrich Egg-shell Beads.—These beads are made by the women. An ostrich egg is first broken into large pieces and from these pieces smaller pieces about half an inch in diameter are bitten off with the teeth. After accumulating a number of these pieces the woman proceeds to drill the holes. She takes her drill, which is a stick about 20 inches long, having an iron point at one end, and, placing the chip of egg-shell on a hard piece of skin, she twirls the drill rapidly between her palms. When she has drilled a hole nearly through the egg-shell she reverses it and starts drilling from the other side, until the two holes meet. She next proceeds to enlarge and smooth the edge of the hole with the aid of a pointed rimer—a tool somewhat corresponding with our bradawl, and consisting of a small piece of wood tipped with a piece of pointed iron. The next step consists in roughly trimming the perforated piece of egg-shell to the shape of a disc. This is done by means of two suitable stones used as a hammer and an anvil. The woman holds the piece of shell on the edge of the anvil, and with the hammer proceeds to chip away the unnecessary corners until it assumes a roughly circular outline. These roughly trimmed discs are now threaded on a strong piece of gut, about 12 to 14 inches in length. The discs are pressed closely together and the gut is knotted at both ends. Bits of fibre, such as are used for making string, are then twisted round between the discs, so that the whole becomes a solid and rigid mass like a stick.

This stick of discs is next placed on a piece of hard skin or wood and the operator proceeds to grind it down smooth with a rough-grained stone. This process reduces all the beads to a uniform size and beautifully rounded.

It has often been assumed that the beads, either singly or strung together in bunches as above described, were rubbed on the stone.

These observations show that, so far as these tribes are concerned, the reverse process is practised.

The final process consists in unstringing and cleaning the finished beads, and restringing them on long strings until the desired length has been made. In threading the beads these natives put the bead over the tip of string, contrary to the method of threading beads on needles which is in vogue among Europeans. The whole process of manufacturing these beads is long and tedious. The woman who was watched broke three out of four discs before completion. She had taken just over three months (moons) to make a string of beads nearly 12 feet long, and was willing to part with the whole string for two handfuls of tobacco.

Rope and String (Plate XX, figs. 1–5).—This is manufactured by the men. In this industry a gemsbok horn (*Oryx gazella*), fashioned to a blade along one side at the tip end, and a piece of hard skin were used. The man has beside him a number of Sansevieria spines or leaves. He holds the horn in the right hand and beneath the right foot, the knife edge downwards, resting on the dry skin. He takes a Sansevieria leaf, passes it beneath the blade, and allows the foot to weigh upon it. He withdraws the leaf, thereby removing with the blade the flesh, and leaving the fibre clean. This fibre is thrown aside and the flesh put over it to keep it moist. A length of prepared fibre is taken and the one end is held in the left hand, the body of the fibre being twisted against the right thigh by the right hand. The next piece is twisted into the last, and itself twisted to string. This goes on until a sufficient length is obtained. The string is even and strong, comparing well with the machine-made article.

Soapstone Pipes (Plate XX, fig. 7).—A drill and a rimer are used. These consist of two pieces of iron, about 2 feet in length and a quarter of an inch in diameter, flattened at one end to a "diamond point." The soapstone is prepared by grinding it to a cigar shape, on a hard rock. This is then placed between the maker's feet as he squats, and he proceeds to drill from the end. He holds the drill between the palms of the hands, and rotates it with a rapid twirling motion, in alternate directions, the hands moving down the stem of the drill; when they reach the bottom he starts again at the top. When this hole has reached a sufficient depth, he takes the larger drill in his right hand, the pipe in his left, and proceeds to enlarge the hole with a riming motion. He reverts to the smaller drill, and in time, working from both ends, he bores right through the stone. This done he proceeds to shape the outside of the bowl by rubbing it on large rough boulders. This pipe takes several days of continuous work. Many of these Bushmen are now using brass cartridge cases converted into pipes.

Skin Dressing (Plate XX, fig. 6 and text-fig. 3).—This is done with rough stones, and a stick with a blade inserted at the one end (text-fig. 3). The flayed skin is stretched out on the ground and pegged to dry. The man takes it up when dry, places it on the ground, and, sitting on it, proceeds to scrape it on the fleshy side until it is reasonably pliable. The skin is then taken in the hands and wrung with a twisting motion until soft. Sometimes rough-faced stones would be used. If the skin is too hard the maker places it in the shade, covered with moist earth. Once the skin is soft it is rubbed with grease, left to absorb this, and twisted and wrung again. It is rubbed with ochre, giving it a reddish appearance, and the fat is allowed to dry out. It is now as soft as kid. The time taken to dress a cat skin may be three hours, but one man may take three days to dress a goat skin—working, walking about, talking, smoking, sleeping, and returning to the work.

A point of great interest is raised by comparing the iron scraper used by these people to-day with a stone implement from Plettenberg Bay in the South African Museum (text-fig. 2).* The latter consists of a stick covered with a resinous substance, in which is set a stone flake of rough chisel shape. The instrument used by the Bushmen is similar, but longer in the handle (18 inches long), the thickened end corresponding with the resinous mass on the Plettenberg Bay specimen, and having inserted in it a broad, flat, chisel edge of iron. This suggests a possible use for the Plettenberg Bay implement.

Subsistence.

These tribes are, in common with all the Bushmen, a hunting and collecting people. Their food at the present day consists largely of the berries of the Rasyntje (*Grewia cana*) bush, together with other vegetable foods, such as the wild cucumber, wild melon, and several varieties of plant roots.

These Rasyntje berries are small brown berries, a little larger than a peppercorn. They grow on a bush that is common in these parts, and reaches a height of some 5 to 6 feet. The taste is not bad, but they are slightly astringent, and one does not take to them readily.

* *Cf.* Péringuey, Ann. S. Afr. Mus., vol. viii, p. 159, pl. xix, fig. 150, 1911; and Hewitt, Trans. Roy. Soc. S. Afr., vol. x, p. 49, pl. i, 1921.

There is more seed than fruit; the Bushmen, however, either eat stone and all, or dry the berries in the sun and pound them up, including the stones. A drink is made from this pounded mass. Even the dogs eat the berries off the trees. The wild cucumber (*Citrullus* sp.) is about 4 to 5 inches long, and grows on a creeper which grows into the trees. The skin is smooth and a pale olive green in colour, marked with whitish stripes and spots, and ripening to a brilliant red. The fruits are easily visible hanging from the bushes on which the creeper has grown. This fruit is only eaten green, never ripe. Eaten raw they are far from palatable; heated on the coals, however, they are better.

The melon (*Acanthosicyos horrida*) is about the size of a cricket ball, and is covered with blunt spines. It is green, ripening to a lemon yellow. They are even more bitter than the cucumber, and are not liked by the Bush people.

Among the roots eaten is one large variety with a brown skin like a potato, white, fleshy, and full of moisture inside. Raw, these have an earthy taste, but cooked on the open fire they are better, and with the addition of salt and pepper make a dish fit for any table. The plant to which this root belongs is insignificant, showing only two long thin stems growing from the bulb, similar to a creeper, with a few small leaves.

Snakes, rats, and mice are never used as articles of diet; in fact, Bush people have a dread of them in these parts. Looking through the middens before the huts no remains of any such animals or reptiles were found.

The wooden spoons used for eating mealie-meal porridge are probably a modern innovation from the surrounding Bantu. In general, the life led by these folk is lazy, consisting of the search for food, dancing, sleeping, and a few industries, which are often pure pastimes.

Dancing (Plates XIX and XXI).

There are several dances, all of them somewhat similar. Both tribes took part in these dances. Dancing is natural to them, and it hardly needs but a clap of the hands to bring them together and start them off. The women would often appear to be wrapt up in little songs and dances of their own, singing softly to themselves as though in a dream, so vacant is the face. Very young children, though hardly able to stand, would clap their hands and try to dance, imitating their elders.*

* *Cf.* Schapera, *loc. cit.*, chap. viii, and pl. xii.

When in the right mood the men and women going for water would dance. They would line up in single file and dance their way along, doing a sort of step-dance as they sang and clapped their hands. Then after each "set" of the dance, they would reform into two ranks, facing each other, dance a few steps thus, and proceed again, and so on until reaching the water-hole. The return journey with the water would be similar. Their voices sounded very sweet as they came over the hills in the distance, and gradually grew clearer as they approached.

The night, however, is the real time for dancing. They will then dance from sunset to sunrise, particularly at the new moon or full moon. The day before a big dance is spent in collecting food, roots, bulbs, and such fare. The women and girls paint their faces in red and black; a few dots here and there and a ring round the eyes would be sufficient to bring out the beauty of the lady to the very best advantage. The men wear rattles of the cocoon of a large moth tied to their legs, and this is all their clothes, except for the loin cloth. Among the dances noted were the eland dance, the ostrich dance, the reed dance, and the porcupine dance—the latter being more of a game than a dance.

Eland Dance (Plate XIX).—Two men were chosen to act as bulls, and they had horns of wood tied to their heads. The five women taking part as cows danced round in a figure of eight, divesting themselves of their clothing the while, the two eland bulls dancing after them. While this dance went on a number of men and women looked on, clapping and singing to the dancers.

Ostrich Dance (Plate XXI, fig. 4).—This is the men's dance, consisting of a sort of leap-frog; each of the men in turn stopping and stooping, the others jumping over him, as they danced in a circle.

Reed Dance (Plate XXI, figs. 6, 7).—Not of much interest; the men and women all shuffle round together, singing and clapping and grunting together. This they keep up for a considerable length of time.

Porcupine Dance (Plate XXI, fig. 5).—Men's dance. This is danced in two lines, each facing the other. These lines dance backwards and forwards to each other all at once, as though each man were trying to out-dance his partner.

The music accompanying these dances is apt to pall and become monotonous to the European after a time.

Games.—A few games are played, as, for instance, the "war game" (Plate XXI, fig. 3). The men and boys would sit on the ground facing each other in pairs, each sitting about 5 feet from his opponent. They would then proceed to mimic throwing dirt at each other, thumping their chests, and hitting the ground and grunting. This is done to a tune and time similar to the dances. Each goes on until either he or his partner is exhausted, the more enduring winning. While the game goes on they hurl epithets at each other, and emphasise these epithets of inferiority by their actions. They never strike each other, but from time to time pretend to spring forward as if to do so.

Stick Game.—The men each had a slender stick of "Rasyntje" bush, about 4 inches long. This they would throw on the ground in front of them in such a way that it would bounce away from themselves; they would follow the stick and throw it again, the game being to cover the greatest distance in the least number of throws. This is a very much faster game than it sounds, and after it the players would perspire very freely.

Musical Instruments (Plate XXI, figs. 1, 2).

Only one instrument was observed, the "Rhumkie," which is a sort of fiddle. The basis of this instrument is a hollowed-out bow, which has a wire stretched along its length. In playing it the one end rests over the right shoulder, while the other end is held with the left hand, the little finger gripping the wood of the instrument, and the other fingers controlling the pitch of the note.

The playing bow consists of a twig strung with some hair from a buck's tail, which is wetted before use by applying it to the mouth. This hair the player controls also with the thumb of the right hand as he plays, keeping the string taut. With this instrument the boys play a soft and rather eerie tune.

Conclusions.

In the light of the observations made on these people we may regard the Kalahari Bushmen and Cape Bushmen as widely divergent, and neither of them appear to be pure Bushmen. The people we have observed in the Kalahari, or Sandfontein, Gaberones, Kanye, and Grootfontein, appear to be bastard tribes, composed of a Bushman basis mixed with Hottentot and Bantu blood.

This fact is also recognised by Miss Bleek, Dornan, and others. In discussing this question Mr. Drury obtained the opinion of four old traders whom he met, respectively, at Vryburg, Prieska, Kanye, and Sandfontein, and who had known the Bushmen for some years, and had trekked through the Kalahari from end to end in the early days. These traders, quite independently of each other, agreed in their statements that the Bushman proper was smaller than his present descendant and a dirty yellow in colour, had no fixed habitation, and was extremely difficult to approach. Their huts were mere temporary shelters, made of branches in the same way that the modern Bushmen make a bivouac when on trek.

It may be noted that these descriptions as regards the physical appearance apply well to the old Bushman, "Jantje," who died in 1924 in Prieska, at the estimated age of one hundred years, and of whom there is a cast in the South African Museum.

Remnants of these purer people are still to be found scattered in the Kalahari, and are also difficult to approach; in fact, it seems impossible to obtain any intercourse with them whatever. Otherwise they might reveal to us what the pure Bushman really is.

Culturally, the Sandfontein Bushmen are probably as pure as, or purer than, any of the other tribes. Even they, however, have been somewhat corrupted by the Bantu and other peoples in the same districts.

Rock Gravings (Plate XXII).

Rock gravings have been reported from several localities in South West Africa. The South African Museum has a very fine series, consisting of original slabs and, where these could not be removed, casts. Brief notices of these gravings have been given by the late Dr. Péringuey in the Annual Reports of the South African Museum (1919, Ann. Rep. for 1918, p. 4; 1920, Ann. Rep. for 1919, p. 16; 1923, Ann. Rep. for 1922, p. 6), together with reproductions of some of the unusual types (Ann. Rep. for 1919, pls. ii and iii).

The first lot of specimens was obtained at Gaub in the Grootfontein district in 1919. The objects represented are the hoof marks or spoor of various bucks and of zebras, and human footprints. Most of them are of about natural size. Thus the zebra spoors are about 80–90 mm. across. The buck spoor vary from 40 mm. up to 140 mm. in length. The human footprints are small, 75–110 mm. in length (S.A.M., Reg. Nos. 3828, 3829). All these gravings have been produced by the method of picking (pointillage) with a pointed implement.

Somewhere in the same neighbourhood a graved elephant had been reported, but this could not be found. Mr. R. W. E. Tucker, who in 1920 also visited the locality, was likewise unsuccessful.

Further rock carvings were obtained at Klein Wit Vlei in the Gobabis district (S.A.M., Reg. No. 3830). These consisted of the usual representations of bucks (eland, gemsbok, wildebeest), and of a giraffe; but also of a few buck spoor and human footprints, as at Gaub. The footprints are larger than those at Gaub. The markings on the giraffe are represented by scattered spots. There were, in addition, two snakes, occupying a space about 4 feet long (Plate XXII, fig. 2.)

These carvings have also been produced by the picking method, but are not of a very high standard of execution. As in other places, Drury noticed that some of the carvings appeared to be of more recent date, and to have been executed, not by picking but by line-drawing, as if some stone or bit of iron had been used to form grooves. It appears probable that these recent carvings have been done by herd-boys and others in imitation of the older carvings.

Reproductions of human footprints have been found in other localities (*e.g.* Vryburg, Saltpan, Schweizer Reneke), but the buck spoor appears to be peculiar to South West Africa.

Various explanations have been put forward as to the purpose of these hoof marks. Péringuey (*loc. cit.*, 1920, p. 16) quotes a statement by Th. Hahn to the effect that the Bushmen had signs to denote places where they had found water or game, but he is uncertain of the nature of these signs, whether they were paintings or gravings. It has also been stated in popular journalistic accounts that these spoors point in the direction where water is to be found. This latter explanation is quite fanciful and is positively disproved by Drury's observations. At Gaub and Schweizer Reneke these carvings occur on rocks actually in the (dry) watercourse, and without any attempt at definite orientation. It seems more probable—as these particular carvings are only found in, or in the neighbourhood of, watercourses or vleis, where the animals would leave many spoors—that they have been copied from natural imprints.

From the promiscuous manner in which the carvings were scattered about it appears that the artists worked "just as fancy took them or space permitted," and it seems certain that they took their inspirations from the actual animals that they saw in the neighbourhood.

The representation of snakes at Klein Wit Vlei is interesting from the rarity of representations of these animals. Only one other example is known. This was at Britstown, and covered all sides of a large boulder, being about 30 feet in length.

The tortoise found at Klein Wit Vlei is paralleled by another example from Klipfontein, near Kimberley, and other localities.

At Otjitambi Mr. Lawrence found representations of gemsbok, eland, elephant, and giraffe (Plate XXII, fig. 1). The markings on the latter are indicated by intersecting lines (*cf.* an elephant from Vryburg, Péringuey, *loc. cit.*, 1909, pl. viii, fig. 2). The same method has thus been used to represent, in the one case, colour-markings; in the other, the wrinkled, corrugated, or mud-caked surface of the skin.

The technique of these carvings is similar (*i.e.* pointillage) to that of the Gaub and Gobabis examples.

It seems impossible to gauge the antiquity of these carvings. Péringuey (1909, Trans. S. Afr. Philos. Soc., xviii, 4, pp. 406 *seq.*) has discussed this question. Certain it is that the carvings antedate the present tribes of Bushmen. Drury emphasises that the local Bushmen in the Gobabis district know nothing whatever about these carvings or their origin, expressing blank surprise when cross-examined on this point. Other observers have testified to the same ignorance, though herd-boys have frequently been observed to make crude imitations.

The occurrence of these rock gravings in the river beds in several localities, as *e.g.* Gaub and Schweizer Reneke (see also Péringuey, 1906, Trans. S. Afr. Philos. Soc., xvi, 4, p. 409), raises an interesting point in connection with the volume of water in these rivers in the days when the artists were working. Either the rivers were no fuller than at the present day or else they must have been intermittent. From the evidences of denudation it is clear that these Kalahari rivers at one time carried an enormously greater volume of water than nowadays.

A question of greater import concerns the geographical distribution of these rock gravings and the race or races who sculptured them.

In North Africa similar sculpturings have been known for some while. To the references given by Péringuey (*loc. cit.*, 1906) may be added Frobenius and Obermaier (Hadschra Maktuba: Urzeitliche Felsbilder Kleinafrikas, 1925; Zelizko, Felsgravierungen der Südafrikanischen Buschmänner, 1925).

Further localities have recently been brought to light by the travels of Hassanein Bey at Owenat in the South Soudan (Geogr. Journ., lxiv, 5, p. 353, pls., 1924). A noteworthy feature of these carvings is the absence of any representation of the camel, indicating that they were executed before the introduction of this animal into the country.

Péringuey (*loc. cit.*, 1909) mentions a locality in Nigeria which forms to some extent a link between the North African and South African localities, and in 1906 (*loc. cit.*, p. 412) he argued in favour of unity of race. A detailed comparison between the carvings of Northern and Southern Africa might lead to important results.

All these carvings have been found in open situations, mostly with a wide view over the surrounding country. They are carved on large immovable rocks projecting out of the ground. In the Transvaal, on the other hand, smaller boulders have been utilised, some of them quite easily moved. At Klein Wit Vlei, although there were numbers of small boulders suitable and handy, the artists preferred large expanses of rock, like tables, almost on the ground level. One exceptional case was observed where carvings had been executed on the floor of a rocky overhang or shelter at Gaub.

EXPLANATION OF PLATES.

Plate XII.

Figs. 1 and 2. Naron huts at Sandfontein, South West Africa, showing method of construction, contents (bedding, ostrich egg-shells), and fireplace outside. The lower figure shows the wooden pestle and mortar.

Plate XIII.

Fig. 1. Group of unmarried Naron men, under their shelter.
Fig. 2. Two Naron girls in their hut, isolated previous to marriage.

Plate XIV.

Fig. 1. Naron woman and child, to show dress, coiffure, and ornaments.
Fig. 2. Naron girl in dancing attitude, photographed from the cast in the South African Museum. Shows dress, ornaments, powder puff, and "vanity bag."

Plate XV.

Figs. 1 and 2. Photographs of two casts of Auen women in the South African Museum, illustrating method of making ostrich egg-shell beads.

The lower figure (2) shows a woman biting off pieces of egg-shell. The upper figure shows the process of drilling the beads, and the two stones which are used to reduce the drilled beads to a roughly circular shape.

Plate XVI.

Fig. 1. Head of Auen woman.
Fig. 2. Head of Naron man.

Plate XVII.

Group of Naron men.

Plate XVIII.

A group of Naron girls and women. The centre figure is a married woman, the others are unmarried.

Plate XIX.

An incident in the eland dance. The two centre figures are men representing the bulls; the five figures on the left are women representing the cows. On the right, "orchestra" and audience.

Plate XX.

(Selections from the cinematograph films taken by Mr. Drury in 1921.)

Figs. 1–5. Manufacture of string. In fig. 1 the man is removing the flesh from a Sanseviera leaf with the aid of a gemsbok horn which has been sharpened to form a blade. 2. Preparing the fibre by moistening it in the mouth. 3. Adding a fresh piece of fibre to a length already twisted. 4. Twisting the fibre by rubbing it on the right thigh. 5. The finished article.

Fig. 6. Braying a skin.

Fig. 7. Boring a soapstone pipe.

Plate XXI.

(Selections from the cinematograph films taken by Mr. Drury in 1921.)

Figs. 1 and 2. Front and side views of boy playing the "Rhumkie," showing position of hands and fingers.

Fig. 3. The war game.

Fig. 4. The ostrich dance.

Fig. 5. The porcupine dance. Two incidents are shown.

Figs. 6 and 7. The reed dance.

Plate XXII

Fig. 1. Giraffe engraved on rock at Otjitambi, Outjo district.

Fig. 2. Snakes and buck spoor engraved on rock at Klein Wit Vlei, Gobabis district. Photographed from the cast in the South African Museum.

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Photos: J. Drury, 1921.

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SANDFONTEIN BUSH PEOPLE.

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SANDFONTEIN BUSH PEOPLE.

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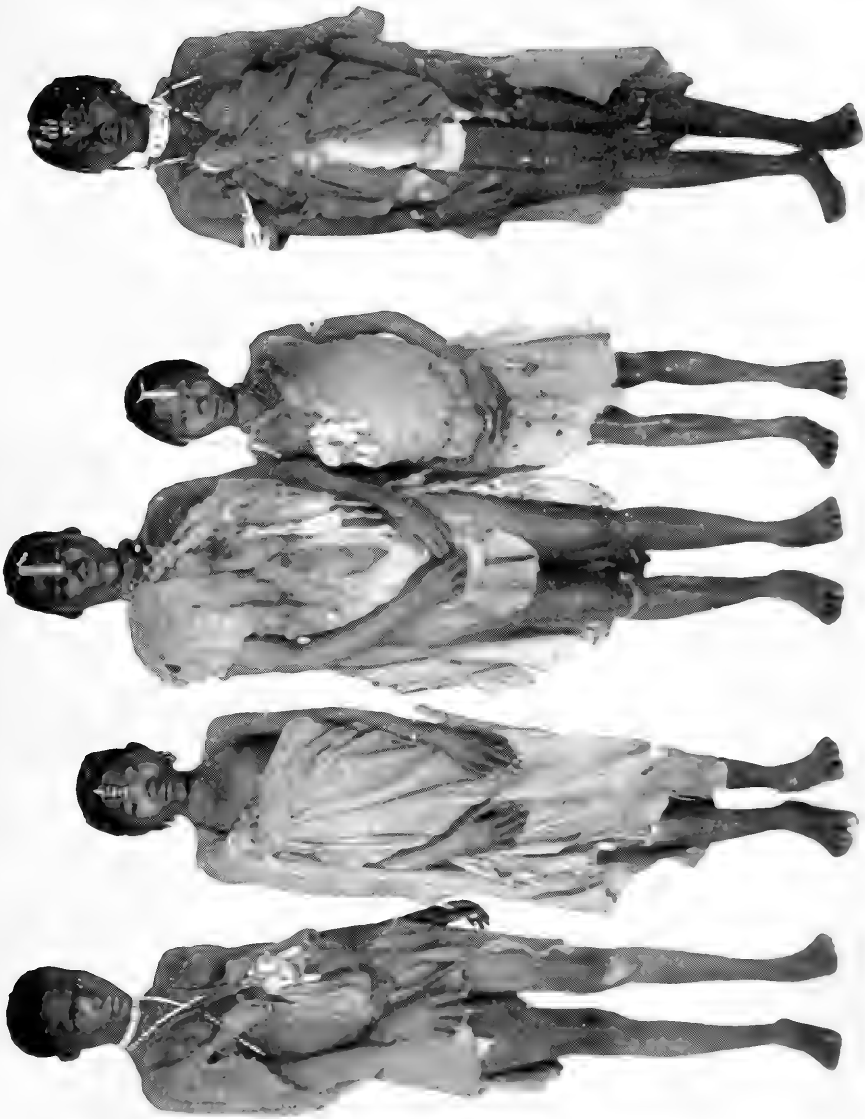

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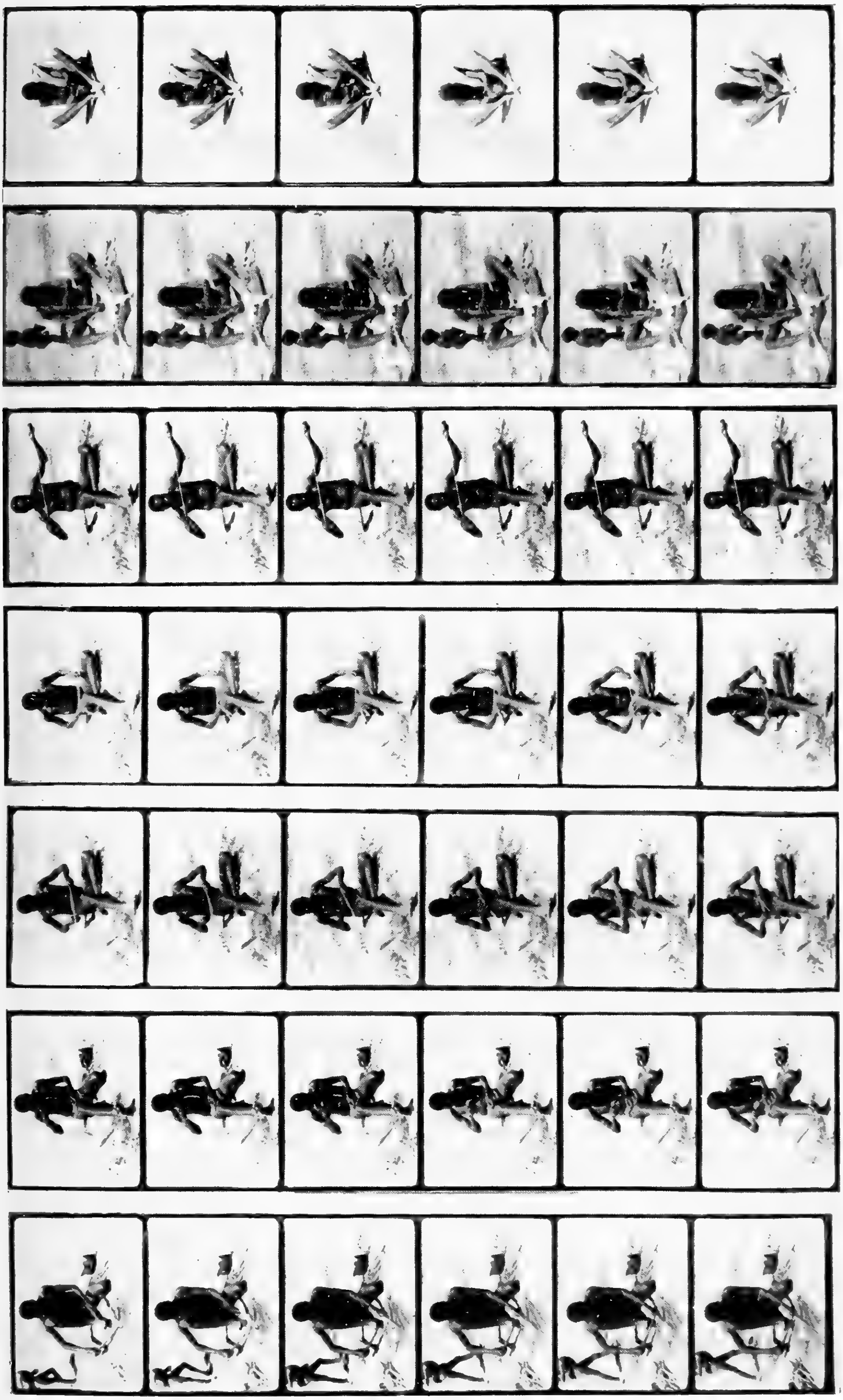

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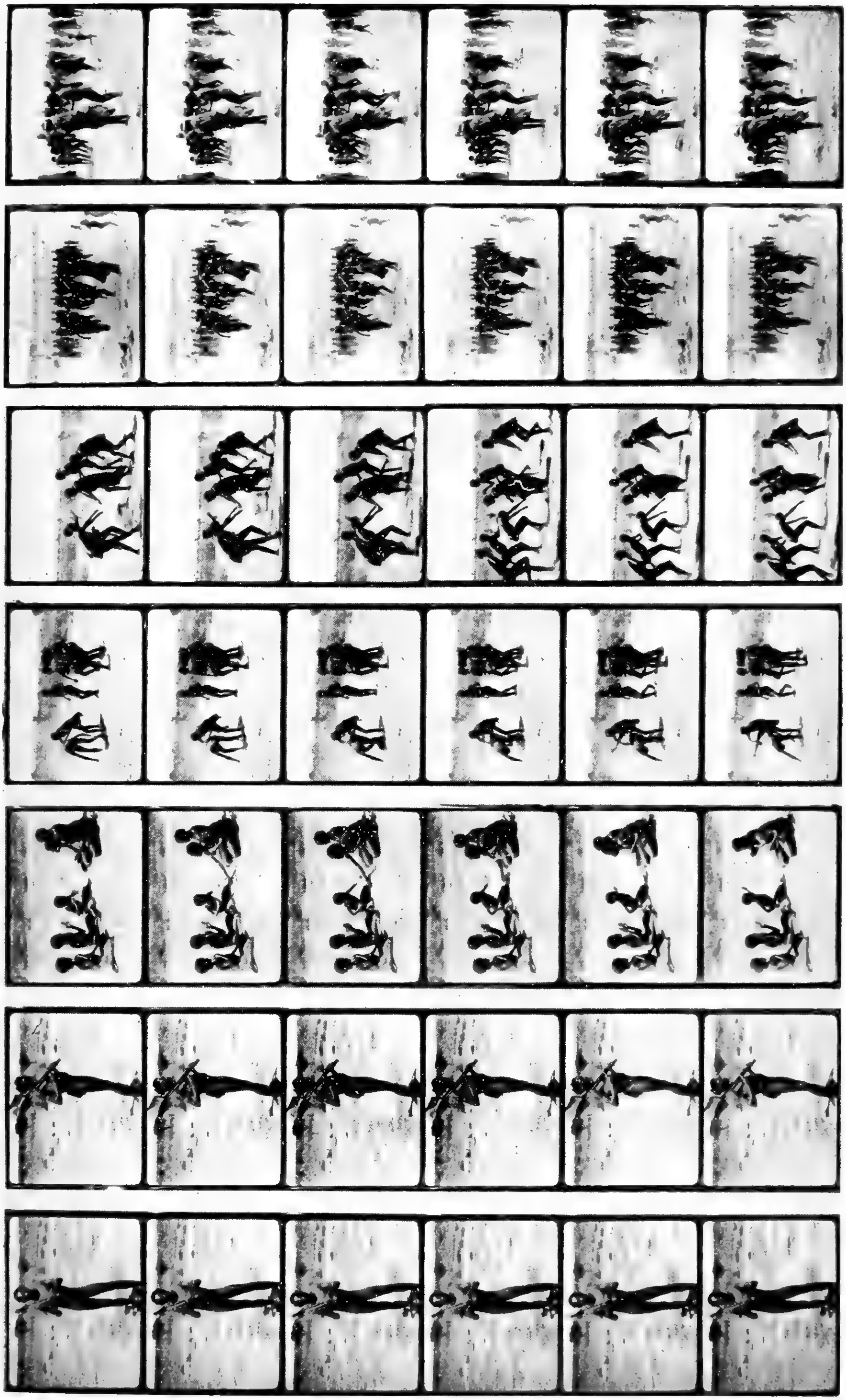

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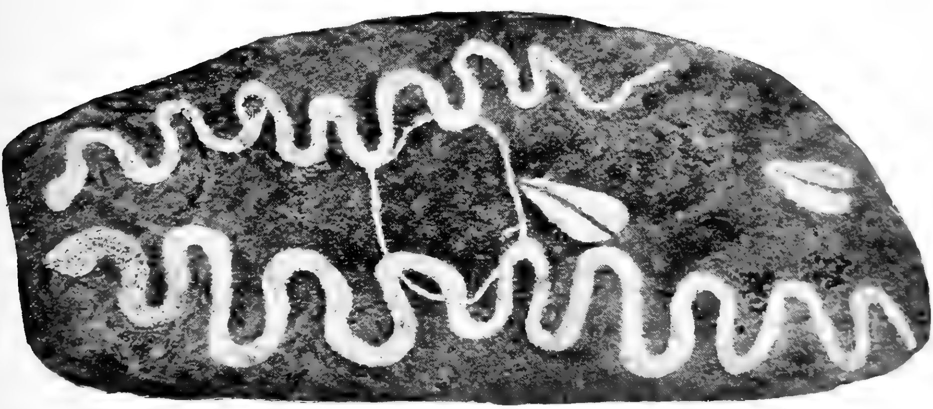

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ROCK CARVINGS, SOUTH WEST AFRICA.

ANNALS

OF THE

SOUTH AFRICAN MUSEUM

VOLUME XXIV.

PART III, *containing* :—

6. *Archaeology of the Cape St. Blaize Cave and Raised Beach, Mossel Bay.*—By A. J. H. Goodwin, M.A., F.R.S.S.Af., and B. D. Malan, B.A., University of Cape Town. (With Plate XXIII and 7 Text-figures.)

7. *Some Native Snuff-Boxes in the South African Museum.* By Miss M. Shaw, B.A., Assistant in Ethnology. (Plates XXIV–XXXI, and 2 Text-figures.)

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(With Plate XXIII and 7 Text-figures.)

Part I.—Historical.

The Schulpegat, as it was called, at Cape St. Blaize, has had a very considerable history. It seems at one time to have been a show cave, and many of the early South African travellers have visited and commented upon it. Barrow * gives an account of the cave up to which he scrambled from the shore below, and "disturbed some thousands of sea-birds, and found as many thousands of living shellfish scattered on the surface of a heap of shells that, for aught I know, would have filled as many thousand waggons. The presence of shells therefore in my opinion is no argument for the presence of the sea."

It was this passage which inspired Lichtenstein's visit a few years later.† "Ascending a steep and narrow path with the high towering cliff on one side, and a deep precipice on the other, we arrive on a sudden at the arched entrance of a cavern, the bottom of which is entirely overspread with muscle-shells. The breadth of the cave is about twenty paces, its depth about half as much, and its height at the centre of the arch may be fifty. The sea is 400 feet below." (The actual height is 95 feet.) . . . "We did not find here the least traces of any sea-fowl . . . not one of the shells besides appeared the least fresh; and all were in a state of decay and half buried in sand and dirt. . . . (Barrow) has, besides, been rather guilty of exaggeration when he says, the quantity of empty shells in the muscle-cave is so great that several thousands of waggons would be necessary to carry them away. Ten or twelve would be quite sufficient for the purpose."‡ "The common opinion among the

* Travels into the Interior of Africa, London, edition of 1801, vol. ii, p. 67.

† Travels in Southern Africa, first English edition, London, 1810–12. Van Riebeeck Society edition, Cape Town, 1928–29, vol. i, p. 219.

‡ The translator of Lichtenstein here flatly denies that Barrow ever made such a statement.

sensible inhabitants of the neighbourhood, and of the postholder himself, is, that the cave was formerly a common resort of the Hottentots, and that they lived very much upon the shellfish, which are taken here in abundance."

The history of our knowledge of the Mossel Bay types of implement has similarly been a long one, and in its beginnings relatively clear. At the South African Museum there is a fairly large and comprehensive collection, mainly from the Cape St. Blaize Cave, extending over a long period of years. Unhappily the material collected has not been typical, as early enthusiasts were interested chiefly in those conventionalised forms which could be described by such terms as "arrowheads and flaying knives."

In about the year 1888, Mr. George Leith, having had his interest aroused by Dr. D. R. Kannemeyer,* excavated a portion of the cave, and his account he published ten years later.† He here explains how the quarrying of the stone immediately previous to the former date rendered the cave more accessible, so much so that the local gardeners had sifted and removed much of the cave-earth for manure. It would seem that Leith had little choice, and examined the refuse from their sievings before turning his attention to what remained of the undisturbed parts of the floor-deposit.

"In the undisturbed part of the deposit I found very fine skinning knives of quartzite, some of them 5 or 6 inches long, and as thin as a shilling. The number of perfectly formed implements, however, bore a very small proportion to the number of broken implements and mismakes, certainly not one to a thousand. The prevailing type of implement was the knife-like or leaf-shaped flake implement, with two cutting edges, terminating in a sharp point opposite the bulb of percussion. These may be classified into arrow-tips, javelin-points, club-spikes, and half a dozen more varieties, according as they vary in size and shape, but I regard such classifications as more or less fanciful and tentative. . . . Early in my cave-hunting experiences at Mossel Bay, I happened to find an implement of indurated shale, and a close examination showed its edge so carefully and regularly notched that I concluded that it was a saw. . . . I may mention another type that I came across that was not figured in the books

* See Kannemeyer, "Stone Implements," Cape Illustrated Magazine, i, 1890, p. 120.

† Journal of the Anthropological Institute, vol. xxxviii [N.S., vol. i], 1898, pp. 260–262, part of "The Caves, Shellmounds, and Stone Implements of South Africa."

at my disposal, but which I am told is known as 'bone-splitters' (*sic*). The implement I refer to is shaped like one of the bevel-edged chisels used by cabinetmakers. The cutting edge is a straight line at right angles to the direction of the blow which struck the flake from the core; in other words, the line of concussion."

It will be noted that Leith, for his time, understood the subject, and described three types of implement, the point in a great variety of shapes and sizes, the saw or perhaps an "oak-leaf" type, and also what would appear to be some form of *tranchet.* This last appears in some of the collections at my disposal, but would seem to be a normal form of rejected flake. The local enthusiasts at Mossel Bay state that Leith recovered a skeleton from this cave, but his documentary evidence is against this, and the only specimen he mentions is from another site. So far as I can discover, no skeletal remains have ever been recovered from here, either from the overlying midden or from the lower deposits, but in excavation we found a few minute fragments of human bones in the disturbed layer.

Leith's implement collection seems to have been divided between various Museums, the Transvaal Museum at Pretoria receiving the major part. The South African Museum, the National Museum at Bloemfontein, and perhaps also the British Museum, have smaller collections.

The difficulties he met with seem to have precluded any attempt to note stratification. A number of illustrations submitted by Leith with his original paper were unhappily never published, though they are referred to in the text, and were on view at the Anthropological Institute.

During the final year of last century, Drs. Rogers and Schwartz of the Cape of Good Hope Geological Survey submitted a number of points from a site "near the Cape St. Blaize lighthouse" (S.A.M., 148), while later in the same year further material "from the cave below the lighthouse" was presented by Mr. G. S. Corstorphine (S.A.M., 157). These are the spoils from a later search at the cave which is dealt with in the present paper.

In 1904 Mr. J. Proctor presented the Museum with another series, this time from a site "situated on the coast between the Gouritz River and Mossel Bay" (S.A.M., 506). In the following year similar material was presented by Mr. J. Bain, from various "caves near the St. Blaize lighthouse." It is quite possible that this material too was a product of Leith's work, as Bain had been collecting for a number of years, and in 1905 his entire collection became the property of the South African Museum.

The type therefore had a very considerable history when Dr. Péringuey wrote his work on the "Stone Ages of South Africa." * In this work he describes and illustrates a number of these specimens, and relegates them to his "Chelleo-Moustierian" period, with the added rider that "these flakes are doubtless Moustierian in shape." While he suggests that the type is "coeval with the boucher," he admits that, "with the exceptions of Cuts 7 and 12, they were not found in connection with bouchers, although these paleoliths do occur in the same district."

He further describes the typical tool as a "knife or scraper" or as a "scraper-knife," and notes that in some cases "it bears at the base a dent that looks like a notch." Reference to the plates indicated shows that this is intended to be a description of the very common appearance of a typical step-flake on the mid-line of the outer face, and not, as might be thought, of a notch on the edge of the flake.

It will be seen that Péringuey realised the importance of his material, recognised it as a "Moustierian" industry, described it rather loosely, illustrated it, but did not specifically name it. He would also appear to have differentiated, though not at all clearly, between this material and the specimens depicted in his Cuts 106 and 107, which latter material I have elsewhere described as of the Pietersburg Variation and Still Bay refuse, respectively. In his subsequent arrangement of museum cases at this museum the Mossel Bay material was very sharply differentiated from the other superficially similar forms.

As a direct result of this publication Mr. Hall presented the South African Museum with a further series (S.A.M., 1755) of points from the original Cape St. Blaize Cave. A rather different collection of material from this site is housed at the Albany Museum, Grahamstown, and presents non-typical Wilton forms, presumably from the surface.

This was the position of our knowledge when Dr. E. C. N. van Hoepen of the National Museum, Bloemfontein, published a paper on the age of South African stone implements,† which included a redescription of Mossel Bay material in Afrikaans, without illustration and with no reference to Leith's publication though it is a description of that portion of Leith's material which is housed in the National Museum. In this article he formally names it the Mossel Bay Culture. The description seems to be partly taken from

* Annals of the South African Museum, vol. viii, 1912.

† Ouderdom van die Suid-Afrikaanse Klipwerktuie, S. Afr. Journ. Sci., 1926, vol. xxiii, p. 797.

Péringuey, and fails to add or mention many of the most important technical criteria whose value he seems not to have understood. I have translated the relevant parts of the paper, and append the description.

"The National Museum has a number of long thin scrapers from Mossel Bay, presented by Geo. Leith. They are probably from the local caves. The scrapers are generally long; they are formed by the removal of three flakes from a core, after which the scraper is so struck off that the new cleavage face is parallel with the middle flake scar of the first three. Generally the midmost of these three flake scars does not run right to the point. The edges of these implements show no secondary working at all. There are no bouchers found with these implements. . . . It would be helpful to name the culture presented by the long scrapers described above with a South African name, and I propose to name them the Mossel Bay Culture. It compares most closely with the Magdalenian Culture of Europe."

This last allocation he revokes, and substitutes the Aurignacian Culture, in a later paper.*

Whilst this description of the Mossel Bay "scrapers" (skrapers) covers the Mossel Bay *points* fairly adequately, it is extraordinarily wide in its interpretation, more especially as it is not accompanied by any illustration. How inclusive and adaptable the description is may be seen in the later publication quoted, in which the entire paper (nominally on the Mossel Bay Culture) is devoted to a description of valuable material in indurated shale from the Modder River, which should perhaps more properly be included in the Glen Grey or some similar culture,† and does not agree with any material so far known from the Mossel Bay district.

In 1929 the present writer included a fuller but crudely illustrated description of the Mossel Bay material in a paper on the Middle Stone Age, in the Annals of the South African Museum,‡ while a section on typology was also added to two papers published in the South African Journal of Science a few years later.§ The descriptions in these latter papers are certainly the most comprehensive and detailed so far published, though both the earlier papers are marred by a failure to acknowledge and refer to the previously

* Argeologiese Navorsing, No. 4, 1932.

† See Goodwin, Annals of the South African Museum, vol. xxvii, 1929.

‡ *Loc. cit.*, pp. 135–140, pl. xxii.

§ "The Chronology of the Mossel Bay Industry," S. Afr. Journ. Sci., vol. xxvii, 1930, and "The Cape Flats Complex," S. Afr. Journ. Sci., vol. xxx, 1933.

published descriptions of Messrs. Leith, Péringuey, and van Hoepen, omissions for which I must apologise. The fact that the papers of all these authors were easily available and widely known would seem a sufficient guarantee that the writer had no intention of appropriating the honours which accrue to Leith's priority of description.

While rightly and courteously drawing attention to the omission of any reference to his previous paper, Dr. van Hoepen has at the same time attacked me for having included the Mossel Bay as a "Variation," within the Middle Stone Age. Reasons for this inclusion, and for having changed the denomination from a "culture" to a "variation" have been sufficiently clearly stated in the "Chronology of the Mossel Bay Industry," and in "The Cape Flats Complex" mentioned above, also in my Presidential Address to the South African Association for the Advancement of Science, Section E, 1931, while they are further supported in the body of this present paper.

Part II.—The Cave.

Introductory.

The Cape St. Blaize Cave or shelter is a semi-dome-shaped cavern facing south-east. The cave measures 28 m. (90 feet) across the extreme lips of the mouth, by 13 m. (40 feet) from front to back, and the present height of the cave roof above the deposit level is some 8 m. It is situated at a height of 30 m. (95 feet) above sea-level, at the rocky point of Cape St. Blaize, the top of which is an extension of the 300-foot peneplain above the town of Mossel Bay. On a shelf 200 feet above the sea, and directly over the cave, stands the Mossel Bay lighthouse.

A hundred metres to the north of the cave is a fine exposure of a raised beach (Plate XXIII). The terrace, starting at present some 45 feet above sea-level, forms a wide common, shelving down to the present storm beach. Both the cave and the beach are rich prehistoric fields, and both show large numbers of stone implements of Mossel Bay type, belonging to the South African Middle Stone Age. The relation of this beach exposure to the well-known 20-foot beaches has hitherto been uncertain, but a quarter of a mile away caves cut by the 20-foot level are observable.* The St. Blaize Cave does not seem to bear any relationship whatsoever to the beach, nor is it

* Compare Dreyer, "The Stratification of the Superficial Deposits at Mossel Bay," Trans. Roy. Soc. S. Afr., vol. xxii, 1934, pp. 165–169.

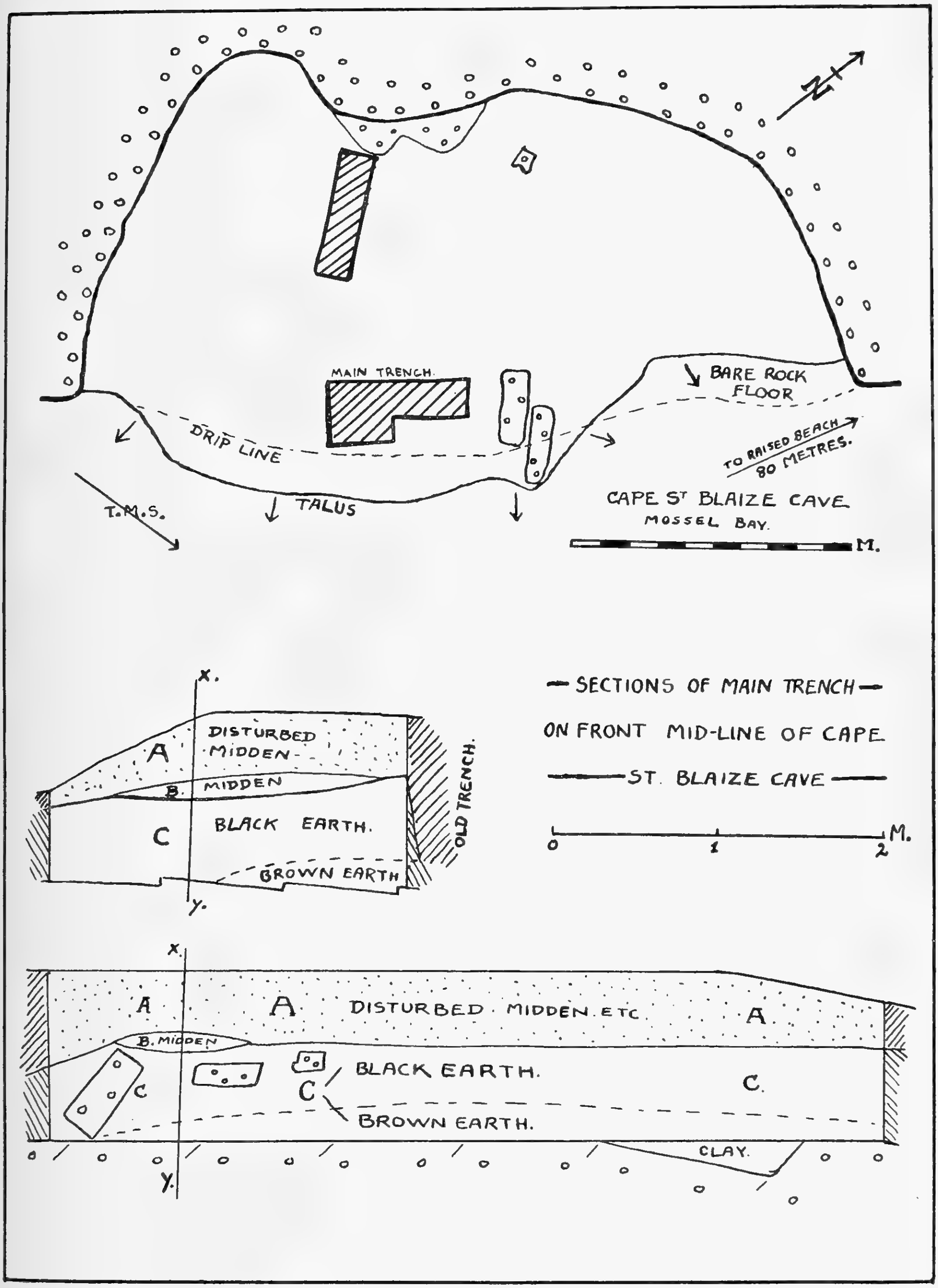

FIG. 1.—Cape St. Blaize Cave.—Plan of cave and sections of main trench.

necessarily a sea-cut cave. It would seem to have been primarily due to a lack of conformity between the horizontally bedded Tertiary deposits of Enon conglomerate and the steeply dipping Table Mountain sandstone. The Enon has here formed a thick layer of quartzitic sandstone, which is macroscopically discernible from the Table Mountain sandstone by its extraordinarily rich botanical fossil content. This deposit overlies the Table Mountain sandstone, which here dips at an angle of some 70° and strikes north and south to form reefs parallel to the coast at this point. The area between two such reefs forms the natural bathing-pool known as the Poort.

To understand some of the stratigraphical difficulties entailed in dealing with this cave, Leith's account of the relevant history of the cave is of value.*

"When first I visited the cave some years previously (*i.e.* previous to 1888) the floor was level. The dark soil of sand and wood ashes was littered with the shells of large edible molluscs, fragments of stone from the roof, flakes of quartzite, broken bones, and sea-worn pebbles. It could only be reached by scrambling up a steep talus of rubbish at the risk of slipping downwards into deep water or from the top by a still more dangerous route. . . . The cave, by the way, is described by the travellers, Lichtenstein and Sir John Barrow (both cited above). . . . On my second visit to the Lighthouse cave I found that a great change had taken place. So much of the rock had been quarried for building purposes that access to the cave had become easy—so easy, in fact, that farmers and townspeople had sifted out a great deal of the cave-earth and carried it away for manure to their gardens. Heaps of the siftings, consisting chiefly of quartzite chips, shells, bones, and fragments from the roof, were lying in the cave, while cartloads had been thrown over the edge into the sea. Here and there, however, especially near the outer edge of the semicircle, considerable masses of deposit were still undisturbed."

This haphazard digging for guano and garden fertilizer must thus have been the cause of the extremely disturbed state in which we found the greater part of the deposit, and accounts also for the number of excellent implements still to be retrieved from the overlying disturbed and crushed midden deposit. If any further excavation is to be attempted in this cave it would seem that the best method to apply would be to sieve the entire deposit once more, removing all material as excavated, and by this means reaching the undisturbed

* *Loc. cit.*, p. 260.

layers below, and eventually lowering the floor-level of the cave to bedrock. A number of permissions would have to be obtained and the work undertaken by an experienced excavator with extreme care.

Course of the Excavation.

Permission having been obtained from the Minister of the Interior, the Minister of Railways, and the Mossel Bay Town Council, work was started on Wednesday, 6th July 1932, by A. J. H. Goodwin and B. D. Malan.

The screens used consisted of a rectangular sieve of six holes to the inch, and two riddles of three holes and two holes to the inch respectively. The sieve, after careful testing, was found to be unnecessarily fine for the deposit and the material collected, and was eventually discarded. All material found was passed through the two riddles.

Excavation was commenced midway across the mouth of the cave (fig. 1) and a trench dug towards the back of the cave from a slight step formed by the swing of the drip-line from the cave lip, some 5 feet from the present talus edge. As it was conditional that we return all earth excavated to the trench after we had finished, the debris was sorted and stacked on this shelf, and eventually returned. At this point the top one-foot layer consisted of a heavily compressed mixture of shell, nacre, black charcoal, and white ash, with a considerable admixture of dark soil and implements of Mossel Bay type, while also scattered here and there were found the epiphyses of fragmentary human bones. It was noticed also that many of the shells in the deposit were perpendicular, and not horizontal, as they would normally have been if deposited over a long period of time. These facts were discernible throughout the whole of this layer, and we were led to expect that the entire cave had been excavated previously, and the material from the rear of the cave thrown forward to cover the front portion of the deposit. A careful examination of the rear of the cave confirmed this suspicion, as the wall showed disintegration, oxidation, and an almost complete absence of lichen to a height of some 5 feet, and it was deduced that the original midden floor (before this previous excavation) had dipped fairly steeply from the back of the cave towards the front, the subsequent levelling being the result of excavating the rear of the cave and throwing the debris forward and over the edge. It was afterwards realised that this debris consisted of a mixture of various layers; a midden layer some 3 feet in thickness, and the dark earthy layer underlying the midden and containing Mossel Bay types of implement. It is therefore impossible to reconstruct the true depths from the original surface of the implements found, and the levels given are relative to the disturbed present-day surface of the midden as we encountered it.

The removal of the material for garden manure, and the subsequent excavation of part of the remainder by Mr. George Leith, is a sufficient explanation of the condition of the deposit.

Considerable numbers of implements of Mossel Bay type and also implements of midden type were found in this debris which we call layer A. No microlithic implements were found.

Below the level of this disturbed midden (1 foot below present cave surface) was encountered a small lenticular layer (layer B) some 3 feet in diameter and 8 inches thick at the centre, which contrasted strongly with the overlying midden (see section, fig. 1). Here the shells were horizontal and in most cases whole and in good condition. The interjacent material consisted of yellow sand and fish-bones in a good state of preservation and apparently containing a large percentage of their original fats. No carbon or white ash was discernible, and it became apparent that we had here met with a small section of the original midden deposit entirely undisturbed. Whereas the overlying debris was crushed and heavily compressed, and contained shell finely broken as though thrown out from the more heavily populated part of the cave, the undisturbed midden layer B was very loose and contained only whole shells. The finding of a small fragment of a modern glass tumbler in the disturbed midden immediately overlying this confirmed our earlier conclusion that this surface had been exposed within the European period. Whereas layer A had contained material from all depths of the deposit, layer B was completely sterile of all implements of any conventional type though specimens of the usual chipped pebbles of water-worn origin, typical of coastal middens, were found. Neither microlithic nor Mossel Bay types of implement were found in the undisturbed midden, layer B.

Immediately beneath this layer was encountered a heavy black, sandy soil, composed entirely of sand and vegetable matter. The shell ceased abruptly and completely, and no single fragment of shell, trace of lime, nor of fish-bones (which might have suggested that the cave-dwellers of this period were fish-eaters), were found below this level. There is no suggestion that the inhabitants ate, caught, or collected fish until the period of the heavy midden deposit (layer B) is reached.* The only animal remains encountered in layer C were an unidentifiable buck, and a tooth identified by Dr. S. H. Haughton as of *Phacochoerus dreyeri* (Dreyer and Lyle). The undisturbed black deposit yielded a very large number of flakes and implements in Table Mountain sandstone of Mossel Bay type.

Throughout the remaining depth of the cave, work was hampered by the embedded fallings from the cave roof, weighing up to 200 lbs. As a result the implements found were in many cases broken and the stratification within this level so disturbed that any attempts to differentiate between minor variations in strata were here impossible. The implements were, however, easily recognisable as of Mossel Bay form from both the whole and the broken implements found. The relative positions of the blocks of fallen stone prove that at this point roof scalings had been falling throughout the whole period of habitation. Implements were found beneath boulders, between them and above them. If it were possible to regard the rate of accumulation of these fallings as constant, then the black sandy soil would represent a far longer period of occupation than the thicker overlying midden. The apparent discrepancy between the actual volume of material in each layer is easily accounted for by the tremendous shell content of the midden deposit.

Towards the bottom of the layer the colour of the deposit lightened to a nut-brown fairly suddenly, but with no marked division. It is within the limits of possibility that the darker colour of the upper and later period was due to the presence of a greater amount of vegetation at the cave mouth, and that the nut-brown portion was the product of a relatively drier period. The analysis of the chemicals composing the layer does not give evidence in any way conclusive on this point (see analysis of specimens 1 and 2).

An attempt was first made to differentiate between the black and the brown layers, but the fallen debris had so disturbed the material contained that no differentiation was here possible. A comparison between implement types showed no distinct change.

Below this level a large expanse of rock was found forming a horizontal surface. This would not seem to have been the original cave floor, but no edge to the block was reached during excavation and no attempt could therefore be made to discover whether the cave had been inhabited previous to this huge fall, for such it would appear

* Compare Dreyer, *op. cit.*

to have been. The rock is of Enon lying horizontally, and is apparently an immense solid falling from the roof. Geological indications would suggest that the original floor was necessarily composed of the steeply dipping Table Mountain sandstone which here underlies the Enon.

At one point a heavily cemented concretion was found between layer C and this rock surface. It had originated from C, but had been strongly concreted by a natural cement. Embedded firmly in this deposit were a number of implements identical with those from the bottom of layer C. The concretion, as exposed, was found to be circular, partly extending under the untouched deposit, and was subsequently found to be a cone of cemented material effected by a drip from a point of rock above.

The work in this trench was continued for a distance of 6 feet towards the back of the cave, the layers remaining the same and horizontal throughout save for the small lenticular fragment of undisturbed midden (layer B) which disappeared.

At this point a sudden change was noted. The top layer (A) dipped vertically, and we realised that we had come to the transverse trench dug by the early guano diggers. The infilling was loose, containing holes and air-pockets, and the midden had throughout the same dark colour with vertical shell-fragments, as previously observed in layer A. This infilling was watched as it was encountered, and while no attempt was made to excavate and sieve the material numbers of excellent specimens were found. The dark colour of the earth still adhering to some of these proved that the implements had come originally from a layer such as the dark earthy layer (C) rather than from the light sandy undisturbed midden (layer B), and had been incorporated in their present position by mechanical infilling. At the bottom of this old trench, proving that the infilling was of recent date, was found an easily recognisable fragment of tanned leather bearing signs of machine-stitching. The trench does not appear to have been dug to bedrock, and the underlying remnants of C may still prove worth digging.

Before proceeding further with this excavation, a trial trench was dug from the rear of the cave, with the intention of joining up with this previous excavation and thereby obtaining a complete section of the cave from front to back (see Plan, fig. 1).

The rear wall of the cave comes forward as the spring of a half-dome resting upon a shelf of rock which starts a few feet above the present floor-level, but well below the original floor. This horizontal rock steps sharply down to disappear beneath the deposit. The step is formed of layers containing a rich content of fossil wood and wood impressions. This is obviously a sedimentary deposit—the base of the Enon probably—and it has formed a number of pockets consisting of wood-impressions filled with loose yellow sand. It has also given off pockets of crystals, some yellow, some sulphur coloured, apparently of gypsum.

In commencing the work from the rear of the cave the surface of this shelf was searched and a slight accumulation of undisturbed deposit was removed. A number of specimens of Mossel Bay type, stained yellow, were found, and among these a single specimen in a light green surface quartzite, bearing signs of the Howieson's Poort technique, was noted. The relationship of this specimen with the others on this shelf is unknown, but the shelf would appear to have been some 2 or 3 feet below the original surface of the cave deposit before it was first rifled. This trench was abandoned after a day's excavation, as it was found that the material throughout this portion of the cave had already been dug by previous workers, a burnt match being found at the depth of 2 feet.

A return was now made to our original trench in the centre of the cave-mouth, and work was continued towards the large rectangular blocks of stone, fallen from the ceiling, which lie on the cave floor. The rock-bottom below the trench had so far remained level. On digging farther it was found that the rock dipped slightly from the edge of the concretion, towards the east, to form a slight hollow. The basin thus formed had filled with a clay-like sandy, damp deposit, free of all implements. Comparison with modern rock pools in the cave shows that the precipitate at the bottom of these is similar to that found in this sandy-clay layer, which thus represents an old pool, completely sterile. The nature of the lower portion of layer C is here better revealed, the concretion is obviously part of a cone cemented by drip action, and C at this point immediately overlies the sandy clay.

Up to this point the fallen rocks from the roof, throughout layer C, had rendered impossible any attempt to differentiate between minor variations in culture in this layer. Now, for an area covering a square yard and rich in implements, the deposit was found to be free of rock-falls, and variation could be noted. It was observed that the implements resolved themselves into two layers of maximum density, separated by layers of relative scarcity. Layer C was now divided into four.

C 1, (top section) not very rich.
C 2, extremely rich.
C 3, relatively poor.
C 4, relatively rich, but small.

This last division coincides with the change from black soil to brown at the base of layer C.

In the course of excavating layer C, a number of flakes and worked implements of surface quartzite and quartz crystals were found, all showing workmanship resembling that of the implements from Howieson's Poort rock-shelter.* An attempt was now made to localise this type more exactly within layer C. They were found to belong to layer C 2; that is, they form an intrusion after the main period of the Mossel Bay habitation of this cave, and before the end. They do not form a separate sub-layer within C 2, but appear to be thinly present throughout. Later, with such flakes, was found a single lance-head of Howieson's Poort type, *in situ* within this layer. It was an inch and a half in length, worked over the whole of one face, to a slight keel, the cleavage face being left unworked. It resembles exactly the Howieson's Poort material (see fig. 5, 4).

This bears out the suggestion implied by the finding of a specimen of the same type on the shelf at the rear of the cave, and shows that the Howieson's Poort Variation at this site cut into the Mossel Bay Variation. This fact becomes more important when we realise that evidence at Peer's cave (Skildegat) (Cape Peninsula) proves that this same Howieson's Poort Variation cuts into the Still Bay layers at that site. We may presume, therefore, that the Mossel Bay Variation at the type site, and the Still Bay Culture at the Skildegat site, were at least partly contemporaneous. This presumption would appear further to support the classification made previously; † in which the Mossel Bay Industry is regarded as a Variation of the Still Bay Culture, and not as constituting a separate and distinct culture.

Work in the cave ceased on Wednesday, 20th July 1932.

Soil Analysis.

The following is the analysis of the organic matter in three samples of soil from layer C. They are: (1) Specimen of black soil, C 1. (2) Specimen of brown layer, C 3. (3) From clayey soil underlying C 4.

* See Stapleton and Hewitt, S. Afr. Journ. Sci., 1927, vol. xxiv, pp. 547–587; and 1928, vol. xxv, pp. 399–409. Also Goodwin, Ann. S. Afr. Mus., vol. xxvii, 1929, pp. 130–134.

† Goodwin, "The Middle Stone Age," Ann. S. Afr. Mus., vol. xxvii, p. 139.

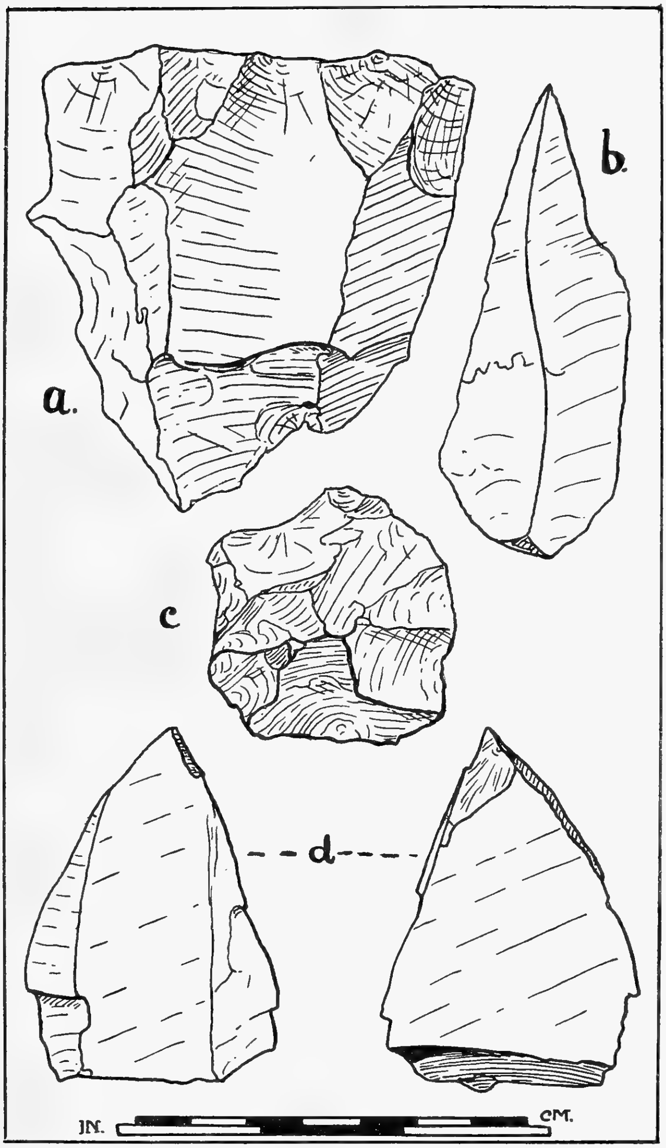

FIG. 2.—*a*, flake core; *b*, point; *c*, Levallois flake; *d*, burin. Implements from layer C 1.

Soils from Cape St. Blaize Cave.

	1.	2.	3.
	Per cent.	Per cent.	Per cent.
Moisture	2·04	3·12	5·09
Loss on ignition	2·65	2·44	2·38
Organic N_2	0·072	0·063	0·047
T. P_2O_5	3·4	5·45	5·4
W.S. K_2O	0·077	0·089	0·098
CO_2	0·15	0·24	0·24
T. CaO	3·85	7·84	6·56
W.S. Cl_2 as NaCl	0·44	0·65	0·95
	12·61	19·83	20·718
Acid-insoluble silicates, etc.	87·39	80·17	79·282

The matter of probable organic origin in specimens 2 and 3 constitutes some 20 per cent. of the whole, while in specimen 1 it is represented by only 12½ per cent. It may eventually be possible to relate this organic change with climatic factors, or with the drop in sea-level or with both.

Analysis and Description of Artefacts.

The following is an analysis of the various types of implements found in the different layers of the major layer C, grouped by sub-

	C 1.	C 2.	C 3.	C 4.	C (gen.).	Slang River.
Total of specimens	50	75	113	50	287	88
Flake cores	1	4	3	2	17	2
Points	26	46	48	31	149	47
Worked points	1	1	3	0	7	4
Blades	13	12	22	10	42	7
Burins	1	1	3	0	2	3
Disc scrapers	1	0	1	0	0	0
Round scrapers	0	0	2	0	2	0
Disc cores	4	2	5	1	8	0
Disc flakes	1	1	10	4	14	0
Oak leaves	0	0	3	0	10	3
Discoidal artefacts	2	4	12	1	23	12
Tranchets	0	4	2	0	1	0
Redirecting flakes	0	0	0	1	12	4

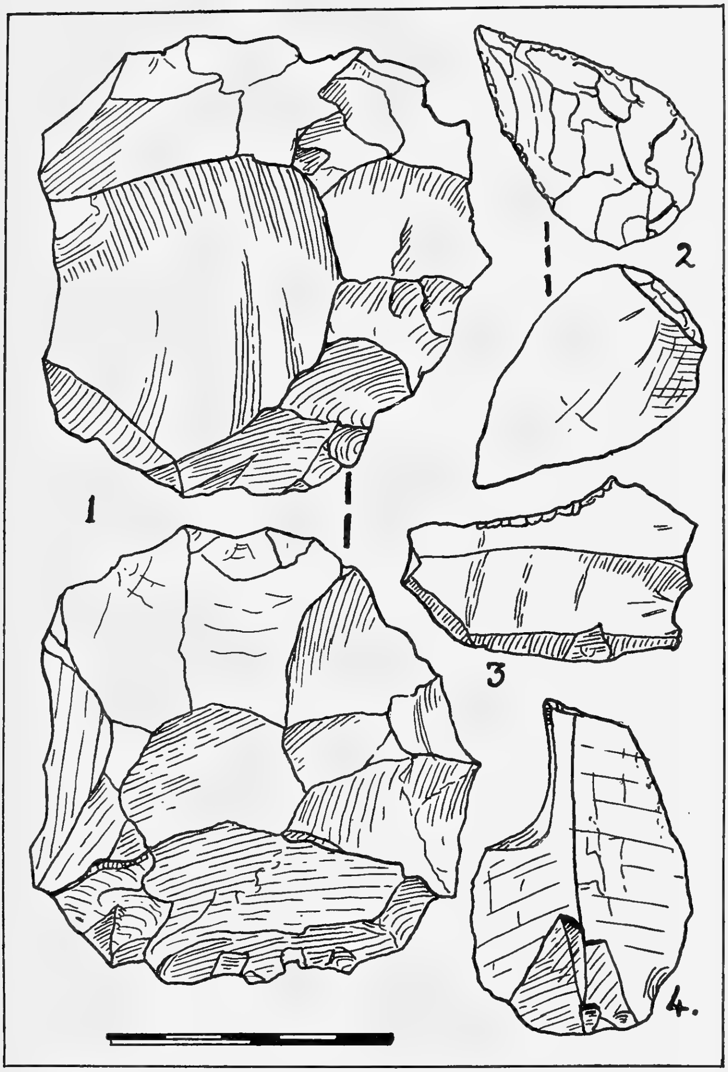

FIG. 3.—1, Levallois core; 2, lance head of Howieson's Poort type; 3, chalcedony scraper; 4, burin. All from layer C 2.

layers and compared with the Slang River material. This shows the amount of homogeneity to be expected within a culture, and also reveals certain interesting discrepancies of a minor order.

The Slang River material is taken from a previous paper,* but

* Goodwin, S. Afr. Journ. Sci., vol. xxvii, 1930, *op. cit.*, p. 572.

we have omitted the twelve nondescript flakes collected there, as we have similarly omitted a large number of nondescript flakes from this present site.

Descriptions.—In many cases no adequate description of the implement types is here given, and readers are referred to the general descriptions given under the same terms in any good book on prehistory.

Material.—The material used in the Mossel Bay Industry is a fine-grained Table Mountain quartzitic sandstone, obtained locally, but in some few instances a surface quartzite, a quartz, or quartz-crystal is used. The Howieson's Poort types are generally of the surface quartzite, though one or two are of each of the other materials. It is not possible to differentiate completely between the debris rejected from these two industries.

Flake Cores.—The specimens found were generally completely used. The striking platform was in most instances prepared in such a manner that the flake produced would have a curved butt, and that the flake scars would converge slightly to produce a pointed flake (fig. 2).

Flakes.—These are of two types, long flakes, with slightly convergent fluting, struck from flake cores; and circular flakes, with radially converging flake scars, struck from a Levallois or disc core.

Points.—These are pointed flakes, without secondary retouch and with no further preparation after their removal from the flake core. They show the cleavage scars of two or sometimes three slightly convergent longitudinal trimming flakes. The third and central scar is short and sometimes stepped, with the result that the bounding ridge between the two outer and major flake scars extends down to the point forming a slight keel. The butt is generally, though not always, faceted, showing either a simple curve or a "Cupid's bow" curve (figs. 2, *b*, 4, 1, 2, and fig. 5, 6).

Worked Points.—The same as points, but with secondary trimming along both edges from the under face, which leaves resolved flake scars on the edge of the outer face.

Oak Leaves.—Points which have been trimmed by the removal of deep secondary flakes at more or less regular intervals along the edges, in such a manner as to leave a series of denticles between the scars (fig. 5, 2).

Blades.—These are really the same as the points save that the central scar runs the whole length of the flake, dividing and separating the two lateral flake scars. It is possible that both the point and the blade are rejects and that they merely represent normal spalls produced by the technique employed. This does not invalidate their inclusion and description, as normal products of a technique are basic to its study.

Burins.—These are generally prepared on a flake by the removal of a sliver from the forward end, down one edge, in such a manner that a transverse chisel edge is left at the intersection (figs. 2, *d*, and 3, 4).

Redirecting Flakes and Refacing Flakes.—The striking platform of the flake core is not always faceted, and in some cases a triangular sectioned flake is found which seems to have been the product of a lateral blow struck in such a manner as to remove the old striking platform.

Side Scrapers.—Exactly similar to the European form, especially as seen at La Quina and Le Moustier (figs. 4, 5, and 5, 1).

Discoidal Artefacts.—Levallois or disc cores (unstruck), pebbles écaillées, "pseudo-coups-de-poing," etc. These have been grouped together, as it is often impossible to differentiate between them with certainty. Certain artefacts are immediately placeable, but many more might fall into either two or even three groups. They are all generally lenticular in shape, having been formed by the removal of a number of radially converging flakes struck from about an equator.

Disc Scrapers.—Two specimens were found of small discs with a worked edge about the perimeter.

Round Scrapers.—Probably belong to the side-scraper class. The work is on a flake, and roughly resembles the circular scraper of the Smithfield.

Levallois or Disc Cores (struck).—These are very similar to the Somme specimens, but are smaller, the flake removed measuring perhaps a little more than an inch in diameter (2·5 cm.). The striking platform is sometimes plain (figs. 3, 1, and 5, 5).

Levallois Flakes (struck from disc cores).—None of these show any sign of secondary retouch. The butt (fig. 5, 6) is generally faceted, but sometimes plain (fig. 2, *c*), agreeing with the striking platform on the nucleus.

Tranchet.—This has only been separated as a type, as early writers refer to it as a "bone-splitter." It consists of a wide, short, parallel-flake, with no signs of secondary working or usage.

Howieson's Poort Types.—These have been sufficiently well described by Stapleton and Hewitt (see footnote, page 124), and no description is necessary here. But compare figs. 3, 2, 5, 3 and 4, with their illustrations.

During the course of the excavation it had been thought that certain changes could be discerned between layers C 4 and C 1.

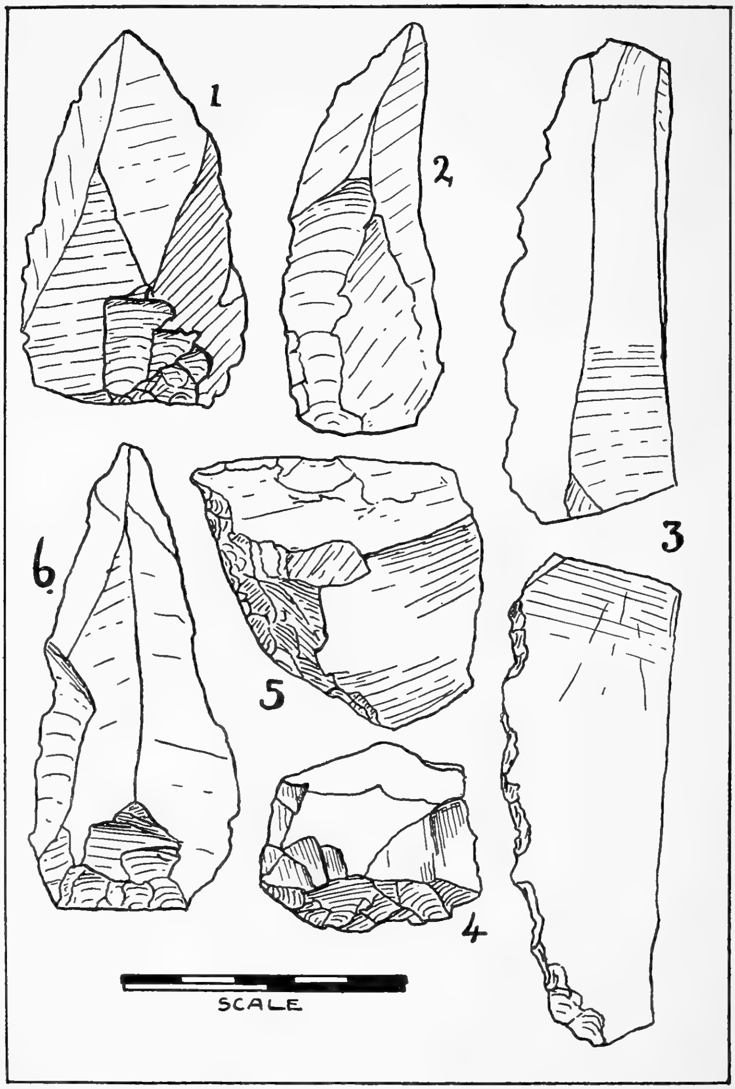

Fig. 4.—1 and 2, points; 3, worked blade; 4, worked chert fragment; 5, side scraper; 6, point. 1 to 4 from layer C 3, 5 and 6 from layer C 4.

Layer C 4 seemed to show a number of long flakes of fine workmanship, and a proportionately large number of wide, flat flakes, lanceolate in form, all made from a fine-grained Table Mountain sandstone. C 1 appeared to show smaller implements and a less fastidious choice of material. With the intention of further analysing and defining this development careful measurements were taken of all points (the total numbers of cases are given above), with the result that no real change could be postulated with certainty.

In spite of the fact that we believe the majority of the points and the parallel flakes or blades to have been in the nature of rejects, yet they are normal products of the technique employed and hence are more likely to give us some idea of any change in skill or desirable forms than a study of the few available "finished" (*i.e.* retouched) implements.

Length of points.	C 1.	C 2.	C 3.	C 4.	C (gen.).
Max. .	10·0 cm.	14·0 cm.	15·1 cm.	11·0 cm.	10·0 cm.
Aver. .	6·5 ,,	6·49 ,,	7·42 ,,	8·38 ,,	6·0 ,,
Min. .	3·0 ,,	3·0 ,,	4·6 ,,	4·3 ,,	2·5 ,,
Widths of points.					
Max. .	5·5 cm.	5·4 cm.	5·3 cm.	4·4 cm.	6·5 cm.
Aver. .	3·0 ,,	3·2 ,,	3·46 ,,	3·31 ,,	2·54 ,,
Min. .	1·9 ,,	1·3 ,,	1·6 ,,	2·1 ,,	1·0 ,,

It will be noted that there is a change from 6·5 cm. in the average length in layer C 1 to 8·38 cm. in layer C 4, but no great weight can be attached to this change, as the flakes in layer C 1 were often dug out of the concretion, and possibly concealed small material may have escaped our notice. It is therefore necessary to withhold judgment until further analysable material is at our disposal.

Part III.—The Raised Beach.

Mossel Bay war memorial stands on a slope which shelves up from the sea, where it is edged by Table Mountain sandstone reefs, to a height of some 45 feet, forming a wide sloping common. Behind the memorial a road has been cut into this shelf at its highest point, and reveals a continuous section of an old raised beach for some thirty metres, standing about 6 feet above road-level at its highest point. Above this cutting the land surface rises sharply, and is

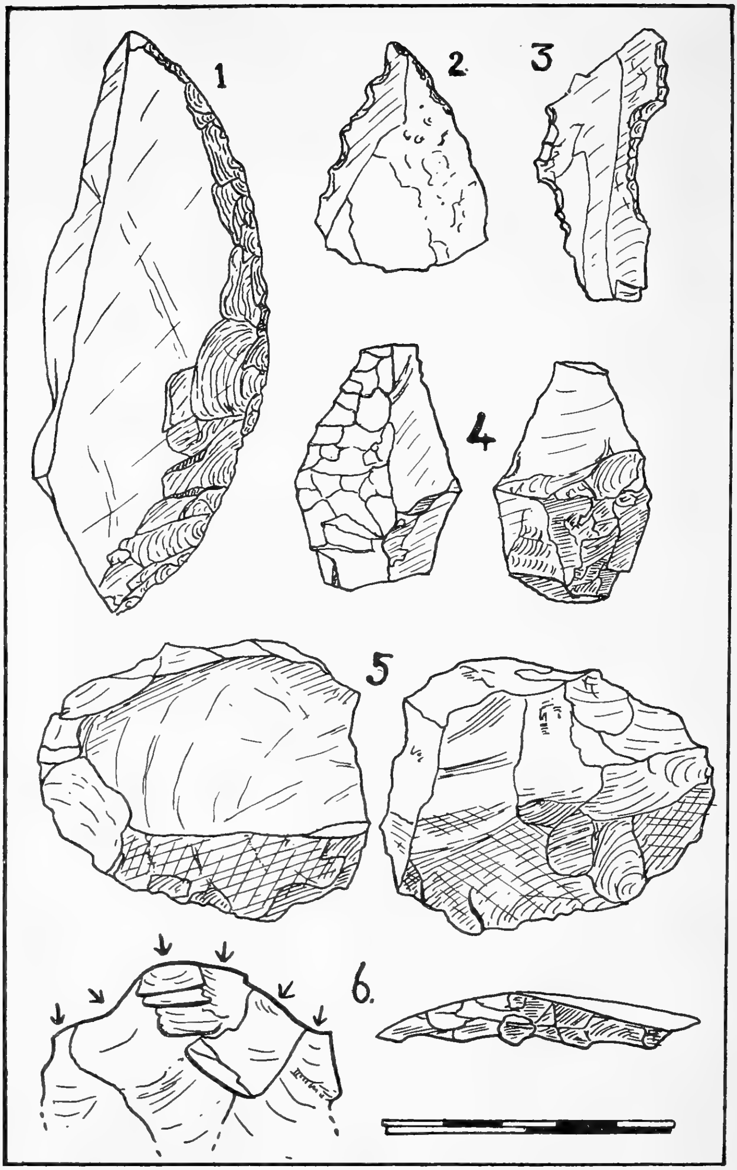

Fig. 5.—1, Side scraper; 2, oak leaf in quartz; 3, concave scraper (Howieson's Poort); 4, lance-head (Howieson's Poort); 5, Levallois core; 6, "Cupid's bow" type of butt to show effect on convergence of fluting. All from layer C, general.

formed by the steeply sloping talus from the 300-foot peneplain behind Mossel Bay. The peneplain is composed of Tertiary deposits of Enon conglomerate which have here formed a quartzitic sandstone, horizontally bedded and lying unconformably on the steeply dipping Table Mountain sandstone.

Dr. A. V. Krige refers to this raised beach, but does not seem to have studied this cutting, which may not have been made at the time of his visit.* He suggests that "the most recent event in the coast-line history is that of slight emergence in two distinct stages. We recognise a major emergence, from nil to 80 feet, followed by a minor emergence between the extreme limits of 15 and 25 feet. This has brought the strandlines of the former emergence to altitudes of from 20 to 100 feet, averaging from 50 to 60 feet."

Discussing the evidence for the major emergence he quotes the raised beach at Cape St. Blaize as an example: "Problematical evidence is afforded by the caves at Cape St. Blaize. The larger cave below the lighthouse is 90 feet above sea-level and the smaller ones are about 110 feet. These caves may be of subaerial origin, as they occur in the base of the Enon sandstones, where these overlie the T.M.S. unconformably. To the north of Cape St. Blaize a little terrace rises to only 45 feet at the foot of the higher escarpment."

Returning to his discussion of the terrace he later states that it has been cited as evidence of the major emergence. "This is not necessarily so, on account of the probability that it may have been built up to this level by rain-wash from the cliffs. Rock floor is seen round the edge to a height of only 15 feet. It is possible that the terrace was cut in part during the higher stand, and subsequently modified during the lower stand" (p. 56). The cutting made for the road, apparently subsequent to Dr. Krige's visit, precludes the hypothesis that the shelf has been built up by rain-wash from the steeply dipping talus slope above. The beach deposit is obviously undisturbed and shows a normal history up to the time when the surface was covered to about a foot in depth by scree. Farther to the north-west the scree entirely replaces the beach at this height.

It stands to reason that the section exposed must either coincide at its base with the base of the beach or stand above that level. If the surface of the beach is 45 feet high, and the exposure cuts down to a depth of 8 feet, then the base of the cutting must stand at a maximum height of 37 feet above sea-level.

* A. V. Krige, "Examination of the Tertiary and Quaternary Changes of Sea-level in South Africa," Annals of the University of Stellenbosch, v, A.1.

Most helpful is the statement of the Clerk of Works to the Mossel Bay Municipality, that the builder of the war memorial was still finding beach material at a depth of 16 feet below surface (5 m.). The memorial stands about 10 m. away (farther down from the slope of the terrace) from the foot of the exposure, and is probably below the storm portion of the old beach. We can thus safely subtract this 16 feet from the 37 feet of the road-level, making 21 feet the maximum height of the base of the old beach above present sea-level. This coincides more nearly with the 20-foot beach described by Rogers at Little Brak,* which certainly belongs to the minor emergence, and with which Tomlin † has associated an extinct type, *Calliostoma mosselense* Tomlin.

The beach exposed by the road cutting at Cape St. Blaize is easily recognisable, and is composed of large spherical boulders perhaps up to 18 inches in diameter, originating from the talus but since completely rolled by sea-action. These are packed with smaller pebbles, while here and there are small patches of sand, and scattered throughout are a considerable number of recognisable shells. No species not usual to this part of the coast were noted. The broken-down fragments of other shells are plainly visible, and many have gone to form a lime which has been carried to the surface of the beach by water action to form a distinct surface, which dips towards the sea at an angle here of about 45°. The lime formation suggests that the beach surface was exposed for some time before the encroachment of the talus rubble, while the steepness of the angle would further suggest that we are dealing with the highest or storm portion of the beach.

Below this visible surface the lime has loosely cemented the beach material, rendering the entire deposit a dirty white. The cemented beach is stratified more or less horizontally, but follows the contours of the large boulders and the old land-surface.

Overlying the lime crust the soil changes very considerably, and there is a marked difference discernible between the original beach material and the overlying rubble. The soil in the latter consists entirely of reddy brown sandy material a foot in depth (obviously the product of a dry climate) containing humus and angular fragments of rock from the Enon. Here and there, as a result of erosion and subsequent infilling, the talus material has cut into the lime surface of the beach to a depth of 2 or 3 feet, but at these points the disturbance is obvious and is always easily definable.

* Rogers, Geological Survey of the Cape of Good Hope (Tenth Report).

† Trans. Geol. Soc. S. Afr., vol. xxviii, 1925.

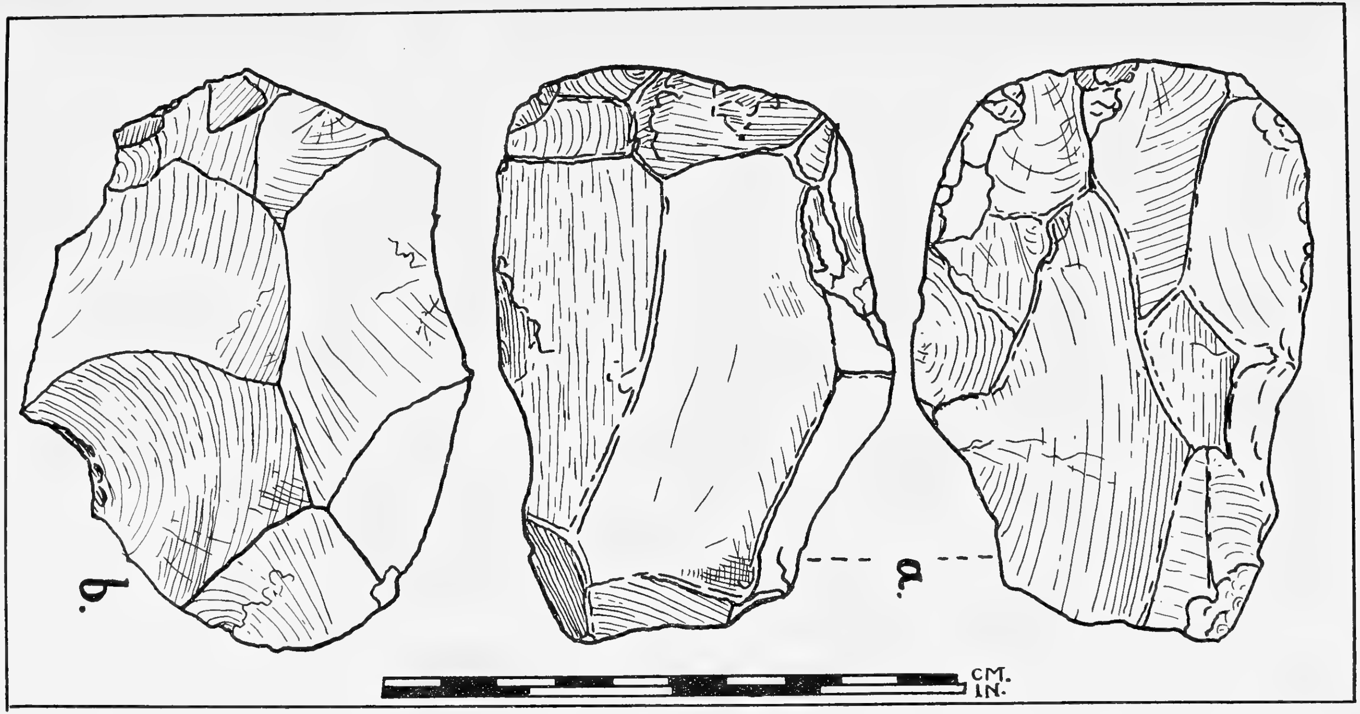

Fig. 6.—*a*, unstruck Levallois core from raised beach deposit, rolled; *b*, unstruck Levallois core from above raised beach deposit, non-rolled.

We are thus presented with two fortuitously associated layers; the beach deposit, exposed at this section, and varying in height above road-level from a few centimetres to a little over two metres; overlying this is a foot of hill talus, necessarily later as a deposit, and containing material of all ages. The importance of this section is considerably increased by the fact that it occurs in a locality extremely rich in caves, and therefore in stone implements, many of which have at all times been included in the talus material. The beach has obviously been fed, at least partially, from this rubble, while the lime crust limits the beach admirably both in time and space. It stands to reason, therefore, that any rolled implements from the talus slope included beneath the lime and in the beach must necessarily have been manufactured before the recession of the sea (or the land uplift), and also before the formation of the lime crust.

The finding of implements attributable to man in beach deposits of a similar type, at a level of 20 feet sea-level at Little Brak River, has been reported by Rogers.* Péringuey, quoting Rogers's report, adds that the implement found in the quaternary limestone of the raised beach at Little Brak "is a fragment of a knife-scraper flake, in shape and composition corresponding with examples found on the surface in the Mossel Bay district, especially at Cape St. Blaize."† The implement thus belongs to the Mossel Bay type of stone implement. Goodwin reported the finding of similar types immediately overlying this same beach, but not from within the beach material itself.‡

Little human material has so far been found in the St. Blaize beach (37-foot exposure), and during the present visit a careful search was made for datable material, which might be related to a definite prehistoric period and used as a datum line in South African chronology. As a result of this search a number of humanly made flakes were found, and one apparent *coup-de-poing*, all considerably rolled. The flakes are generally formless, and might be attributed either to any Earlier or Middle Stone Age culture. The butts are crudely faceted, and in form they resemble the Nooitgedacht material described by Péringuey (*op. cit.*, pl. xiii, 105), which has since proved to be a collection of spalls from the Stellenbosch Industry. None show, on account of their rolled state, any further definable form.

* *Op. cit.*, p. 293.

† Péringuey, Ann. S. Afr. Mus., vol. viii, p. 80.

‡ "Chronology of the Mossel Bay Industry," S. Afr. Journ. Sci., vol. xxvii, 1930.

The *coup-de-poing* would seem to be a more easily identifiable fossil, and we identify it completely with the *pseudo-coup-de-poings,* perhaps unstruck disc cores, described in association with the Mossel Bay Industry both here and at Slang River.* Several specimens of this type from the talus overlying the raised beach were also found associated with Mossel Bay type at the site at present under discussion.

This implement was found cemented into the beach deposit and in a position which it could not have reached as a result of a recent fall from the talus (see Plate XXIII). It was heavily rolled, was more than half enclosed in beach deposit when found, lay directly below unbroken lime surface, and was completely surrounded by shells, pebbles, sand, and similar authentic and undisturbed beach material. It is therefore to be regarded as an integral part of the raised beach. In order to ascertain whether it would be possible for talus material to be incorporated in the beach deposit from above, a careful search was made for non-rolled implements from the perpendicular beach section. Some few were found, but all lay in positions easily reached in their fall from above, and were all caught in the surface, but neither buried nor cemented in. Rolled artefacts were in all cases attached, and partially buried into the lime.

We may, therefore, take it as proved that the Mossel Bay Industry is, at least in part, contemporaneous with or older than the raised beach exposed at Mossel Bay. It had previously been proved that this industry is partially contemporaneous with or older than the 20-foot raised beach at Little Brak, on the evidence of Rogers.

It remains, therefore, to suggest the relationship of the St. Blaize beach with that at Little Brak. Rogers states that the beach at Little Brak lies some 15 feet above the alluvial plain and about 20 feet above sea-level. Krige (quoted above) states that the terrace at St. Blaize rises to 45 feet above sea-level. The cut in the beach exposing the section totals 8 feet, and does not reach the bottom of the beach deposit. We were voluntarily informed that the builder who contracted for the war memorial dug to a depth of 16 feet, and was still finding sea-shells, lime and water-worn pebbles. We may take it, therefore, that the beach deposit is 16 feet thick from the present road-surface, and that we are dealing with a beach the base of which is not more than 21 feet above sea-level. This brings the St. Blaize beach within the scope of the minor emergence described by Krige, and not, as he suspected, with the major emergence.

The Mossel Bay Industry is therefore partially contemporaneous

* Goodwin, S. Afr. Journ. Sci., vol. xxvii, *op. cit.*

with, or previous to, the minor elevation marked round the southern South African coast by the "twenty-foot" beaches.

Further research in raised beaches, together with our previous knowledge, reveals other features of interest, which all point to the validity of the association. At Shelly Beach, Port Elizabeth, a shelf covered by old dunes and standing to a height of up to 50 feet has been left by the Minor Emergence. Beneath the hardened sand-dunes which form the surface are to be found a number of implements of Mossel Bay type. They are often slightly waterworn, but no further proof of their associability with the Minor Emergence is forthcoming. The section of 20-foot raised beach exposed by the road cutting behind the boat-building yard at Humewood, Port Elizabeth, is completely sterile of implements.

On a recent search in a railway cutting, a hundred yards east of the Bitou railway bridge, near Fairey Knowe, George district, a fragment of raised beach was found, and incorporated in it were a few water-worn implements of Mossel Bay type. The deposit is too much disturbed to be conclusive in itself. The height above sea-level is a little over 20 feet.

Goodwin * has already pointed out that Middle Stone Age sites near the coast are all situated above the raised beach level, and it should be further noted that they are generally situated *immediately* above that level, but never below. The recent contour survey of the Cape Peninsula (Trigonometr. Survey, Cape Peninsula, Sheet 2, 1934) has shown that the Noordhoek lagoon or vlei, which would seem to be a remnant of the raised beach, is situated just below the 25-foot contour. This becomes important when we realise that on the seaward shore of the vlei and at the 20-foot level is an extensive Still Bay site, which lies beneath midden material containing Wilton implements.†

Conclusions.

From the Cave.

1. That the Mossel Bay Industry precedes the midden cultures of the Southern Littoral, and is certainly not a midden culture itself.

2. That the Howieson's Poort Variation cuts into the Mossel Bay at this site, much as it cuts into the Still Bay Culture at the Skildegat site.

* "Chronology of the Mossel Bay Industry," S. Afr. Journ. Sci., vol. xxvii, 1930, p. 570.

† See Haughton, S. H., The Geology of Capetown and adjoining Country. Explanation of Sheet 247 (Cape Town). Geological Survey. Pretoria, 1933.

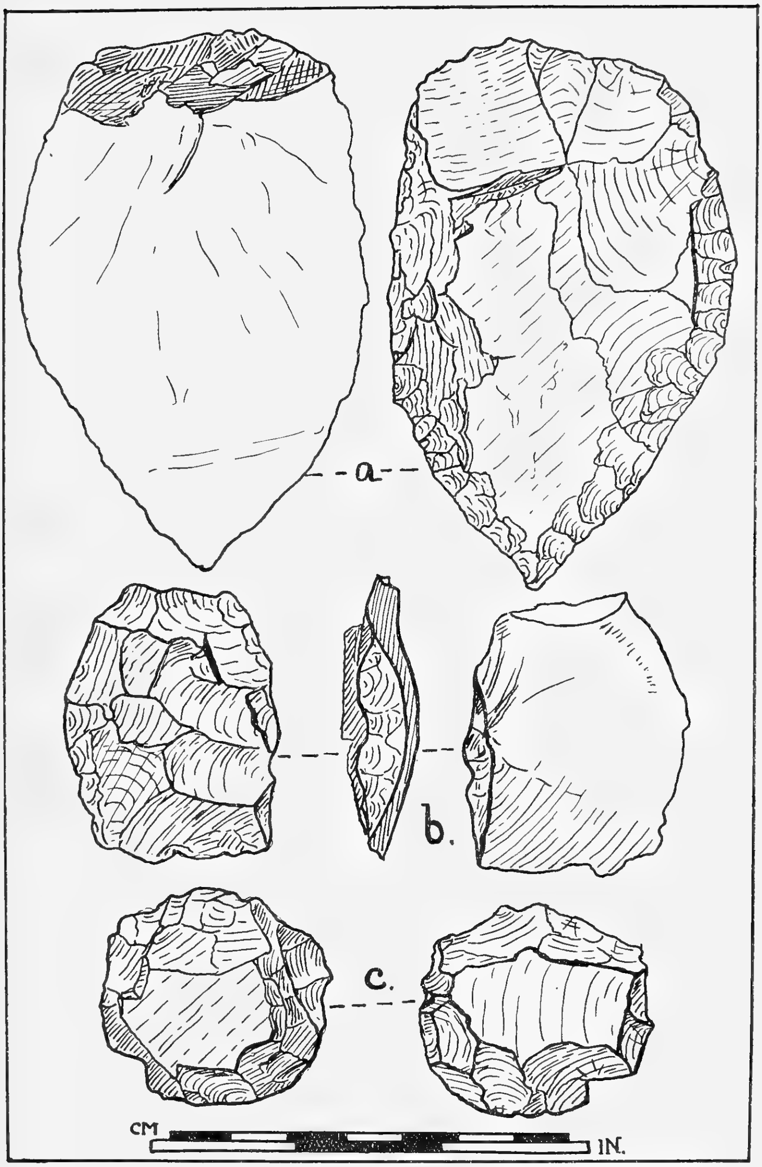

FIG. 7.—*a*, worked point; *b*, Levallois flake; *c*, small disc core. From above the raised beach, non-rolled.

3. That we may therefore presume that the Mossel Bay Industry is at least partly contemporaneous with the Still Bay Culture, of which it is a Variation, due to a choice of materials used.

From the Raised Beach.

4. That the Mossel Bay Variation is partly contemporaneous with the Minor Emergence of Krige.

5. That the only extinct marine fauna so far associable with the raised beach (at Little Brak) is *Calliostoma mosselense* Tomlin. The type is described from that source.

From the Cave and previously known Sources.

6. That the land fauna associable with the Mossel Bay Variation is in part extinct, and included *Equus capensis* and *Phacocoerus dreyeri*.

ACKNOWLEDGMENTS.

Our thanks are due to the South African Railways and to the Municipality of Mossel Bay for permission to excavate, also to the University of Cape Town for financial help.

|a

|b

:ruck Levallois core *in situ* (*cf.* text-fig. 7, *a*).

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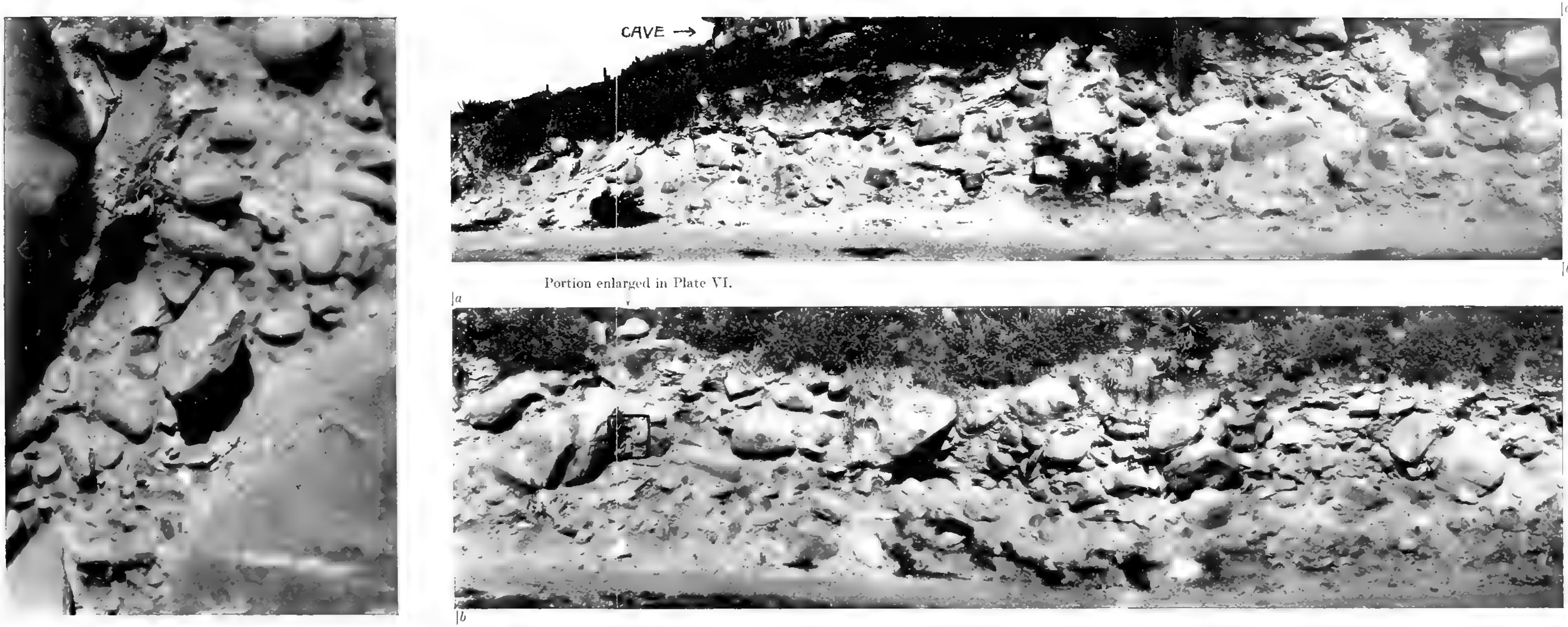

Exposure of raised beach deposit at Cape St. Blaize, showing position of cave. The area outlined in black is enlarged in the left-hand figure, and shows an unstruck Levallois core *in situ* (*cf.* text-fig. 7, *a*).

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7. *Some Native Snuff-Boxes in the South African Museum.*

By Miss M. Shaw, B.A., Assistant in Ethnology.

(Plates XXIV–XXXI, and 2 Text-figures.)

Snuff-taking is a widely-spread practice among the Bantu tribes of South Africa, both men and women alike being "passionately fond" of it (**9, 10, 13, 15,** p. 237; **22,** p. 683; **27,** p. 179; and **23**). Tobacco and snuff were among the most important objects of barter and gift carried by the early travellers. The Herero are a notable exception, and they learned the use of tobacco from the Nama Hottentots, who, like the Bushmen, do not grind it to make snuff (**6**). Tobacco is believed to have been introduced by the Portuguese in the sixteenth century (**26**); and it is possible that snuff-taking was introduced at the same time, though the fact that powdered dagga leaves are frequently used instead of tobacco suggests that the practice might have been known beforehand. Even more than smoking it is the accompaniment of nearly all social intercourse, but whereas smoking always remains a more or less individual affair, snuff-taking, at least among the south-eastern tribes, has reached such a height of formality that it has become a social usage in itself (**25,** p. 223).

There is little variation throughout the tribes in the method of preparing snuff. Tobacco is used more frequently than dagga and is grown about the huts (**8,** pl. vi,; **10, 15,** p. 237; **23,** and **27,** p. 180), excepting by the Ovambo who import theirs from the north (**28**). The dried leaves are ground to a powder between two stones, usually with the addition of the white ashes of burnt twigs, or dried aloe leaves or some other sharp ingredient, to increase the strength and quantity of the snuff (**12, 18**). It is kept in bulk in large calabashes which are hung up in the huts. The Suto tribes of the Northern Transvaal damp the snuff after the first grinding and allow it to dry in blocks which can be used for trade. When wanted for use a portion is broken off and ground again, and the powder is put into a snuff-box (**9**).

As to the manner of taking snuff, although it seems to have attracted the attention of travellers in most parts of the country, the only adequate description available is for the South-Eastern Bantu. The Zulu, both men and women, all carry a snuff-box (**25,** p. 8), and those who can afford it, a small snuff-spoon carved out of ivory. They take snuff squatting on the ground; in a circle if there are several of them. Having first cleansed the nostrils with an iron spatula, which serves as a handkerchief, they pour a certain amount of snuff into the left hand and inhale it, either directly from the palm of the hand, or by taking a large pinch with finger and thumb, or by scooping it up with a spoon. After a short pause the thumbs are drawn down the sides of the nose from the eyes, as if to make a channel for the tears which soon gather and overflow. This is the height of enjoyment and apparently the crux of the performance, which is terminated by a loud sneeze (**7, 13, 25,** pp. 8–9). According to Delegorgue, if any of the company was so hardened that the snuff did not make him sneeze, he tickled his nose with a few blades of straw so as not to be outdone by the others (**7**). Shooter states that "they seldom meet without indulging in a concert of snuffing" (**25,** p. 223), and it would be regarded as very rude, if not as a definite insult, to interrupt them (**7, 13**). If there is an important person among them, or one richer than the others, he is expected to supply snuff for the party, but he must be asked for it once or twice and show reluctance to comply. If he seemed over-eager, or offered it without being asked, he might be suspected of evil motives; because in order to take snuff a man must necessarily lay down his arms and place himself in a defenceless position, and it is reported that the Zulu despots frequently used this means of treachery to get rid of people whom they found undesirable. It is considered polite to pour a quantity of snuff into the left hand and pass it round without looking to see how much the others take, or better still to hand over the box, and let the others help themselves (**25,** p. 223).

The Xosa and other tribes of the Eastern Province and the Basutoland Border take snuff in much the same way as the Zulu, and make as great a business of it. All work is set aside if there is snuff to be taken. According to Fleming both sexes take snuff, but Kropf, writing much later, says that it is only the men. They shout with joy when the tears flow and go on till they are quite stupefied. When they sneeze they say "May the Chiefs bless me" (**17**). Most of them use bone, ivory, wooden, or less frequently iron spoons, with which first to clean the nostrils, then to carry the snuff to them, and finally, to scrape off and return to the box any particles of snuff remaining round the edges. One nostril is held with the finger while the other is provoked. Fleming mentions a small brush that is used to give the nose a final tidying (**10** compare **7,** p. 355). He also describes an iron point with which to stir up the snuff when it has become caked in the box, but the pointed end of the snuff-spoon or the finger-nail might be used for the same purpose (**11, 18, 21**). Those who can afford neither spoon nor box rub the snuff on to a very hairy piece of skin, which is carried rolled up and applied directly to the nose (**12**).

The Basuto of Basutoland use spoons when they can, or even the ordinary iron sweat-scraper (**5, 23**). The Transvaal Suto inhale directly from the palm of the hand, or if they do not possess snuff-boxes, from a piece of skin, in the same way as mentioned above. They too take great enjoyment in snuffing-parties and a good flow of tears. Grutzner gives an account of the part played by snuff in the betrothal ceremony of the Northern Suto. When the boy's father has obtained the girl's father's consent to the match, and has returned to tell the boy, a messenger is sent back to the girl's kraal to ask for snuff. The old women grind some and put it into a gourd snuff-box which is sent two or three days later, with a member of the girl's kraal, to the boy's. The boy's family and relatives are then called together to take the bridal snuff. The box is opened by the husband (or future husband if she is as yet only betrothed) of the boy's eldest sister. He opens it with his awl, shakes some into his left hand, and passes the box on, to go the round of the whole family. Next day the empty box is sent with the first instalment of cattle to the girl's kraal, and is given to the girl, who covers it with beads and wears it round her neck as a sign of betrothal. She calls it her child, *Noana*, and removes it only after she has borne her first child, when she makes a necklace of the beads and hangs them round the child's neck (**9, 14**).

The Bechuana do not appear to use spoons, but "pour a large quantity of snuff into the palm of the hand and draw the whole of it up the nostrils at once" (**4**). In Burchell's time the southern Bechuana tribes obtained their tobacco by barter from their northern neighbours. The leaves had been prepared by steeping them in hot water, which made them much milder, so that the colonial brand was preferred.

The Matabele are inveterate snuff-takers (**3**), but with less formality. Unlike the South-Eastern Bantu, among whom snuff-taking makes any other occupation impossible, one writer reports of them that the women were seated "weaving mats, snuffing, and chatting" (**27,** p. 214). Apparently they have no prejudice against offering snuff, as a young man may try to win the love of a girl by giving her a pinch of snuff in which a special medicine has been mixed (**27,** p. 278).

Among the Bathonga of Portuguese East Africa if two men meet they will always offer each other a pinch of snuff and thereby establish a friendly atmosphere before starting a discussion. In the same way snuff is taken at peace conferences as a sign of goodwill. In the final part of the marriage ceremony of one of the clans the bride kneels to offer the bridegroom snuff, but when he has approached and taken a little between his fingers, she throws the rest in his eyes and runs away, pursued by his friends, who must catch her before she reaches a certain point, or else further presents must be given to persuade her finally to return to the village (**16**).

Another example of snuff being used ceremonially is reported by Bent, of the Makalanga in the south-west of Southern Rhodesia. He says that whenever they enter a new territory "they kneel before a tree and burn snuff, saying as they do so, 'Muali, we have brought knives, give us meat.' Then they do the same at another tree, asking the same for their children" (**2,** p. 271).

The snuff-boxes are carried either attached to a necklet, tucked in the girdle or attached to it by a strap, or in a small bag. The Zulu, Matebele, the Natal tribes now in the Eastern Cape Province (Fingo, Hlubi, etc.), and some of the Mashona tribes, use a small piece of reed, decorated and stopped at each end, which they carry in a hole made in the lobe of the ear. The spoons are frequently attached to the boxes, or else stuck in the hair, or carried somewhere else on the person, as an ornament (**1, 2, 8,** p. 20; **10, 15,** pp. 237–238; **18, 20, 22, 25,** p. 8; **27,** p. 179).

Zulu.

The earliest types of snuff-box were the reed worn in the ear, of which the Museum has no specimen, and a small gourd (*Lagenaria*) (**15,** p. 237).

The simplest is a dark brown bottle gourd, unpolished, with a round hole at the top, fitted with a round of gourd shell (S.A.M., 287 ([4])).

Height, $4\frac{3}{4}$ inches (upper bowl, $1\frac{7}{8}$ inch; lower bowl, $2\frac{7}{8}$ inches).

Diameter of upper bowl, $1\frac{3}{4}$ inch.

Diameter of lower bowl, $2\frac{3}{4}$ inches.

Diameter of neck, $1\frac{1}{2}$ inch.

Diameter of mouth, $\frac{5}{8}$ inch.

This type would be carried in a small bag attached to the waistband.

Plate XXVI, fig. 2, shows an example of the same type (S.A.M., 2870 ([5])), though smaller and lighter in colour, with a leather stopper attached to a thong round the neck, by which the box could be suspended.

Height, 4 inches (upper bowl, $1\frac{1}{2}$ inch; lower bowl, $2\frac{1}{2}$ inches).

Diameter of upper bowl, $1\frac{3}{8}$ inch.

Diameter of lower bowl, $2\frac{1}{4}$ inches.

Diameter of neck, 1 inch.

Diameter of mouth, $\frac{3}{8}$ inch.

Another very popular type has hitherto been described as a small round gourd (**25,** p. 8), but appears rather to be the shell of a tree fruit, probably a *Strychnos*. It has a round hole at the top for the mouth, and next to it two smaller holes through which a loop of twisted grass is passed and knotted at each end. It can be attached to the waistband or necklet.

Plate XXVI, fig. 5, shows an example (S.A.M., 2870 ([1])) of this type suspended from a necklet of small blue and white beads, with a centre-piece and ends of three large red tubular beads. The fastening is at the back.

Diameter of shell, $2\frac{1}{2}$ inches.

Diameter of mouth, $\frac{5}{8}$ inch.

Length of loop, $3\frac{3}{4}$ inches.

Another example of the same type (S.A.M., 2870 ([2])) has a short thong loop, instead of a grass one, to attach it to a necklet which fastens in front. The bowl is decorated with scratched figures illustrated in the panel, Plate XXVI, fig. 6.

Chiefs and rich men who could afford a lot of snuff used larger gourds of the same type (*Lagenaria*).

An outstanding example is illustrated on Plate XXIV (S.A.M., 3322). Fig. 1 is an outline of the gourd itself, fig. 2 the design on the upper bowl, and fig. 3 the design on the lower bowl. The gourd is said to have belonged to Dingaan and to have been decorated by a Zulu who had visited Cape Town, to give him an idea of European civilization. It is light brown and highly polished, and the engraving appears to have been done with a sharp point before the shell was dry. The amount of detail shown is quite remarkable. On the lower bowl there are public buildings and houses showing the stairs inside with people climbing up them; particular attention has been paid to the structure of the roofs. There is a tent wagon and an open one, both outspanned, though the latter has an ox beside it; a carriage and pair with driver and groom; two trees and a solitary rider; a barrel of wine; and two processions, one of cavalry brandishing swords with the scabbards at their sides, and the other of infantry, with fixed bayonets and led by a band! On the upper bowl three men are out shooting with their dog, and a large flock of birds above them; in front of each is what might be a dead bird. There is a grandfather clock standing in a group of unrecognisable furniture; a man seated on a chair, writing at a desk; and finally what appears to be a view of the town, showing roofs only, perhaps as seen by the man through the window.

Height $5\frac{3}{4}$ inches (upper bowl, $2\frac{1}{4}$ inches; lower bowl, $3\frac{1}{2}$ inches).
Diameter of upper bowl, $1\frac{7}{8}$ inch.
Diameter of lower bowl, $3\frac{1}{2}$ inches (approx.).
Diameter of neck, $1\frac{5}{8}$ inch.

Plate XXV, fig. 2, shows another example (S.A.M., 3330). It is the same light reddy brown with a fairly polished surface, decorated with rows of triangles, first traced with a sharp point, and then branded.

Height, 8 inches (upper bowl, $4\frac{1}{2}$ inches; lower bowl, $3\frac{1}{2}$ inches).
Diameter of upper bowl, $1\frac{3}{4}$ inch.
Diameter of lower bowl, $2\frac{5}{8}$ inches.
Diameter of neck, $1\frac{1}{8}$ inch.
Diameter of mouth, $\frac{1}{2}$ inch.

After their introduction European beads became the most popular form of decoration for snuff-boxes.

Plate XXVI, fig. 1, shows a plain bottle gourd (S.A.M., 2870 (3)), covered with a diamond network of beads (about $\frac{1}{8}$ inch in diameter), strung on sinew. The top half of the upper bowl is navy blue and white, and the remainder navy blue, white, and white-eyed red. Half-way down the lower bowl the network gives way to a long fringe of slightly larger beads, mainly sky blue, and ending in white-eyed red, navy, white, large tubular black, and white. The stopper is missing, but should be a wad of rag, probably with the upper half beaded.

Height, 4 inches (upper bowl, $2\frac{1}{2}$ inches; lower bowl, $1\frac{1}{2}$ inch).
Diameter of upper bowl, $1\frac{1}{2}$ inch (approx.).
Diameter of lower bowl, 3 inches (approx.).
Diameter of neck, $1\frac{1}{4}$ inch (approx.).
Diameter of mouth, $\frac{3}{8}$ inch.
Length of fringe, $1\frac{1}{4}$ inch.

This type, besides serving the twofold purpose of snuff-box and ornament, rattles splendidly with the least movement.

An entirely different type, possibly a development of the reed snuff-box, is illustrated on Plate XXV, fig. 3 (S.A.M., 2820 (1)). It is a cylinder of wood covered with closely set beads strung on sinew. The actual stringing is diamond fashion, but the beads are set so closely as to appear in rows. The colours are arranged in spiral stripes of two beads each—white ($\frac{1}{8}$ inch), alternating alternately with white-eyed red ($\frac{1}{8}$ inch) and black (slightly smaller). The odd stripe is china blue ($\frac{1}{16}$ inch). The edging at each end is two rows of apple green and one row of white ($\frac{1}{16}$ inch). The ends are stopped with rounds of gourd shell, one fixed permanently with two short bead straps, china blue edged with black ($\frac{1}{16}$ inch), and the other to open, and attached by one similar strap. Two conical brass buttons at each end attach the box to a round necklet of cloth covered with small white beads ($\frac{1}{16}$ inch) strung on fibre—a long string wound round.

Length, $5\frac{3}{4}$ inches.
Diameter, $1\frac{3}{4}$ inch.
Length of necklet, 28 inches.
Diameter of necklet, $\frac{1}{2}$ inch.

Plate XXV, fig. 1, shows an example of a large round gourd used for storing snuff (S.A.M., 2871). It is light coloured and covered entirely with a diamond network of beads (about $\frac{1}{8}$ inch); the points being two white beads, and each side two china blue beads. There are two horizontal stripes, one near the mouth and one round the bowl, made by filling in the sides of the diamonds alternately with white-eyed red, and black. At the bottom a tassel of four strands comes from a circle of white-eyed red and black. Each strand is composed of one white, three dark saxe glass, one pink, three dark saxe glass, one white ($\frac{1}{16}$ inch), one large tubular black, and one white. The stopper is a wad of rag, the top of which is covered with five alternate rows of large white and china blue. It is attached to the bowl by a short string of dark saxe glass, white, black, and pink.

Height, 6 inches.
Greatest diameter, 6 inches.
Diameter of mouth, $\frac{3}{4}$ inch.
Length of stopper, $1\frac{3}{8}$ inch.

Transkei.

The snuff-boxes of the Transkei differ very little from those used by the Zulu, except that the reed worn in the ear is only found among the Fingos and a few others who have migrated from Natal in fairly recent times (**1**). The most common form is again the gourd, plain, decorated by branding, or covered with beads.

Xosa.—Plate XXVII, fig. 8, shows a light coloured bottle gourd (S.A.M., 3328) decorated by branding, the designs having first been scratched with a sharp point. There is a plain band of branding round the mouth, and round the lower bowl the figures of a man and woman in European clothes, discussing a dead fowl; a man and woman in European clothes walking arm in arm; a man on all fours being attacked by a dog; a large bird and various incomprehensible designs. This type would be carried in a bag.

Height, $4\frac{1}{2}$ inches (upper bowl, $1\frac{5}{8}$ inch; lower bowl, $2\frac{7}{8}$ inches).
Diameter of upper bowl, $1\frac{1}{4}$ inch.
Diameter of lower bowl, $3\frac{1}{4}$ inch.
Diameter of neck, 1 inch.
Diameter of mouth, $\frac{1}{2}$ inch.

A less usual and more original type is illustrated on Plate XXVII, by figs. 1, 2, 3, and 4. These are made when an animal, usually an ox, has just been killed and skinned. The blood and remaining tissues that are scraped off the inner side of the skin when cleaning it are collected and mixed with ochre or powdered clay, and if necessary a little more blood is added to form a stiff paste. A clay model of the desired shape is made first and baked in the sun. The paste is spread over this, and when nearly dry a rough nap is picked up with a sharp point. When quite dry a round hole is cut for the opening, and the clay model is picked out. A stopper is fitted, either of wood or a round of gourd shell. These boxes are carried in a bag, or hung from the waistband by a short thong (**11, 12**).

Plate XXVII, fig. 1, shows an example shaped like a bottle-necked gourd (S.A.M., 3319 (1)). It is a very light neutral shade, and the nap runs in regular concentric rings, except round the neck and at the bottom, where it is left plain. It has a round wooden stopper, the top of which is shaped like an hour-glass.

Height, $3\frac{1}{2}$ inches (upper bowl, 1 inch; lower bowl, 2 inches; stopper, $\frac{1}{2}$ inch).
Diameter of upper bowl, $1\frac{1}{4}$ inch.
Diameter of lower bowl, $2\frac{3}{4}$ inches.
Diameter of neck, $\frac{3}{4}$ inch.
Diameter of stopper, $\frac{11}{16}$ inch.
Total length of stopper, $1\frac{1}{8}$ inch.

This specimen does not appear to have been used, as the nap is very sharp and fresh, whereas on two other examples (S.A.M., 3319 (2) and (3)) it is worn almost smooth. No. 3319 (2) has a stopper of the same material, with the top half covered with white beads.

Plate XXVII, fig. 2 (S.A.M., 3319 (4)), is shaped like a pig. The opening is in the snout, and is stopped with a round of gourd shell. The box is reddy brown in colour and appears to have been rubbed with red ochre. The tail and ears have been left smooth. The nap is worn rather smooth.

Length, tail to snout, 4 inches.

Greatest height, from ears, $2\frac{1}{2}$ inches.

Greatest width, $1\frac{3}{4}$ inch.

Plate XXVII, fig. 3 (S.A.M., 58 (1)), represents an ox. It is pinkish in colour, and the tail, feet and belly, horns, eyes, ears, and nose have been left plain. The opening is between the horns.

Length, from tail to horn tips, 6 inches.

Greatest height, at horns, $4\frac{1}{2}$ inches.

Least height, at tail, 2 inches.

Greatest width, $2\frac{1}{4}$ inches.

Plate XXVII, fig. 4 (S.A.M., 58 (2)), also represents an ox, with the horns curved down and a hump behind the head. The nap is in very regular rows, and the colour brownish red. The opening is below the tail, which with feet and belly, ears, horns, and nose is left plain.

Length, $4\frac{1}{2}$ inches.

Height at head, $2\frac{7}{8}$ inches.

Height at tail, $1\frac{3}{4}$ inch.

Greatest width, 2 inches.

The Museum has another example of this type (No. 1339), made to represent a sheep.

Another very common form of snuff-box is made of the pointed end of a goat- or ox-horn (**18**). The solid point is usually carved, and the hole at the base is filled in with a thin disc of wood cut to fit exactly, and nailed in.

Tembu.—Two Tembu snuff-boxes of this type are illustrated on Plate XXVII, figs. 5 and 6, and fig. 7.

Figs. 5 and 6 show two views of a black and white horn (S.A.M., 988 (1)); the bowl of which has been pared down to make the base a definite and very symmetrical oval. The light-coloured wooden base is nailed in with iron tacks. The top is carved to represent a buck's head, with short ears, long straight horns and a conventionalised shield-like face, in which the hole for the aperture is cut.

Length along upper curve, 8 inches.

Base, $2\frac{1}{4}$ inches by $1\frac{3}{8}$ inch.

Oval aperture, $\frac{3}{8}$ inch by $\frac{1}{4}$ inch.

Fig. 7 shows a dark brown horn (S.A.M., 988 (²)), thinned at one end to a straight nozzle, divided from the bowl by a flanging ridge. The wooden base is oval and nailed in with brass tacks. It appears to have been covered with red ochre. A crack near the base has been stuffed with a rag. The stopper is a short joint piece of reed. A leather strap is knotted round the base of the nozzle.

Length along upper curve, with stopper, $6\frac{3}{4}$ inches.

Length of nozzle, $1\frac{3}{8}$ inch.

Diameter of nozzle, $\frac{7}{16}$ inch.

Base, $1\frac{7}{8}$ inch by $1\frac{5}{8}$ inch.

Length of strap (double), 6 inches.

Width of strap, $\frac{1}{4}$ inch.

Tambuki.—Plate XXVIII, figs. 3 and 6, shows two beaded gourds used by the Tambuki of the Cala District, Eastern Province. Both are light-coloured bottle gourds (S.A.M., 4981 (¹) and (²)).

Fig. 3 has only the neck and two-thirds of the lower bowl covered with a network of small white beads ($\frac{1}{16}$ inch), with a single stripe of black beads round the middle, and alternate triangles of black and white round the neck. At the bottom there is a band of four rows of china blue beads, and below that a short fringe, every two strands of which are joined in alternate pairs top and bottom, at the top by a white and two black beads, and at the bottom by a small diamond of two black and two pink beads. The strands themselves are divided in the centre by a black bead, the top half being dark jade, and the lower half china blue, except for a short patch where white-eyed red take the place of the green. The stopper is a wad of pale blue cotton material, covered at the top with rows of pale blue and pink beads. A long bead handle of china blue and white is attached to the top of the beadwork at each side.

Fig. 6 is entirely covered with beads ($\frac{1}{16}$ inch), with the exception of a small ring round the mouth, and an irregular seven-sided patch at the bottom. The beads are threaded on black cotton on the upper bowl, and twisted sinew on the lower. The colours are in vertical stripes of white, black, jade, white, china blue, black, and white. The beads are threaded on a long string wound round and round the gourd and supported at every change of colour in each row by a vertical strand of wood fibre which is twisted round the thread. In between these seven vertical columns the strands are free, and in some places hang fairly loosely. The stopper is a wad of dark blue cotton, with some small white beads sewn irregularly on top. It is attached by a short string of alternate black and white beads. There is a loop handle attached to the top of the beadwork, a single strand of black, white, red, and yellow beads.

	Fig. 3.	Fig. 6.
Total height . . .	4 inches.	$4\frac{7}{8}$ inches.
Height of lower bowl . .	2 inches.	$2\frac{3}{4}$ inches.
Diameter of lower bowl .	3 inches.	$3\frac{1}{8}$ inches.
Height of upper bowl . .	$1\frac{1}{2}$ inch.	$1\frac{5}{8}$ inch.
Diameter of upper bowl .	$1\frac{1}{2}$ inch.	$1\frac{5}{8}$ inch.
Stopper	$\frac{1}{2}$ inch.	$\frac{1}{2}$ inch.
Depth of net-work . .	$1\frac{3}{4}$ inch.	
Depth of fringe . . .	$\frac{3}{4}$ inch.	

Fingo.—A typical product of the trader's store is the Fingo snuff-box illustrated on Plate XXVIII, fig. 2 (S.A.M., 969). An empty vaseline tin holds the snuff. Two holes are bored in the side, about $1\frac{1}{4}$ inch apart, through which there is a short loop of twisted fibre. The tin is attached to a flat pendant of beadwork by loops of china blue, black, and white beads, which pass under the fibre loop. The ground of the pendant is white ($\frac{1}{8}$ inch and $\frac{1}{16}$ inch), with an edging of yellow ($\frac{1}{8}$ inch) and stripes of two rows of coloured beads; from the bottom, black and red, green and black, blue and black, red and black, yellow (single), black and pink, red and black, green and black, blue and black, black and red. At the top there are two groups of six strands each of white beads, one topped with yellow and black and the other with blue and black, gathered together and attached each group to a brass button, by means of which the pendant is buttoned on to a necklet.

Diameter of tin, $1\frac{7}{8}$ inch.

Height of tin, $\frac{7}{8}$ inch.

Total length of pendant, 6 inches (slightly shortened in illustration).

Width of pendant, $1\frac{7}{8}$ inch.

Length of loops, at top, $1\frac{1}{2}$ inch, at bottom, 1 inch.

Basutoland Border.

A variety of snuff-boxes comes from the Colonial side of the south and south-eastern borders of Basutoland.

Plate XXVIII, fig. 5, shows an ordinary bottle gourd (S.A.M., 4932), covered with a network of pale blue and white beads ($\frac{1}{8}$ inch), with a single row of white round the neck, and a spiral stripe of dark blue, black, and white-eyed red round the lower bowl. On the upper bowl the beadwork is a regular diamond pattern, with two white beads for the points, and a single blue between. On the lower bowl there is a similar arrangement of the white beads, but the blue ones are alternately in ones and twos, and only in occasional patches on the bottom half is there an appearance of regularity. The top of the rag stopper is covered with pale blue and white beads, and there is a short handle of blue beads interspersed with red, white, and black.

Height, 5 inches (upper bowl, $1\frac{1}{2}$ inch; lower bowl, 3 inches; stopper $\frac{1}{2}$ inch).

Diameter of upper bowl, 2 inches.

Diameter of lower bowl, $3\frac{1}{2}$ inches.

Plate XXVI, fig. 3, shows a specimen (S.A.M., 4956) very similar to the Zulu type on Plate XXV, fig. 3, but considerably smaller. It is a hollow piece of bamboo covered with rows of beads ($\frac{1}{16}$ inch) threaded on a string of twisted sinew and wound round. The colours are in five stripes, black and red alternate, separated by a single row of white, and there is an edging of pink and blue at each end. The box is attached to a short double-bead chain, of white-eyed red at the bottom, and black at the top, divided at each change of colour and in the middle of the black by a short flat pattern of blue and white.

Length of box, 2 inches.

Diameter of box, $\frac{7}{8}$ inch.

Length of chain, $6\frac{1}{4}$ inches.

Plate XXVI, fig. 4 (S.A.M., 4937), is a brass cartridge case covered with a diamond network of beads ($\frac{1}{16}$ inch), white for the points, with the sides filled in at the top and bottom with green, and in the centre half with black and half with pink. It is edged top and bottom with white-eyed red. The rag stopper is made to look like a head, with black beads for the hair edged by a row of black and white alternate, and a frill round the neck of pink, black, green, white, and yellow. The snuff-box is attached to a single-bead chain of green and pink not long enough to go round the neck.

Height, $2\frac{3}{8}$ inches.

Length of stopper visible, $\frac{3}{4}$ inch.

Diameter of cartridge case, $\frac{5}{8}$ inch.

Finally, there are horn snuff-boxes similar to those previously mentioned.

Plate XXVIII, fig. 1, shows a greyish black horn (S.A.M., 4933) with natural spiral rings. It is round in section and at the bottom has a convex-faced wooden plug, thick enough to remain in without nailing. The nozzle is eight-sided and separated by a step from the bowl. Near the mouth it has three narrow bands of roughly plaited brass wire. At the base of the nozzle two thongs are knotted round the horn, twisted, and knotted together.

Total length over outer curve, 8 inches.

Basal diameter, $1\frac{7}{16}$ inch.

Length of nozzle, $2\frac{1}{2}$ inches.

Diameter at mouth, $\frac{9}{16}$ inch.

Diameter at base, 1 inch.

Plate XXVIII, fig. 4 (S.A.M., 4958), resembles the type found at its best in Basutoland. It has a short, black, fairly polished bowl, oval in section, with a wooden base nailed in with three brass tacks, and a round hole with raised lip near the top in front. It is surmounted by a very conventionalised buck's head in which the two horns curve inwards and join in one piece.

Height, $3\frac{3}{4}$ inches (bowl, $2\frac{3}{8}$ inches; head, $1\frac{3}{8}$ inch).

Basal diameters, $1\frac{5}{8}$ inch by $1\frac{1}{2}$ inch.

Width across horns, $1\frac{1}{8}$ inch.

Basuto.

The Basuto use plain or beaded gourds similar to those of the South-Eastern Bantu, but their most distinctive snuff-boxes were carved out of horn, an art that is now lost. The horns are black and highly polished and filled in at the bottom with flat discs of wood as has been previously described.

The Museum has three specimens, which are illustrated on Plate XXIX.

Figs. 1 and 2 are two views of No. 448, which represents a man. His head and neck are the full size of the horn at that point. His head is turned obliquely and he has a beard. The short nozzle is in the top of the head and has a raised ring round it. The rest of his body is entirely disproportionate and is carved in relief on the back of the horn. Each leg coincides with a natural patch of white. The wooden base is not nailed.

Height, 5 inches.

Length along outer curve, $5\frac{3}{4}$ inches.

Basal diameter, $1\frac{11}{16}$ inch.

Diameter of nozzle, $\frac{5}{16}$ inch.

Figs. 5 and 6 are two views of a similar snuff-box (S.A.M., 561). It represents a woman with a child on her back. The skin cloak which supports the child is shown in the front but not at the back, where it would naturally cover the child. The woman wears a round girdle and the old-fashioned skin skirt, long at the back and short at the front. Up to that point, though not proportionate, the body is carved according to the size of the horn, but it is terminated by two spindly legs, right-angled to show the thighs, and standing out in relief in the front of the horn. The toes are turned in. The hole is in the top of the head and has a raised lip. The wooden base is not nailed in.

Length over outer curve, $6\frac{1}{4}$ inches.

Height, $5\frac{1}{4}$ inches.

Basal diameters, 2 inches by $1\frac{3}{4}$ inch.

Diameter of mouth, $\frac{3}{8}$ inch.

Figs. 3 and 4 illustrate No. 449, of which only the top part is carved, and that in the shape of an antelope's head and neck, with graceful horns. The hole is in the front near the top and has a raised rim. The horn is shaped to a sharp edge down the centre of the back and the round wooden base is nailed in with two brass tacks.

Height, $6\frac{3}{8}$ inches.

Length over outer curve, $8\frac{1}{2}$ inches.

Diameters of base, $1\frac{7}{8}$ inch.

Diameters of nozzle, $\frac{7}{16}$ inch by $\frac{1}{2}$ inch.

Mashonaland.

The snuff-boxes from Southern Rhodesia show much less European influence than those of the South-Eastern Bantu. Again the gourd is one of the most common types, but it is less frequently decorated with beads.

Plate XXX, fig. 8 (S.A.M., 1806), is a plain gourd (*Cucumis* or *Citrullus*) snuff-box, from the Manyika tribe on the south-eastern border. It is reddish brown and highly polished, but entirely without decoration. Its stopper is a small wooden plug, hour-glass shape. Inside are a quantity of melon seeds, which serve perhaps to sift the snuff and certainly make a very good rattle.

Height, $1\frac{7}{8}$ inch.

Greatest diameter, $3\frac{1}{2}$ inches.

Diameter of stopper, $\frac{3}{8}$ inch.

Height of stopper, $\frac{3}{8}$ inch.

Another type very characteristic of Mashonaland is illustrated on Plate XXX, figs. 4 and 5 (S.A.M., 2774 and 1807) (**2**). Both come from the Manyika tribe and are hollowed out of very hard dark brown wood, with the design cut in ridges, but whereas in fig. 4 both the ridges and the ear handle are quadrilateral in section, in fig. 5 they are triangular. The inside hollow does not appear to be very large.

The twined brass wire round the nozzle of each appears to be European, but that round the base of fig. 4 is thicker and probably of native make; it is covered with a black gummy substance.

On fig. 4 the pattern is the same back and front, and the flat back of the handle has three rows of short parallel ridges. The loop through the handle is a two-ply twist of black rag.

Height, 9 inches.

Greatest width, $1\frac{7}{8}$ inch.

Greatest thickness, $1\frac{5}{8}$ inch.

Length of nozzle, $1\frac{1}{4}$ inch.

Diameter of nozzle at base, $\frac{5}{8}$ inch; at top, $\frac{7}{8}$ inch.

Diameter of hole, $\frac{7}{16}$ inch.

Ear projects, $\frac{1}{2}$ inch.

On fig. 5 the whole of the back (on each side of the handle) is carved in longitudinal ridges, and the front is divided by two longitudinal ridges into two panels of diagonal ridges, both running in the same direction, but changing it at the bottom. At the base there is a deeply cut ring with a ridged cone protruding slightly.

Height, $5\frac{3}{4}$ inches.

Greatest diameter, $1\frac{1}{2}$ inch (the box is round in section).

Length of nozzle, $1\frac{5}{16}$ inch.

Diameter at base, $\frac{5}{8}$ inch; at top, $\frac{3}{4}$ inch; of hole, $\frac{5}{16}$ inch.

Ear projects, $\frac{1}{2}$ inch.

A similar but less finely finished example is shown on Plate XXX, fig. 3 (S.A.M., 3335). It is hollowed out of hard black wood, round in section, and carved in longitudinal ridges. The nozzle is plain and the mouth stopped with a mushroom-shaped light wooden stopper. A single piece of leather is inserted in a hole in the side and then split in two, almost as far as the hole, and knotted to form a loop. A small piece of tin has been hammered in near the base below the loop.

Height, with stopper, $3\frac{1}{4}$ inches.

Diameters of base, $\frac{3}{8}$ inch by $\frac{1}{2}$ inch.

Greatest diameter of bowl, $1\frac{1}{4}$ inch.

Length of nozzle, $\frac{5}{8}$ inch.

Diameter at base, $\frac{5}{8}$ inch.

Diameter of mouth, $\frac{7}{16}$ inch.

Diameter of stopper, $\frac{9}{16}$ inch; height above mouth, $\frac{3}{8}$ inch.

Length of loop, $3\frac{1}{2}$ inches.

The specimens shown on Plate XXX, figs. 1, 2, and 7 (S.A.M., 3318), were used by the Makalanga of the Victoria District, Southern Rhodesia. They are made of moth cocoons (*Lasiocampidae*, probably

Gonometra), with the top cut off and fitted with a small stopper of light wood. The cocoon is attached to a strap of leather or twisted fibre string, which passes once and is knotted under the ridge made by the junction of the cocoon and the twig from which it was broken. Some still have the remains of the twig. The boxes could be attached to a necklet or worn in the hair.

Fig. 2 is a single cocoon with a leather strap decorated with a large white-spotted sky-blue bead and divided to form a loop by which the box might be suspended. The stopper is hour-glass shape.

Total length, $2\frac{3}{8}$ inches.

Greatest width, 1 inch.

Diameter of stopper, upper circle, $\frac{7}{16}$ inch; lower circle, $\frac{1}{2}$ inch.

Height of stopper, $\frac{1}{2}$ inch.

Length of strap, $4\frac{1}{4}$ inches.

In fig. 1 two cocoons of similar proportions and with conical stoppers are fastened together on a short fibre string.

In fig. 7 the ends of a short strip of leather, about $2\frac{1}{2}$ inches by $\frac{7}{16}$ inch, are split in two and a cocoon attached to each of the four corners.

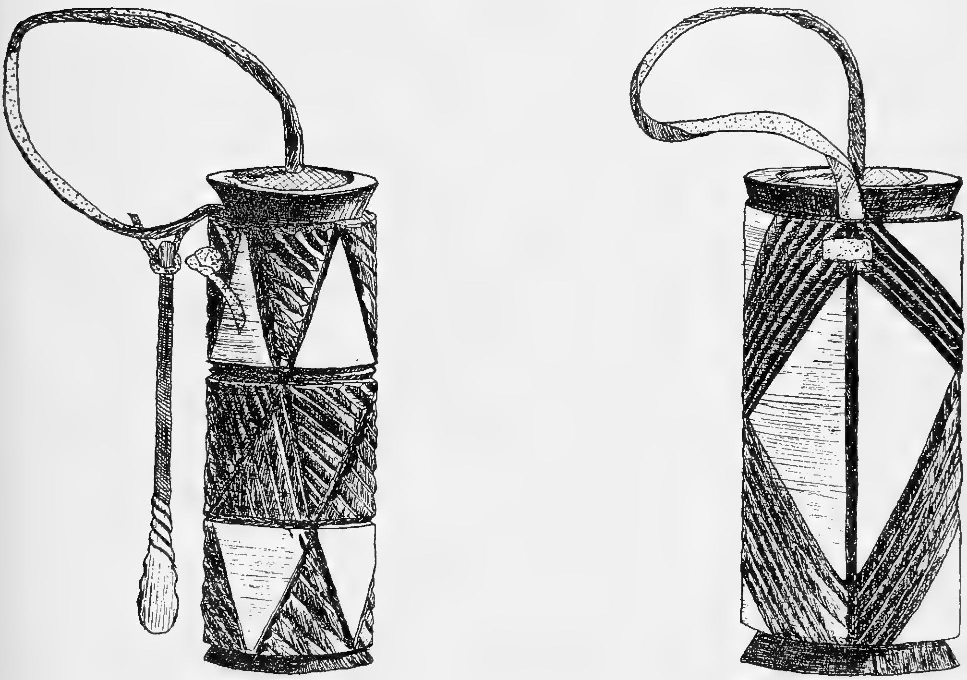
Plate XXX, fig. 6, shows a small leather snuff-box (S.A.M., 1791). It is a round of leather worked into a conical shape while wet. The greatest diameter when open is $2\frac{1}{2}$ inches; when closed the length is $2\frac{1}{4}$ inches. The edge is decorated with a double row of beads, in bands of pink and black alternately (three times). About $\frac{3}{4}$ inch from the top is a leather thong, sewn to the main portion in two places and threaded through three metal beads, brass, iron, and copper, which can be slipped up or down to close or open the box. The rest of the thong forms a loop and is decorated with several brass beads. Its length when doubled is about $5\frac{1}{4}$ inches. When closed the edge is inclined to frill.

Ovambo.

The Museum has three specimens of Ovambo snuff-boxes all quite modern and unused. They are carved out of light-coloured wood, probably of a palm, and decorated with incised and branded diagonal grooves.

Plate XXXI, fig. 6 (S.A.M., 4769), is shaped like a stemmed cup. A leather strap passes vertically through a projection at the top, and is held by the insertion of a transverse piece of leather. At the other end it is divided in two, one end being attached to a round stopper of gourd shell, and the other to a wooden spatula.

Height of box, $3\frac{3}{4}$ inches.
Diameter at greatest width, $1\frac{7}{8}$ inch.
Diameter of base, 1 inch.
Diameter of neck, $1\frac{1}{16}$ inch.
Diameter of mouth, $\frac{3}{4}$ inch.



a *b*

Fig. 1.—Ovambo Snuff-boxes.

Total length of spatula, $4\frac{1}{16}$ inches.
Length of bowl, 1 inch.
Greatest width, $\frac{3}{8}$ inch.

S.A.M., 5435 (text-fig. 1, *a*) is a cylinder of wood, hollowed out and open at one end, which is fitted with a round stopper of gourd shell. The stopper is attached to a leather strap which is passed through the wall of the box near the top and knotted. At its base a short piece is divided from the main strap to attach an iron spatula which appears to have been made out of a European spirally grooved file.

Height of box, 3 inches.

Diameters, 1 inch by $1\frac{1}{16}$ inch.

Length of spatula, $2\frac{3}{4}$ inches.

The third example (S.A.M., 5436) (text-fig. 1, *b*) is similar to the second, but wider, and having a different design in decoration. It has no spoon or spatula.

Height of box, 3 inches.

Diameters, $1\frac{5}{16}$ inch by $1\frac{3}{8}$ inch.

The two latter examples are very smoothly finished and look as if they have been sandpapered; the former shows the marks of a knife.

Bechuana.

The Bechuana use mostly goat- or buck-horn or bone for their snuff-boxes (**24**).

Plate XXXI, figs. 1, 2, and 3, shows three snuff-boxes made of highly polished horn. They all have the bottom filled in with a round of wood, which is nailed in with small wooden pegs. The nozzles are inserted separately and cut to fit the hole in the top of the horn. The stoppers, which are missing, would probably be wads of rag.

Fig. 1 (S.A.M., 3344 (1)) is a black horn striped with grey. It has an oval base and a round ivory nozzle decorated with three vertical rows of black dots, and with no apparent means of securing it except exactness of fit. The mouth has a raised lip.

Height of bowl, $2\frac{7}{8}$ inches (approx.).

Basal diameters, 2 inches by $1\frac{3}{4}$ inch.

Length of nozzle, $\frac{7}{8}$ inch.

Diameter of nozzle, $\frac{5}{8}$ inch.

Fig. 2 (S.A.M., 3344 (3)) is a light-coloured almost transparent horn with a round base filled in with a convex piece of wood nailed with three black wooden pegs. The ivory nozzle is not quite circular and has three vertical rows of black dots. The mouth has a raised rim.

Height of bowl, $2\frac{11}{16}$ inches.

Basal diameter, $1\frac{1}{2}$ inch.

Length of nozzle, $\frac{7}{8}$ inch.

Diameter at base, $\frac{11}{16}$ inch by $\frac{1}{2}$ inch; at mouth, $\frac{1}{2}$ inch by $\frac{3}{8}$ inch.

Fig. 3 (S.A.M., 3344 (2)) is a round white horn with a scallop decoration in black dots. The nozzle is made of black horn and like the wooden base is held in place with four small black wooden pegs. The mouth has a raised lip.

Height of bowl, $2\frac{9}{16}$ inches.

Diameters of oval base, $1\frac{13}{16}$ inch by $1\frac{13}{16}$ inch.

Length of nozzle, $1\frac{1}{4}$ inch.

Diameter at base, $\frac{7}{8}$ inch; at mouth, $\frac{9}{16}$ inch.

Plate XXXI, fig. 4, shows a snuff-box (S.A.M., 1686) made of a piece of bone, decorated with two bands of treble chevron pattern, first engraved with a sharp point and then filled in with some black substance. There is a plain band round the bottom, with the initials in black, M. K. B. The base is triangular and filled in with wood held by three tiny wooden pegs. The mouth is oval and has a wide flat rim. The stopper is a piece of hide with a short double leather tag.

Height, $4\frac{3}{8}$ inches.

Length of each side of base, $1\frac{3}{8}$ inch.

Top, $\frac{7}{8}$ inch by $\frac{3}{4}$ inch.

Mouth, $\frac{9}{16}$ inch by $\frac{3}{8}$ inch.

Length of tag, $\frac{7}{8}$ inch.

Plate XXXI, fig. 5, shows an unidentified specimen (S.A.M., 2876) which is probably of Bechuana make. It is an unpolished light-coloured horn, oval in section and slightly twisted. The stopper is a wad of leather with a long double leather tag. The bowl is quite plain except at the bottom, where it has been pared away to leave a slightly raised ring round each of the eleven tiny wooden pegs which hold the wooden base in place. The outstanding feature is the base itself (fig. 5, *a*), which has been branded in a conventional pattern after it was fixed in place.

Height, $3\frac{3}{4}$ inches.

Basal diameters, $1\frac{7}{8}$ inch by $1\frac{7}{16}$ inch.

Diameter of mouth, $\frac{7}{16}$ inch.

Length of tag (doubled), $2\frac{7}{16}$ inches.

The Museum has few examples of snuff-spoons. Of those shown in text-fig. 2, *a* and *b* come from East Pondoland, *c* from the Basuto-land Border, and *d*, *e*, and *f* from Basutoland. The Zulu spoons are the same type. Speaking of them Holden says: "In making the comb part great patience is requisite, as to shave the solid piece of ivory to the proper size and then saw the long teeth with a rough piece of iron is no small task" (**15,** p. 254).

a is made of bone. The cross-hatching on the back of the stem has been first incised and then filled in with dark red ochre. The front is quite plain. In cross-section the stem is a segment of a circle and the prongs rectangular. The bowl projects slightly forward.

Bowl, 1 inch by $\frac{5}{8}$ inch.

Stem, $1\frac{1}{8}$ inch by $\frac{1}{4}$ inch.

Fork, length, $3\frac{7}{8}$ inches, width at top, $\frac{3}{8}$ inch, each prong $\frac{1}{8}$ inch.

Thickness, $\frac{1}{8}$ inch.

b is made of bone. The round dots in front are first incised and

a *b* *c* *d* *e* *f*

Fig. 2.—Snuff-spoons.

then filled in with dark red ochre, as is the cross-hatching on the back, which stretches from the base of the bowl to the third last dot. In section the prong is the segment of a circle. The back of the bowl is in a line with the prong, curving up slightly at the tip.

Bowl, 1 inch by $\frac{11}{16}$ inch.

Prong, 5 inches by $\frac{1}{4}$ inch (at greatest width) by $\frac{1}{8}$ inch (at thickest).

Length of dotting, $1\frac{7}{16}$ inch.

c is made of bone and rather more elaborately carved, but otherwise undecorated. It keeps the same horizontal plane throughout. The prongs are round in section.

Bowl, $\frac{13}{16}$ inch by $\frac{9}{16}$ inch.

Stem, $\frac{13}{16}$ inch by $\frac{9}{16}$ inch (across the wings) by $\frac{5}{16}$ inch thick.

Fork, $3\frac{3}{4}$ inches by $\frac{11}{32}$ inch (at greatest width), each prong, $\frac{1}{8}$ inch.

d is an ordinary iron sweat-scraper, sometimes used by the Basuto to take the place of a snuff-spoon. The iron is bent over and welded down at the top of the stem to make a hole for a suspension cord. The stem is almost square in section except where it is flattened and cross-hatched. The blade is thin, with a midrib on the upper face only and slightly askew. It curves up at the bottom about $\frac{3}{4}$ inch above the general plane.

Stem, $3\frac{1}{2}$ inches by $\frac{5}{32}$ inch.

Band of cross-hatching, $\frac{3}{4}$ inch by $\frac{7}{32}$ inch.

Length of blade, $2\frac{5}{8}$ inches.

Width of blade across wings, $1\frac{1}{16}$ inch.

Width of blade at centre, $\frac{7}{16}$ inch.

Width of blade at bottom, $\frac{9}{16}$ inch.

Total length, $5\frac{3}{4}$ inches.

e is made of ivory. The front of the prong is plain and flat, and the underside curved and decorated with triangles of cross-hatching. The bowl curves very slightly forward. On the back of the prong, near the top, there is a short triangular projection.

Bowl, $1\frac{1}{4}$ inch by $\frac{5}{8}$ inch.

Prong, $4\frac{7}{8}$ inches by $\frac{1}{4}$ inch (at widest) by $\frac{1}{8}$ inch (thick).

Length of cross-hatching, $2\frac{7}{8}$ inches.

Length of triangular projection, $\frac{3}{4}$ inch; height, $\frac{9}{32}$ inch.

f is made of bone. In section it is the segment of a circle and it is curved up at each end, narrowing gradually from the top, and hollowed for rather more than half its length to form a bowl. The front is plain, the back has a length of cross-hatching exactly similar to that on No. 5.

Total length, $6\frac{5}{8}$ inches.

Length of bowl, $3\frac{5}{8}$ inches.

Greatest width of bowl, $\frac{9}{16}$ inch.

Width of stem, $\frac{5}{16}$ inch.

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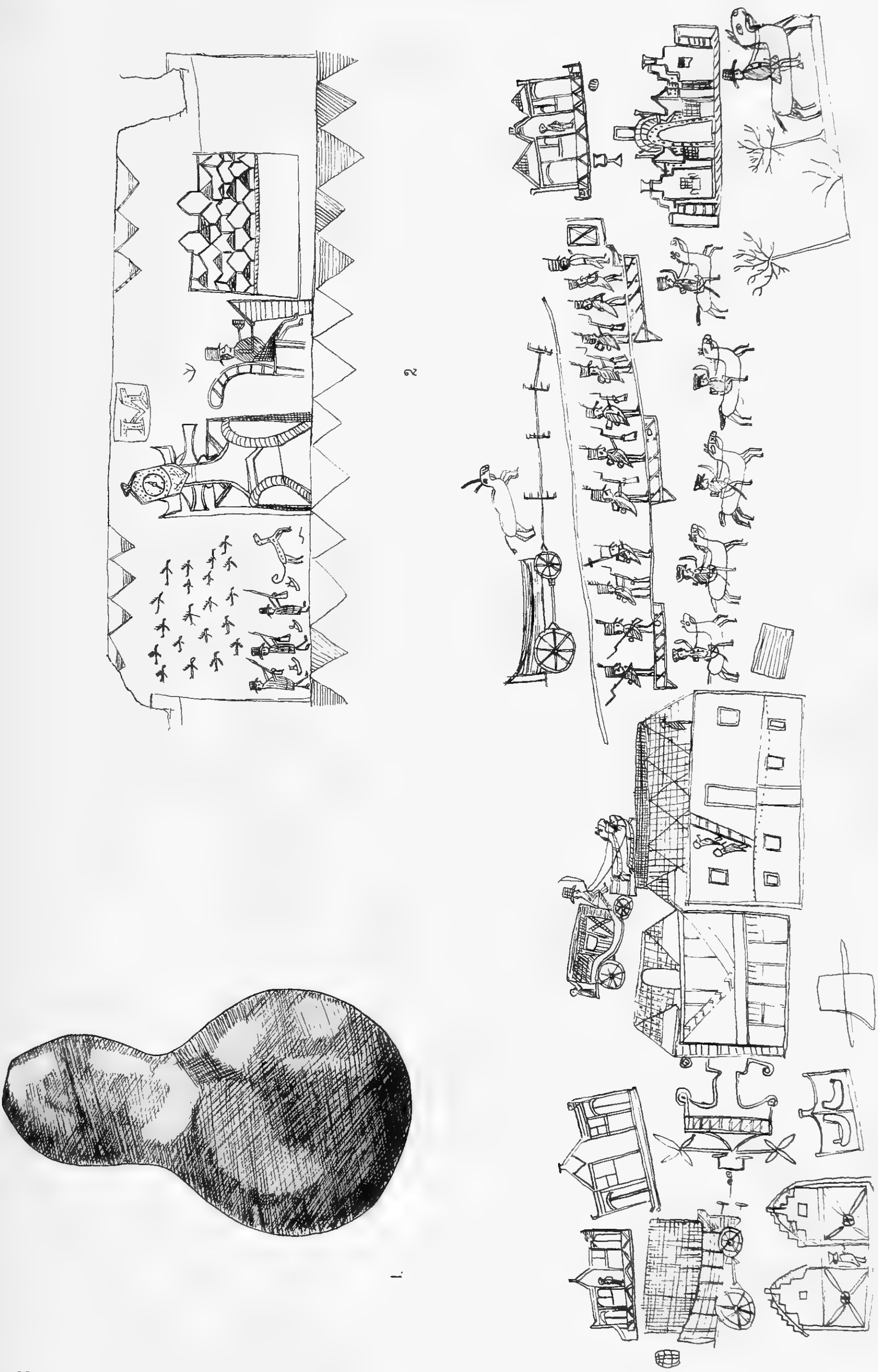

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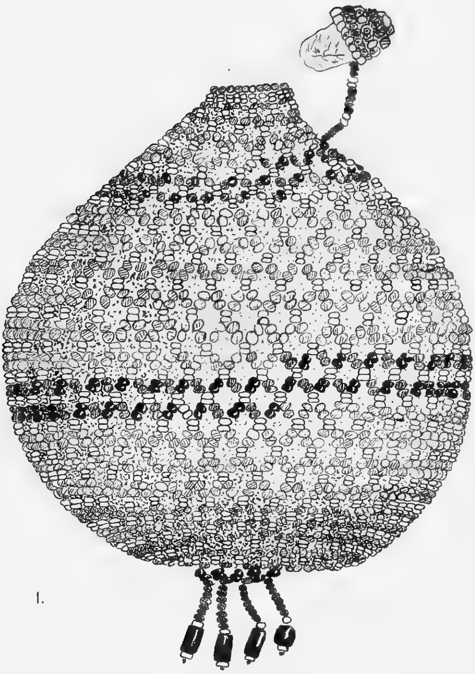
ZULU SNUFF-BOX.



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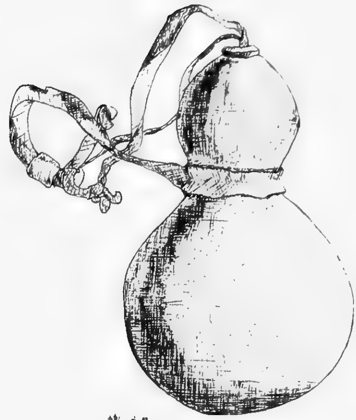

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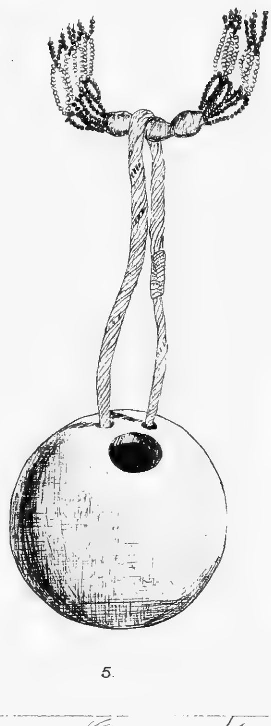

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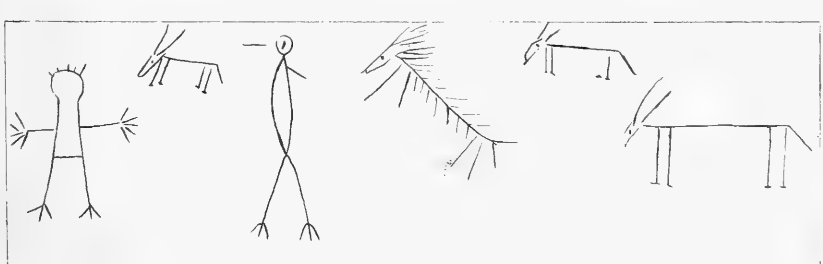

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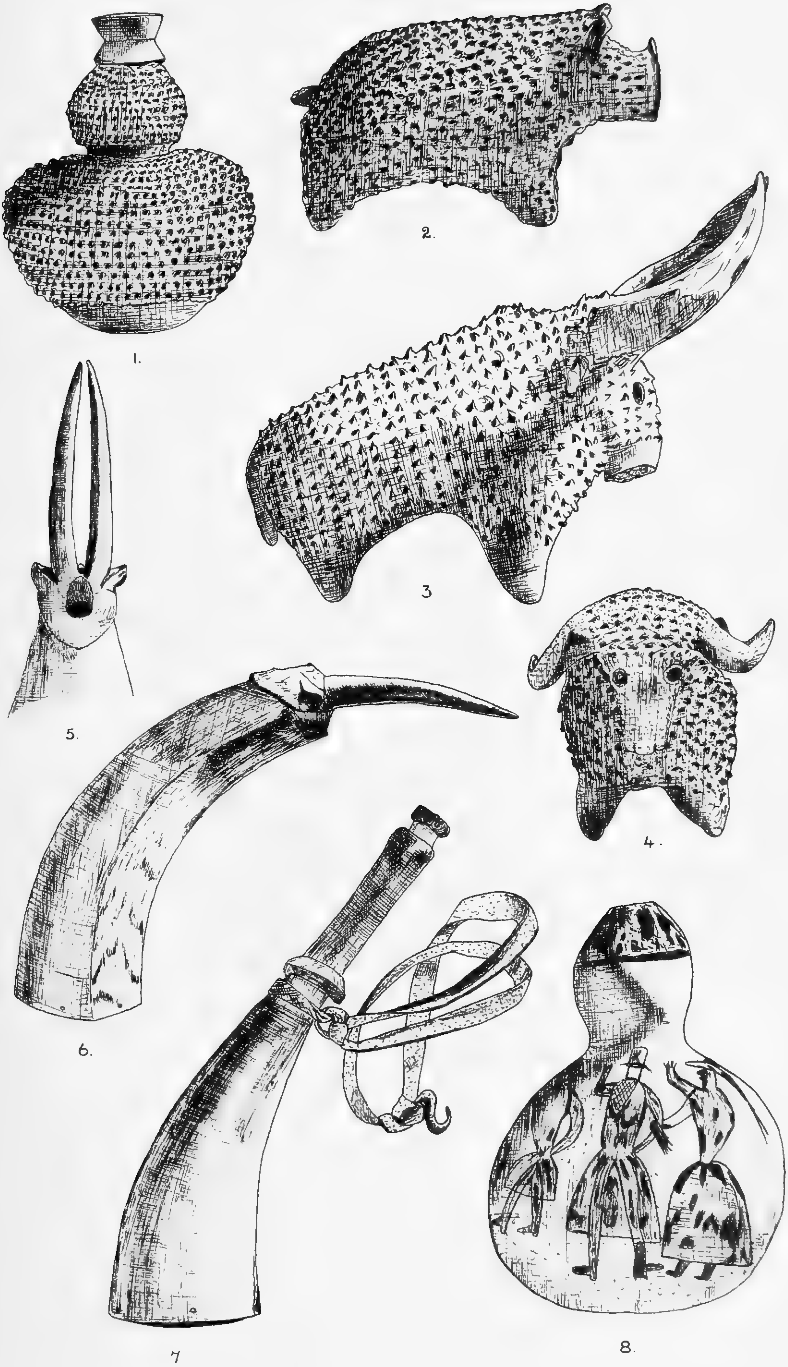

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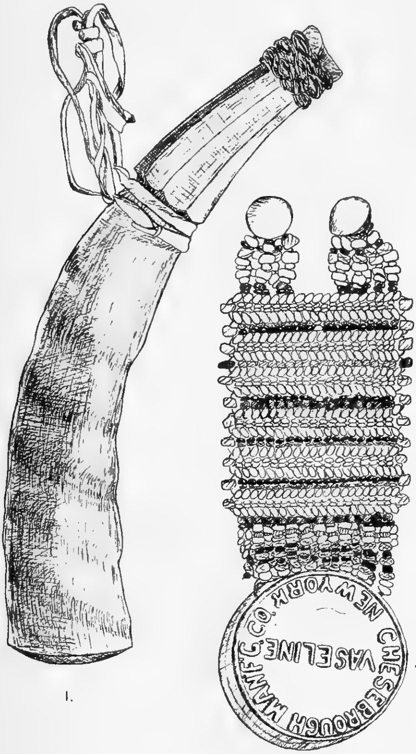

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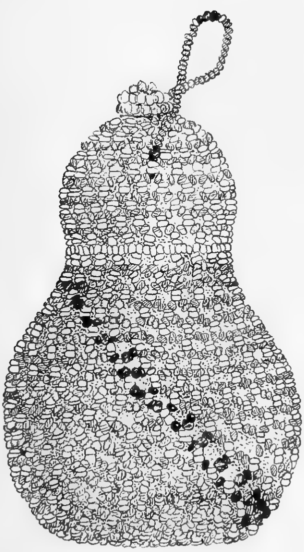

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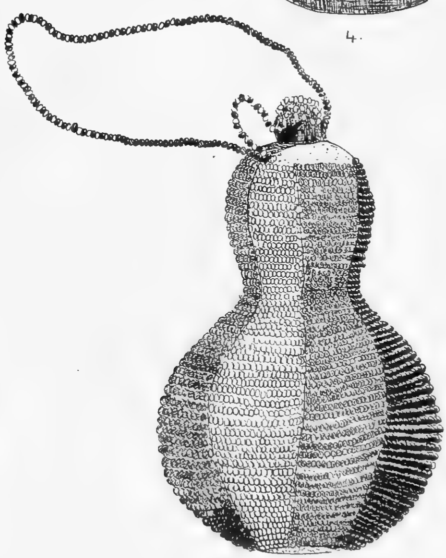

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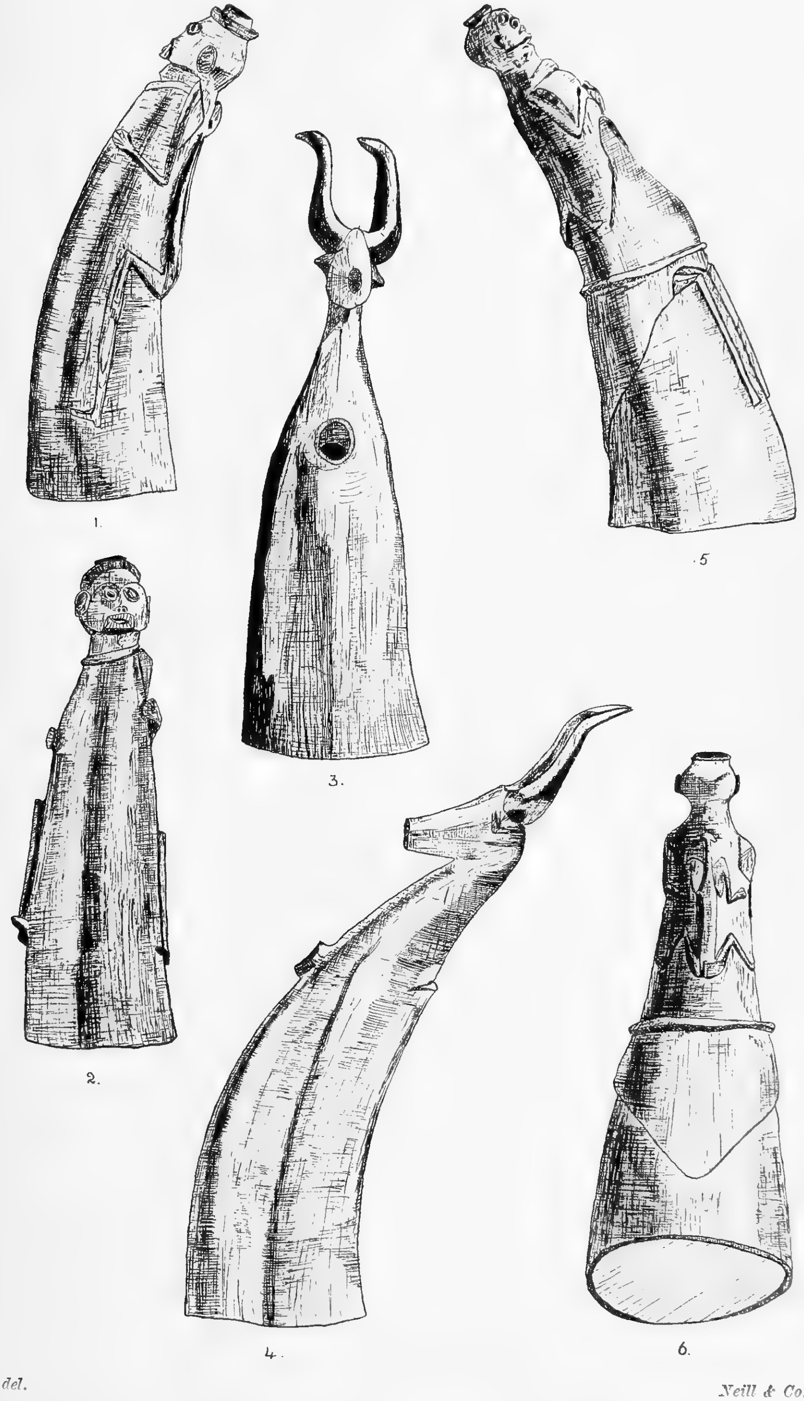

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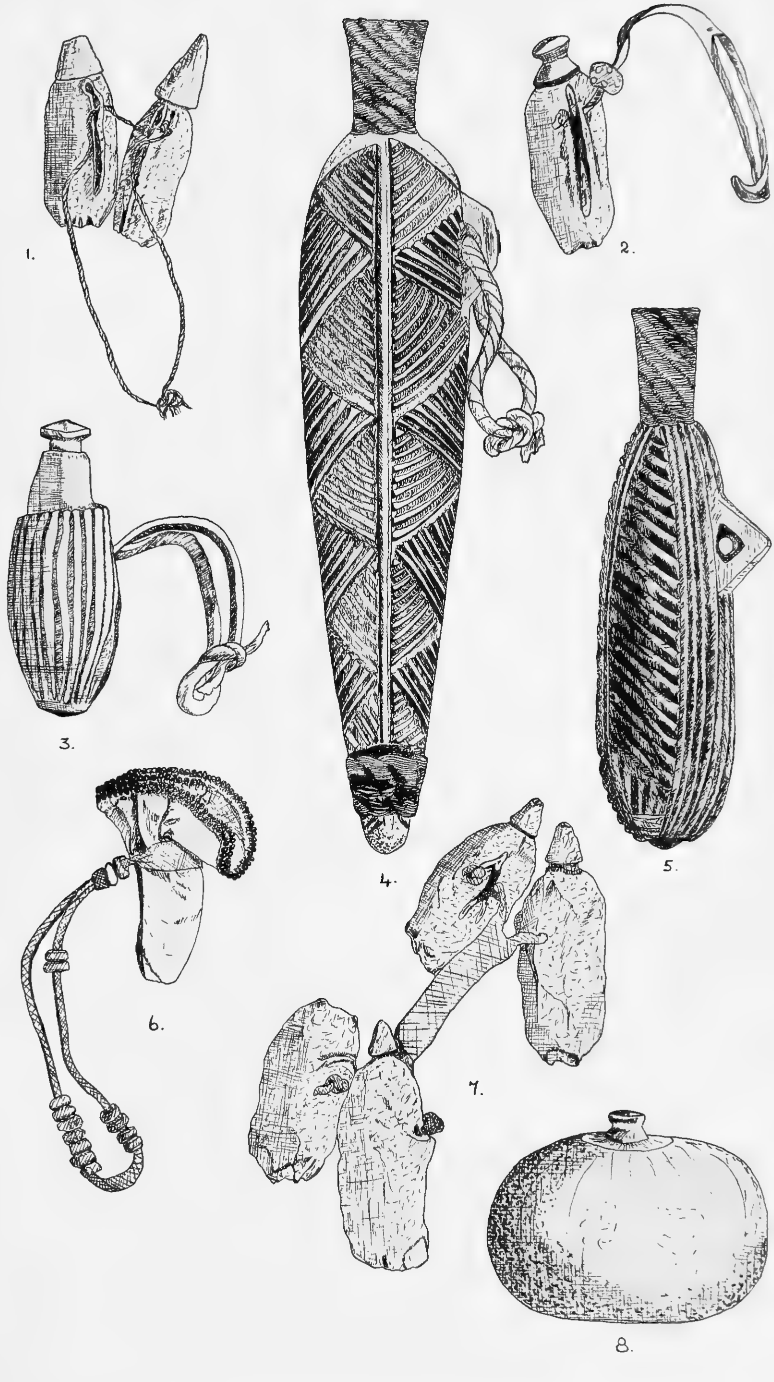

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BECHUANA AND OVAMBO SNUFF-BOXES.

ANNALS

OF THE

SOUTH AFRICAN MUSEUM

VOLUME XXIV.

PART IV, *containing* :—

8. *Vosburg: Its Petroglyphs.*—By A. J. H. Goodwin, M.A., F.R.S.S.Afr., University of Cape Town. (With Plates XXXII–LX and 13 Text-figures.)

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(With Plates XXXII–LX and 13 Text-figures.)

The Site.

Vosburg is a small village with a population of less than 400 inhabitants. It was founded by the Vos family, and stands 23° East of Greenwich, by 30° 40′ South. The village lies just within the Victoria West district of the Cape Province, where it meets the Britstown, Carnarvon, and Prieska districts. It is served by road from Britstown 50 miles to the east, from Prieska 60 miles north, and from Victoria West and Pampoenpoort 60 miles south. It is accessible from this latter station and from Britstown by a road-motor run in conjunction with the railways.

The whole area shows rock-engravings, many of which have never been visited by scientists, but we shall here confine ourselves to those on the farm Keurfontein, lying 5 miles east of Vosburg on the Britstown road.

Climate.

Except in extremely dry seasons, Keurfontein can hold considerable stocks of sheep. The country as a whole is arid, and lies within the Karoo, a region of summer rain but subjected to long periods of intense drought. The annual rainfall is between 5 and 10 inches, and this is confined almost entirely to the summer months when evaporation is at its maximum. When rain does fall it is short and heavy, but supplies reservoirs which, with use and the enormous evaporation, will generally last the year. Should these fail, bore-holes normally supply sufficient water to carry the stock over until the following year. In extreme cases the stock is railed 200 or 300 miles to a region of winter rains at the Cape, an action which more or less reproduces the normal game-migrations of pre-European times.

No such certain sources of water were available to prehistoric man, and both he and the game he hunted must necessarily have depended upon the precarious springs of the district. If these failed as the dry season came, so game and man must have moved to more amenable fields for their sustenance. The Orange River at Prieska is only 60 miles away.

In the Karoo to-day, sheep, hemmed in by herdboys and fences, die in their tens of thousands. It is necessary to stress this point as it is one seldom considered in attempting to draw conclusions on prehistoric climate and animal population in areas whose condition is known to-day.

As to other evidences, the suggestion of a greater water-supply during prehistoric times is present. Here and there in this part of the Karoo are to be seen the remains of ancient lakes, originally dammed by dolerite dykes which have since broken through. Similarly it can be shown that the very evident drying up of springs to-day is in part due to a lowering of the water-table by means of excessive dependence upon bore-holes. Most of this water is brought to the surface and lost.

The scenery of Keurfontein is typical of the Karoo—startlingly treeless. The whole area consists of a wide plain from which rise small dolerite kops, ridges, and plateaux. The alluvium of which the plain consists is desertic and typical of the region. It is composed almost entirely of red-brown earth and sand, formed from the weathering of broken dolerite blocks, which slowly wash down to find the valley level, leaving the hills relatively bare of earth and exposing the shiny black desertic blocks which are a monotonous feature of the country-side.

It is on the exposed surfaces of these blocks of dolerite that the engravings and other petroglyphs occur, in the open, and never covered by any rock-shelter.

Evaporation.—It is the constant evaporation of the water which falls during the hot summer that is the key to the area. When rain falls, that water which does not immediately flow off in wide shallow erosion gullies soaks into the ground. In soaking downwards it dissolves various soluble salts, mainly of calcium, and keeps these in solution. As time passes the hot sun and dry wind demand moisture, and this water is sucked up once again bearing its burden of soluble salts. Towards the surface of the ground these are precipitated, the crystals forming as the volume of water becomes too small to carry them.

The local flora is of a peculiar type; it must be able to exist for long periods without rain, and it must be capable of obtaining water and nourishment from a soil filled with various salts, and rendered "brak." There is thus little grass, and indeed little apparent nourishment for game, though sheep seem to have adapted themselves. What is possible for stock is possible for game, and in the Kalahari, farther north, considerable herds of game are supported by an even more arid climate for longer periods.

Evaporation and Patina.—Of great importance to us is the effect of this high evaporation, engendered by sun and wind, upon the surfaces of the dolerite boulders with which we are concerned. The dolerite is an igneous rock, formed into dykes, sills, and pipes, as intruded by volcanic forces. Denudation has left the rock bare, while forces such as lightning, insolation, and original contraction and stresses of the cooling lava, have broken up the dolerite into misshapen masses. Where these are *in situ* they are piled up in ruiniform groups, but more generally they lie scattered down the talus slopes of the hill-sides, or over the plain, forming a firm rubble of rocks up to 6 feet in diameter. Typical ruiniform groups are the Painted Shelter and High Rock, but these are unusual.

The forces which have broken up these rocks still continue to act, and I have been able to note three new fractures of large rocks during the four years covering my visits. The newly broken surface is olive green, and shows a recognisable freshness and sparkle, which is dulled after rainfall.

The normal surface patination or oxidation of the dolerite is of two types, the one affecting rock above ground, the other (which does not here interest us) seems to continue below ground in the presence of moist soil. This latter type forms a matt, powdery crust of ochreous red, easily washed away by running water to join the alluvium of the plain. No such surfaces have been used for making petroglyphs. This type of patination may also affect relatively deep rock-pittings, which hold water and thus provide the continued moisture necessary.

The patination of rocks above ground is largely a product of oxidation due to evaporation. As in the case with the soil, water falling on the exposed portion of the rock spreads over most of the surface of the boulder. It penetrates to a slight depth, generally a little over a millimetre, dissolves out soluble iron, manganese, and other salts, then evaporates, bringing the salts to the rock surface and depositing them there. Here they oxidise to form a brown-black matt patina, to which the wind eventually gives a fine glaze.*

* A similar state of affairs is described from Australia (see Basedow, "Aboriginal Rock-carvings of Great Antiquity in Australia," Journ. Roy. Anthr. Inst., vol. xliv, 1914, p. 199).

Once soluble salts have been removed from immediately beneath the surface, the way is left open for further inroads of the action; thus patina may in rare cases affect the rock to a centimetre in depth, though the average thickness of the affected rock is generally about 5 mm. This is not all true patination, and in a patinated rock three general layers are to be observed. There is an outer skin or film of true patina, almost black in colour, forming a partly protective "paint." The thickness is fairly constant and is maintained by the action described above, while any growth is counteracted by wind polishing. Beneath this and of varying (2 mm. to 7 mm.) thickness is a light brown layer from which soluble salts have been leached; while beneath this is the unaffected rock.

Factors in Patination.

Various writers, notably Basedow, and, in South Africa, Péringuey (S. Afr. Phil. Soc., 1906, p. 401, and 1909, p. 401), have attributed extreme antiquity to petroglyphs which have been heavily patinated. Since their time various attempts have been made to fix the relative order in which groups of petroglyphs were made, by means of a study of apparent patination.

It might appear obvious that the deeper the patina the older the petroglyph, and that is the presumption underlying this method. In estimating the age of petroglyphs from the relative patina observable, I would suggest that a large variety of important and complex factors come into play which render such a presumption less safe, unless they are taken into constant consideration, or a sufficient number of cases are observed to cancel out these variative factors.

1. Climatic conditions of alternating wet and very dry, through succeeding years, with extreme evaporation.
2. Distribution of water over exposed rock-surfaces.
3. Direction of wind and sun.
4. Presence or absence of previous patination and pitting.
5. Action of birds.

All these factors affect the distribution, the thickness, and the intensity of patination, and all act unevenly through time with no definite relationship to the period over which they act. It is not time which produces patina, but the various factors mentioned acting alone or together, and more or less intensely over varying periods.

The general process of patination as a result of evaporation has been described above, and we need not recapitulate here, but the various other factors need amplification.

The distribution of water over the rock-surface is governed by the direction and intensity of a rain-bearing wind, the flow of water over the rock, the drip-line and so on. The more intense distribution would necessarily occur on the exposed upper face of the rock, the least intense beneath the rock and within the drip-line. The direction of wind and sun will also have their effects. The side protected from both these evaporating agents will remain moist for longer, and infiltration of moisture would thus be allowed to go on for longer periods. The abrasive action of the wind in controlling and checking the growth of more than a skin of complete patination must also be taken into account.

The presence or absence of previous patination is important. A new surface will dull rapidly, but an old patinated surface reacts very slowly to further inroads. If the surface patina has been scratched to leave the under layer exposed, the water will have greater penetrating powers, and repatination will be quick. Where the scratch is sufficiently deep to hold water, patination will quickly heal the wounded rock-surface, as the amount of immediately available water is greater. It seems obvious that designs facing upwards on the rock will hold water, and patination will be fast. Where the petroglyph is shallow, the speed will be affected by the exposure of the unprotected second layer.

The action of birds does not affect all rocks, nor the whole surface of any one boulder. As there are no trees, birds are given to settling on certain rocks, generally those higher than their surroundings. Not all such boulders are chosen, and the birds show marked preferences. Those perches they choose are affected by their droppings, which form a cap and seem to have two effects. They coat the rock, keeping it damp and cool and impeding evaporation. More important is the chemical action of the various acids, etc. in the droppings, which effectively remove the black outer skin of patina, exposing the second layer. Those rocks upon which birds have perched are thus chemically bleached to a light brown and bear no polish, while any shallow petroglyphs on rocks so coated are destroyed. This action is plainly visible on Big Rock, where it would appear to have been made use of by man as a medium of artistic expression.

It is worth noting that while the intensity of patination has generally been used to prove the relative age of petroglyphs, it has been just as readily admitted that the patination on certain rock-engravings equals that on the exposed rock-surfaces about it. This admission of such a maximum of patination (admitting as it does that an engraving can "catch up" with the patination of the original rock-surface) is important, and to some extent logically defeats the end in view. If all engravings lay at the same angle and had consistently suffered from the same atmospheric actions, and if they were all of the same depth, we might presume to give a table showing the relative age of the various artistic periods, phases, or schools represented. Too many factors enter into the question of patination to do this with entire safety, but despite these a considerable amount can be done.

I shall give a suggestion of order in this paper, but it is tentative, and cannot, except where superposition is shown, be considered as absolute. But it must be noted that relative order, as observed from patination, agrees with the relative order obtained from palimpsests. Each period (except the first) is based upon a large number of examples, and the direction of the petroglyphs in relation to the prevalent rains, winds, and the sun is therefore cancelled as a factor. Other important factors still remain. The most important is the depth of the original incisions in the rock.

Distribution.

When first I visited the farm Keurfontein in 1926, with the late Mr. F. J. Jansen and Mr. C. H. T. D. Heese, it was thought that the engravings were confined to a single hill, and in 1928 when I visited the site once again, with Mr. and Mrs. Burkitt, only the series on this hill were shown to him. His conclusions have long been published (Burkitt, South Africa's Past in Stone and Paint, pp. 145–149, Cambridge, 1928). Since that time I have been enabled to pay three visits to the site, ranging from three weeks to four days, and on each visit numbers of new specimens have been found, many some distance from Burkitt's Hill. These I have divided into four regional groups. The various points referred to are shown on the accompanying plans. The rock known as High Rock, which I have taken as a fixed point, is a prominent ruiniform arrangement of stones on the hill described by Burkitt ("Burkitt's Hill").

Group I.—About half a mile east of High Rock is a long dyke running directly towards the farmhouse; on this ridge are a number of petroglyphs, very scattered and seldom of very great interest. Many of these have been photographed, but not all have been traced. Certain earlier styles are missing.

Group II.—High Rock stands on a small kopje (Burkitt's Hill), perhaps 50 feet high, which covers an area measuring some 200 by 300 yards. All over the upper part of this kopje, and in the talus of fallen boulders strewn about, petroglyphs are to be found. They are not markedly grouped, and seem to occur only on suitable rock-

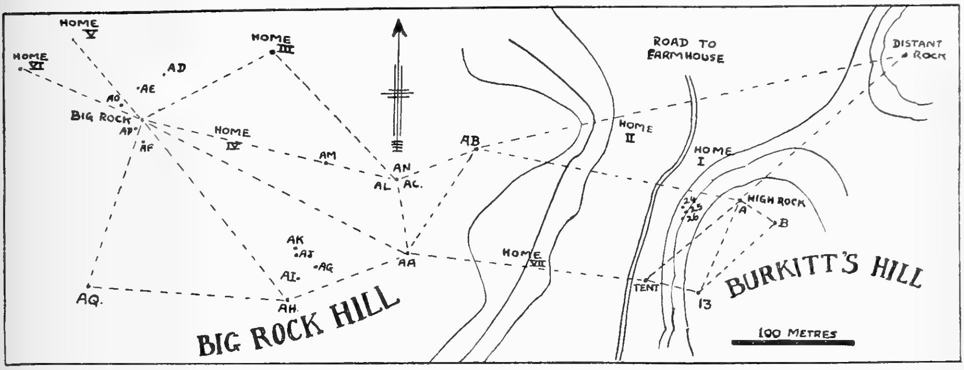

FIG. 1.—General plan of Big Rock Hill and Burkitt's Hill.

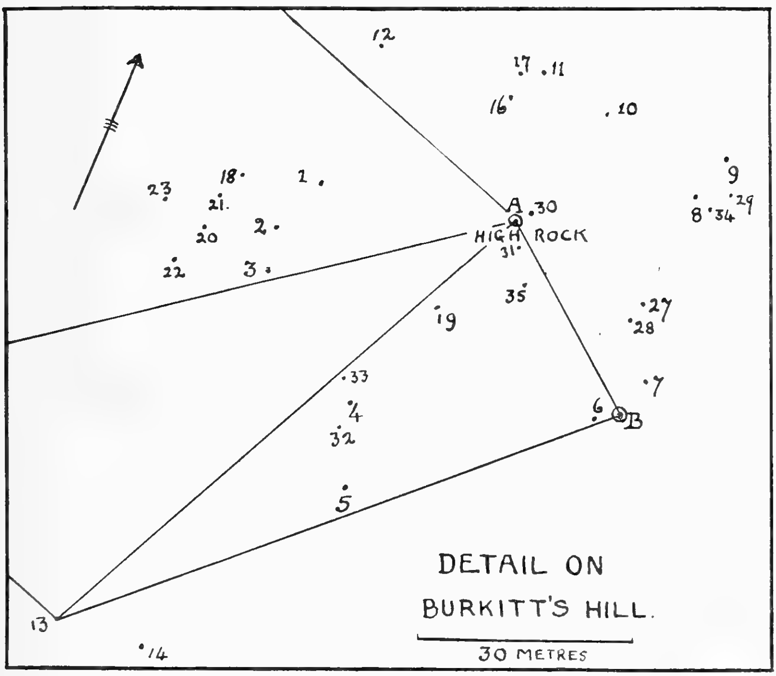

FIG. 2.—Detail on Burkitt's Hill.

faces, but they form a rough circle about High Rock, of which Burkitt says (*op. cit.*, p. 146):

"On the summit of the decorated kopje near Vosburg, a large boulder, much undercut, had doubtless been used as a shelter, and there we found a Smithfield industry. Although the contemporaneity of this with the engravings cannot be proved, it would seem probable that at least some of the series which we are going to describe are the work of Smithfield man."

A continuation of Burkitt's Hill forms a small kop, which I have called Distant Rock, 150 yards north of High Rock. A few badly made petroglyphs are found here, all in the late scratched style and of little interest.

Group III.—West of High Rock a road skirts the kopje, leading from the farmhouse to a windmill. The valley along which it runs is about 100 yards wide and is bounded on the west by a low plateau (Big Rock Plateau) which stands a few feet higher than Burkitt's Hill. On this plateau are a number of petroglyphs; generally they are found in groups of four or five, where useful rock-surfaces occur together. The most important group is found immediately about Big Rock, which is 220 yards west of the eastern lip of the plateau.

In the valley dividing Big Rock Plateau from Burkitt's Hill, and scattered about among the engravings on the plateau itself, are a number of "homes," or sites inhabited by prehistoric man. The High Rock Home (Burkitt's undercut boulder) now yields nothing, but seven other homes have given us an abundance of implements, pottery, bored-stone fragments, ostrich eggshell and so on. They are generally in earth-filled hollows, between the boulders and not sheltered to any extent, which seem to have been used for the erection of rough dwellings, though no hut foundations of any sort are discernible.

Group IV.—Separated from these other groups by a distance of about a mile is a long, fairly high dyke. It is capped by ruiniform dolerite, which holds back a plateau very like the Big Rock Plateau. This ridge overlooks the Vosburg-Britstown road and is perhaps half a mile west of the farmhouse. In the main dolerite "ruin" is a small shelter composed of a number of blocks, on the largest of which are paintings. This I have called the *Painted Shelter.* Both on the plateau behind the shelter and on the small hill which it overlooks are several petroglyphs.

It is almost certain that search would reveal petroglyphs on all the hills on this farm, and indeed throughout the district, but search is a slow process, and it was thought that the four main groups described above would be sufficiently representative.

Techniques Employed.

The basic method of making petroglyphs at all sites in South Africa was always the same. It consisted of the removal of the outer black glaze on the rock to reveal the second dull light-brown layer, or possibly in some few cases the removal of both layers to reveal the olive-green rock beneath. The rock was always heavily patinated before the petroglyphs were made, and a deeply cut design would originally have shown olive-green below the black surface, while the more usual shallow designs would be brown.

The methods by which the patina was removed varied with different artists and with different periods. Some artists incised or engraved sharp lines, some pecked deeply into the rock, some pecked just deeply enough to remove the dark outer skin. Others have rubbed off the skin mechanically, while there is evidence that during at least one period the artists at Vosburg have removed the outermost film chemically. This was effected by painting designs on the patinated rock with bird-dung, and allowing the action of the naturally contained chemicals to take its course.

Burkitt (*op. cit.*, pp. 146 *et seq.*), in discussing the techniques which he described after visiting the High Rock group, says:

"Four distinct techniques almost certainly of very different ages can be determined as follows:—

"Engravings of the earliest series show a fine incised outline, and the bodies of the animals are filled in with fine lines more or less parallel to this outline (fig. xxv, 1). In some cases the surface of the engravings has almost the appearance of having been rubbed over later, but this may be partly due to subsequent weathering. The important fact to notice is that the patina of the engraved lines is exactly as dark as that of the rock on which the figure is engraved. This indeed often makes it very difficult to see the figures, and it is not to be wondered at that examples of the incised style are not seen in museum collections. At Vosburg we noted elephant and eland figured in this series.

"Another series comprised figures of animals made by a pocking technique without any definite outline; sometimes there is merely an outline formed by a more or less wide band of coarse pockings (fig. xxv, 2); sometimes the whole of the body of the animal, sometimes the head and neck only, are covered with pock marks. This pocking technique clearly shows that a punch was used, and in view of the hard nature of the dolerite one would imagine that punches must have been made by shaping some still harder pebble to produce a sort of cigar-shaped point. But no such tools, or indeed any tool suitable for making these engravings, had yet been found. The patina of this second series is not quite so deep as it is in the case of Series I; on this ground alone we came to the conclusion that the pocking technique here was invariably rather more modern than the incised technique of Series I. A variation of Series II can be recognised where the pock marks, instead of being little more or less circular hollows, consist of dashes. It is quite easy to see how this variation probably arose. If the punching was effected by means of direct blows at right angles to the rock, the normal kind of pocking would result. If, however, the punch were held obliquely to the rock-surface there would result a long dash in place of the circular pock mark. Generally, the body of the animal is covered all over with such dashes, but less densely than in the case of the normal pocking. The patina is similar. In Series II we noted figures of eland, springbok and rhinoceros.

"Series III is the most important and the most frequently seen of all, and, judging from the fact that the patina is sometimes fairly deep and sometimes very slight, it must have lasted through a long period of time. Especially when only slightly patinated, the drawings are lighter in colour than the patinated surface of the rock itself, and are therefore very visible. Engravings of this series show a clear outline, the body of the animal being, as it were, deeply rubbed all over. That this 'rubbing' was done with a fine punch making a minute pocking all over the surface seems to me to be proved by the fact that definite pock marks can occasionally be made out. Buck, ostrich, and eland are figured, and also some metal spears which occur in superposition over the body of an elephant belonging to Series I. This fact is important from two points of view. Firstly, because here stratigraphy confirms the deductions obtained from a study of the preservation, *i.e.* degree of patination; such a confirmation is necessary, for of course weathering is always a capricious factor, although the engravings being all in the open and close together, and the rocks being all of the same material, it generally forms a fairly safe guide. Secondly, because the occurrence of what must have been meant for metal spears indicates that a part, at least, of this third series only dates back as far as the introduction of metal into South Africa, which was due, in the first instance, to the Hottentots.

"Lastly, at Vosburg we noted a series showing no patina and made in various ways, generally with a metal knife; this was clearly the work of modern herdsmen, doubtless in imitation of the older engravings around. The bodies of the animals are sometimes filled in with cross-hatching, an uncommon feature in the earlier series."

Since Burkitt's visit I have been able to return to the sites at various times and to make a considerable survey of the field. The evidence collected points to the petroglyphs being the products of a long series of prehistoric artists. The data here obtained did not contradict Burkitt's findings, but amplified them very considerably. With the discovery of considerable numbers of other petroglyphs generalisations were possible which he had not the data to make.

The material will best be understood if the general findings and sequences are first stated and the proofs given afterwards. These proofs are of two types; the absolute proof of direct superposition; and the somewhat less satisfactory proof of comparative patination. While I regard patination as inconclusive proof, it must be remembered that the various drawings composing the palimpsests show just those differences in patination which we are employing in the second type of evidence. This very considerably strengthens our case in making use of this latter method.

From the findings I have divided the various types into eleven styles. Some of these depend upon patination alone, some on both sources of evidence. These styles I have numbered in Arabic figures, 1–11. Some can be redivided into substyles, which may represent either the return of the old artists a few years later, or imitations in the same technique by later artists.

These styles may be grouped into general phases thus:

Early, deeply engraved. Styles 1 and 2.
Heavily pecked. Styles 3, 3A, 3B, 3C.
Chemically made. Styles 4, 4A.
Middle engraved. Style 5.
Lightly pecked. Styles 6, 6A.
Mechanically rubbed. Styles 7, 8, 10.
Late engraved. Styles 9, 11.

At this site Styles 9, 10, and 11 may all be relegated to the age of metals.

Superpositions or Palimpsests.

Big Rock.

This rock stands out on the centre of its plateau, somewhat reminiscent of a Central American monument, and is as completely covered with designs, though these are not so deeply cut, nor are they all related to one another. The rock forms a rough sphere of about 4 feet in diameter and is banded about by an intricate complex of lines. Closer examination reveals six differing periods of artistic execution * (Plates XXXII–XXXVII and LVIII, B).

On Big Rock the earliest artistic efforts show an early scratched type (Style 2). A well-drawn eland is typical of this old style. The incisions are completely patinated and are at one point covered by the second style. This deeply engraved and heavily patinated style belongs to Burkitt's Group I.

Second is the peculiar, and apparently local, type of work which first suggested rubbing to me, but which I have since found to show little sign of mechanical action. The workmanship does, however, conform absolutely to the action of bird-dung on the rock, and it seems almost certain that the patinated rock was painted with dung (probably to give an immediate white design), and as this washed off, the pattern remained. Quite possibly only frequent repainting over the same lines would have so marked an effect (Style 4).

Third is a group of elongated and bizarre human figures, rough animals of an equally quaint type, ladders and grills, targets or concentric circles. This I have called Style 4A. In technique it is identical with Style 4, but is later, slightly less patinated, and here and there can be seen to overlie Style 4. Where they do not overlap it is difficult to say which is which, and in fact at many points of overlap the superposition is not decipherable. The second series does, however, show more recognisable animal and human forms than the earlier.

Fourth (by patination only, for there is no palimpsest present) is a spotty or dashed technique, showing a delightful study of an eland head, with a giraffe head imposed upon it (Style 6). The patina is very much lighter than that visible on the two previous styles, and there can be little question of the order here.

Fifth, if it can be regarded as a style separate from the fourth, is an imitation in very deteriorated mode. A scattered patch or two of badly executed forms is all that represents this. One patch shows a shape resembling a shark's egg, another a possible buck. The patina is slightly lighter than that of the two animal heads which are on the same panel, and has thus been called Style 6A.

* In the following descriptions Arabic figures refer to the style in the general series outlined above and developed below; verbal numbers to the order in the palimpsest which is being described; while references to Burkitt's series will be specific.

The sixth and final style is lightly and faintly scratched. It overlies the third style in places, and is represented here only by a single shape very much resembling the light wooden structure of a domed Hottentot hut. It is obviously relatively recent. One or two similar hut-like specimens are to be found elsewhere, for instance, an exactly similar representation 250 yards south-east of Rock 30 (Burkitt's Hill) on a dolerite rock in the valley. There is also a badly drawn zebra on Burkitt's Hill of the same age (Style 10).

Paintings Hill Rock.

On what was originally a single rock, about 100 yards west of the Painted Shelter, and on the crest of the hill looking towards Vosburg, is a large representation of a buffalo (Plate XXXVIII). Since the engraving was made, this rock has split at least twice. The first split removed the tail, the second cut into the belly-line and hind legs of the buffalo. The animal is deeply engraved with incised lines, obviously belonging to Burkitt's Period I (Style 2).

Superimposed directly upon this, and seemingly confined by these breaks in the rock, is an eland, lightly incised, and not much patinated (Style 5). It stretches from the neck of the buffalo to the belly, the tail extending farther. Overlying the tail is a crude ostrich in a late scratched style (Style 9). Overlying the hind legs of the eland is another ostrich in a rather similar late scratched technique. It is impossible to say what the relationship between the two ostriches may have been, but from the relative positions of the legs, the stylised tails, and the general similarities of form and pose, they are either by the same artist, or the simpler specimen was copied from the other. The patina of both agrees, and superposition shows them to be later than the eland, and, therefore, than the buffalo. We may accept them as belonging to one style.

Rock 6.

Rock 6 is the only palimpsest on Burkitt's Hill (Plate XXXIX). It bears an elephant in Style 5, rubbed and scratched. About it and related to it, though of a much later date, are a few badly drawn human figures. They are throwing huge lanceolate spears, the heads being as large as the throwers. The spearheads are certainly of metal and overlie the elephant. On neighbouring rocks are to be seen similar individual spears, some barbed specimens proving that the originals were of metal (Style 10).

Rock AK.

Rock AK on Big Rock Hill has a rhinoceros and a zebra deeply pecked upon it side by side (Plate XL, B). Overlying these are two elands, scratched all over, the scratches following the natural direction of the hairs. The superposition here shows Style 3A with Style 5 imposed upon it.

Apart from these, there are a few palimpsests of no importance. They show either completely modern drawings over earlier styles, or are not sufficiently definite for us to draw any conclusions—a few scratched lines over an older style, and so on.

We may summarise the data obtained from these definite sources by comparing the actual palimpsests on Big Rock, Rock AK, Rock 6, and the rock on Paintings Hill:

2		4, 4A		6, 6A		10	Big Rock.
	3A		5				Rock AK.
2			5		9		Paintings Hill.
			5			10	Rock 6.

The Series of Styles.

Turning from these sequences to those suggested by the relative state of patination on the petroglyphs, a considerably augmented series may be made. Where the evidence of sequence has been proved absolutely by the superpositions described above, these are referred to. In other cases references are given to examples of each style. These do not constitute a complete list of the petroglyphs studied. Here the order relies upon the long and tedious task of relating each patina with every other.

1. Very deeply patinated cross-hatched designs (Plate XLI). A curious design, cut on Rock AL, is the only specimen of the style identified with any certainty. The design is deeply cut, and so heavily patinated that it is not visible as a whole from any angle, but parts stand out on the curved rock with differing cross-lights. The camera actually reveals more than is visible to the eye. No attempt to trace this specimen succeeded, but the photographs taken in a suitable light show the figure well. The object, be it idea or bird, represented is too stylised or diagrammatic to be recognisable. It is finely cross-hatched, and appears to end with a conventionalised swallow-tail.

2. Animal forms in deeply scratched lines following the natural

direction of the animal's hair. The lines were cut with a fairly coarse tool which gives a gouged effect. This is Burkitt's first period (Burkitt, *op. cit.*, plate xxv, 1) and is the oldest style in the palimpsests on Big Rock and Paintings Hill. Rock 27 also shows a fine eland (Burkitt's specimen) and Rock 28 bears a zebra.

3. Deeply pecked outlines, carefully executed, with some slight attempts at body marking. This is Burkitt's second period (Burkitt, *op. cit.*, plate xxv, 2 and 3) and he has taken his illustrations from Rock 30, immediately below High Rock (Plate XLII). The one shows a buck with a ring on its neck and stylistically rounded feet, the other is an animal with defined and peculiar markings. Rock AL and several other rocks show ostriches belonging to this style; Rock AO (Plate XLIII, A) has a pair of ostriches, one in outline, one filled in. Rock AN has an unfinished buck. All of these agree in patina and in style.

3A. This may be a development from Style 3. It is similar in technique but the figure is filled in with attempts at body markings. This represents locally the best known of our South African artistic periods. Almost all the more striking specimens of rock-peckings in both the Transvaal Museum and the South African Museum conform in type and patina (where this has not been oiled by authority) with this style.

It is sometimes difficult to draw a clear line between this style and its neighbours, 3 and 3B. Many specimens waver, and may perhaps belong to transitional styles. At Vosburg 3A is almost confined to Big Rock Hill, which explains why Burkitt missed it. It generally depicts the quagga. The earlier quagga and rhinoceros of the palimpsest on Rock AK belong to this group. The Styles 3 and 3A are perhaps linked by the two ostriches on AO, one of which conforms to each of these styles (Plate XLIII, A). Rock AF bears two deeply pecked quagga, only the shoulders being striped. These are of interest, as in both instances and in several other peckings of the same style on nearby rocks the animal has been naturalistically depicted then spoilt. The additions consist of added trunks, tails, extra legs, enlarged bellies and so on. What is most important is that these additions are in the same laborious technique, and belong to the same period and patina as the well-drawn quagga which have been marred. Such studied vandalism, apparently by the artist himself, is difficult to explain (Plates XLIII, B, and XLIV).

Rock 29 has an ostrich, and several rocks in the neighbourhood of Big Rock have quagga depicted in this style (Plate XLVI).

3B. Outlined figures, pecked all over, the pecking being "dashed" to follow the lines of the hair. These figures are generally slightly conventionalised, but good. Rock 3 has an eland of this type, Rock 10 a buck with a few dashes on the body. Rock 14 has a bearded eland (Plate XLVII), while the outline of a second has been started and left. On Rock 31 is a buck, sparsely "dashed" on the body, and there is a later design on the same rock. Style 3B is Burkitt's variation of his second style. Probably a quagga bearing light graffiti on the body belongs to this style (Plate XLV).

3C. Now seems to come a deterioration of the deep pecking technique. The form of the animal is generally bad, so bad that even the zoological family is not recognisable; some show animals which might be buck, lions, or baboons. What is lost in form is adequately compensated for in a fine vivacity and movement, which gives a crude, but pleasingly humorous effect. The figures are generally confined to "dancing buck," what appear to be horns being shown. Rock 33 has a "lion" pecked deeply all over in this style, Rock 35 has a pair of opposed dancing or fighting buck, and Rocks AQ and AN have bucks in similar attitudes (text-figs. 3 and 4). It is possible that this "dancing buck" style precedes 3B.

4 and 4A. These "chemical" styles are almost entirely confined to Big Rock. Here two periods are visible, the older being the better executed and slightly more patinated than the later, which it underlies. There is little difference either in style or time between these two phases, and we may introduce them together.

Judging from a careful examination of the rock-surface, it is extremely probable that the technique consisted of painting the black rock with white bird-droppings; perhaps the painting was repeated, but the white paint was left in place sufficiently long to attack the rock chemically. At the top of the rock the lines of the encircling "snakes" of both these periods merge completely with the patch left by the natural action of the birds which have perched here, and cannot be differentiated from this. There is no sign of mechanical rubbing on the lines of the drawings (Plates XXXIII, XXXIV, XXXV).

4. To the earlier period belong ridiculous and whimsical animal figures, drawn at all angles. Two ostriches with necks intertwined, a pair of quagga, the front legs of the one forming the back line of the other, a weird animal with beaver-like tail, a baby buck with umbilical cord, and a number of lines encircling the rock, can all be relegated to this style (Plate XXXII).

4A. To the later period of the two belong very similar snakes,

FIG. 3.—Human figure in Style 4A. "Dancing Buck" in Style 3C.

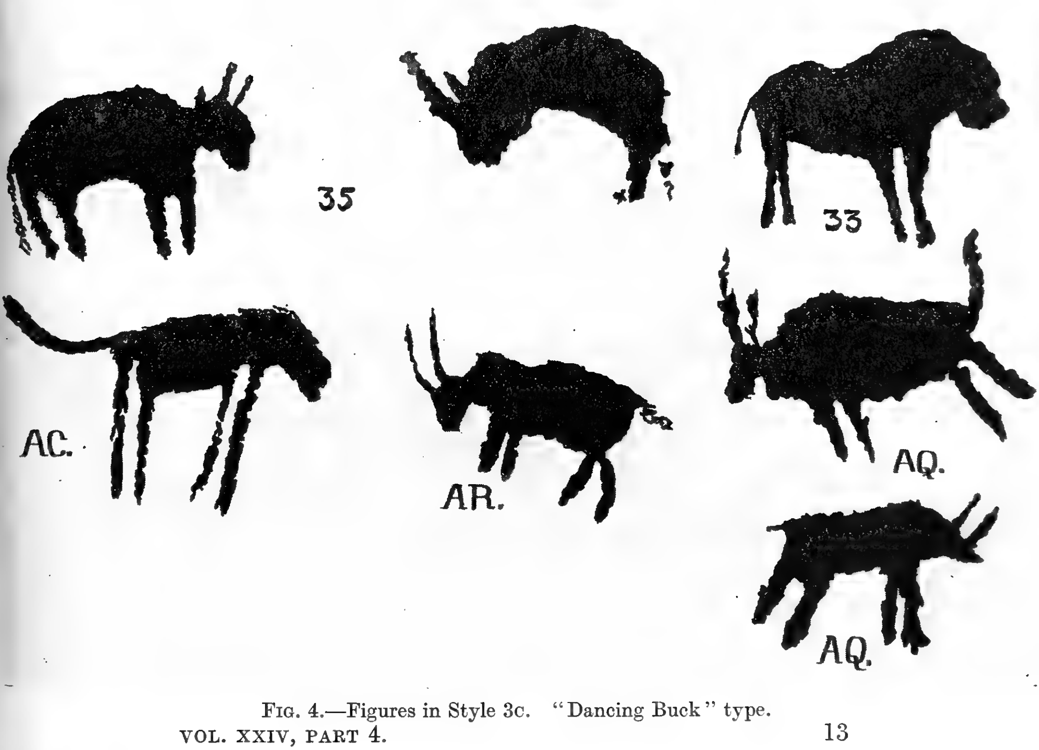

FIG. 4.—Figures in Style 3C. "Dancing Buck" type.

better drawn, and crossing and recrossing the older specimens. With these are some weird human figures, one showing steatopygy. Possibly the devil (a distinctly "medieval" representation with horns, a tail, and an erect penis) is of this period too, but as he stands on a different face of the rock his patina is somewhat darker (Plate XXXVII). It is worth noting that at Vosburg all the grids and concentric circles belong to this period. These forms are very common in the Kimberley district, and many have been depicted by Miss Wilman.* In that region it is certainly a pecking technique, and shows no sign whatsoever of having been done with the bird-droppings. One or two concentric circles at Vosburg have been similarly pecked, but these also conform to Style 4A in patina.

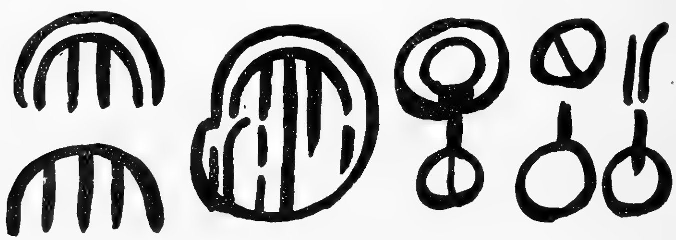

FIG. 5.—Maroon Paintings. Painted Shelter.

To one of these two periods can be assigned the dancing or squatting human figure on Rock AD (text-fig. 3) and a figure between Rocks 2 and 3.

5. Deeply scratched design, recalling Style 2 in all but patina and the animals depicted. Style 5 shows a fairly old patina, and may be more closely related to Style 2 than I have suggested. The palimpsest on Paintings Hill shows a very clear gap between the buffalo of Style 2 and the eland of this style. Similarly the superposition on Rock AK proves this style to be later than Style 3A. It can therefore only precede Style 4, but the patina on this latter type is darker and presumably older than that on Style 5.

Rock 6 is the best example, and here again we have a superposition, this time the metal spears referred to above (Plate XXXIX). An elephant 30 yards below the Painted Shelter is of this period also.

6. A good revival in pecking follows either Phase 4A or Phase 5. It is typified by light dashes rather than pecking, recalling though hardly resembling Style 3B. Here again the dashes follow the

* M. Wilman, Rock Engravings of Griqualand West, Cambridge, 1934.

lines of the hair on the animal, but the strongly pecked outline is missing, and the patination is very much lighter and of no very great age.

In this style there is a peculiar tendency, not markedly seen in other South African prehistoric art, but present in the European Aurignacian, to concentrate upon the head of the animal. This is carefully and feelingly delineated, while the body is very much less carefully executed, or left out entirely. This is the most artistic, though not the most impressive period at Vosburg.

This style is spacially the most nearly related to the paintings in the Painted Shelter, and there are two specimens within a few yards of this site. One of these is a buck 10 yards from the shelter, the other a buck's forequarters 3 yards from the shelter. Comparison with the elephant 30 yards below proves that this style is considerably later than Style 5.

On Big Rock can be seen two "portrait heads," one of a buck, the other of a giraffe (Plate XXXVI). This is the only attempt to draw two animals abreast, a distinct artistic achievement.

6A. Possibly the deterioration of Style 6 accounts for the weird, loosely pecked figures, sometimes badly outlined with light scratches, which occur here and there. The style has no interest whatsoever. One specimen occurs immediately behind the two heads in Style 6 on Big Rock, and the horns of the giraffe seem to have been elongated in this deteriorated style. A few other figures elsewhere belong to this type. Among the Eastern Outlyers is a very fine rhinoceros (Plates L–LI), which, though spoilt by later scrawlings, shows that even the artists of this period were capable of a certain degree of attainment. Rock 28 shows a sparsely pecked animal, Rock 3 a similar buck, Rock 2 a rhinoceros and a rhinoceros head. There is also an equid in the same technique.

7. A rubbed series with fairly good animal forms (Burkitt's third style). The figures are often outlined, and the incised outlines show a lighter technique than the rubbing. This can only be accounted for by the fact that the rubbing has not removed the whole outer skin of the rock, and hence was never greatly contrasted with the background. The incised lines, however, have cut through this outer skin, and show up more markedly.

Rock 10 bears a badly outlined wildebeest, Rock 11 has a group of ostriches, zebra, and buck. The grouping here is very similar to that on Rock 9, and the two certainly belong to a similar style. Rock 15 shows a large, pregnant eland, and both 23 and 24 show elands with bunches of incised hairs at the end of the tail. Rock 22 has a strongly outlined buck (text-fig. 6), 23 a lightly rubbed buck with no outline, and 26 has a similarly rubbed ostrich. On the Big Rock Hill, AM has a crude picture of a lion biting off a man's head (text-fig. 7), and AQ has a zebra, the mane and stripes of which have been incised with engraved lines (text-fig. 8). Near Big Rock itself is a porcupine in much the same style, but the patina has the appearance of being very much older. Possibly this is due to the

Fig. 6.—Buck in Style 7, on Rock 22.

figure being drawn on a horizontal flat surface which has undergone the maximum of weathering.

8. Very lightly rubbed outlines. Rock 32 shows a series of pools much as they would appear in the rainy season in a shallow erosion gulley. Such a gulley is easily visible from this spot, perhaps 200 yards east. Near this, also on Burkitt's Hill, is a crudely executed drawing of a human couple copulating. An ostrich on Rock 34 may belong to this style. A buck, depicted with a queer form over its head, possibly representing water as seen in perspective from the hill above, is the only animal which can certainly be relegated to this style.

9. Lightly scratched and scrabbled figures. The elephant and the rhinoceros are generally depicted, but a fine eland, some 4 feet long, is to be seen among the Eastern Outlyers (Plate LII). A buffalo being followed by a man, in the same region, may belong to this

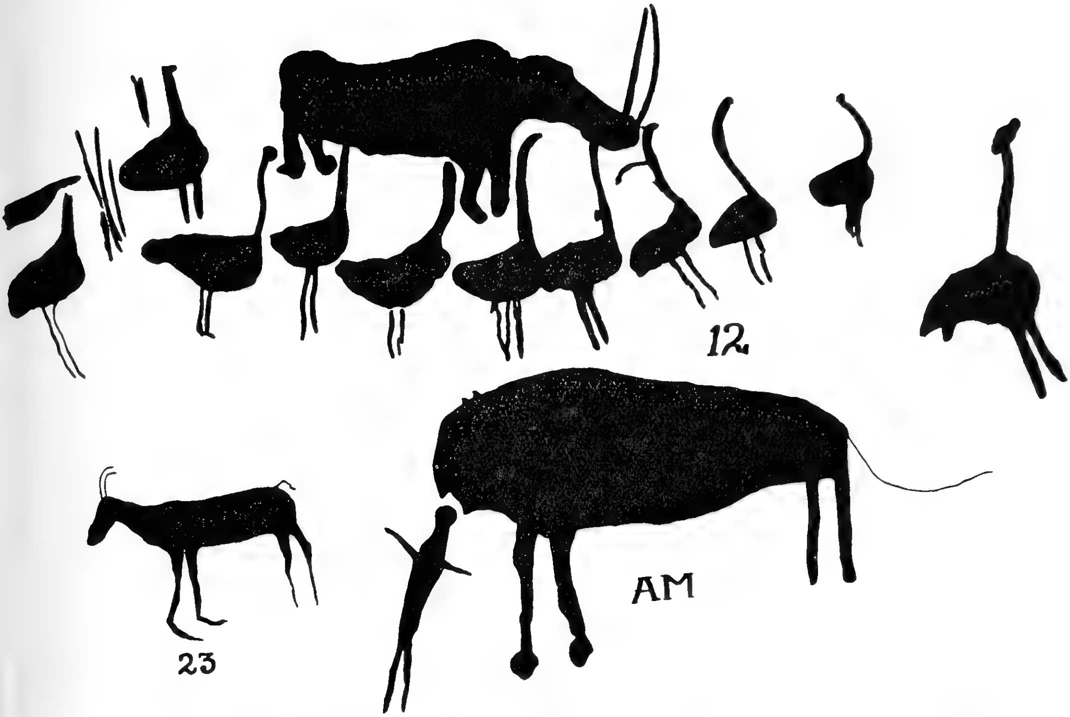

FIG. 7.—Various rubbed figures in Style 7.

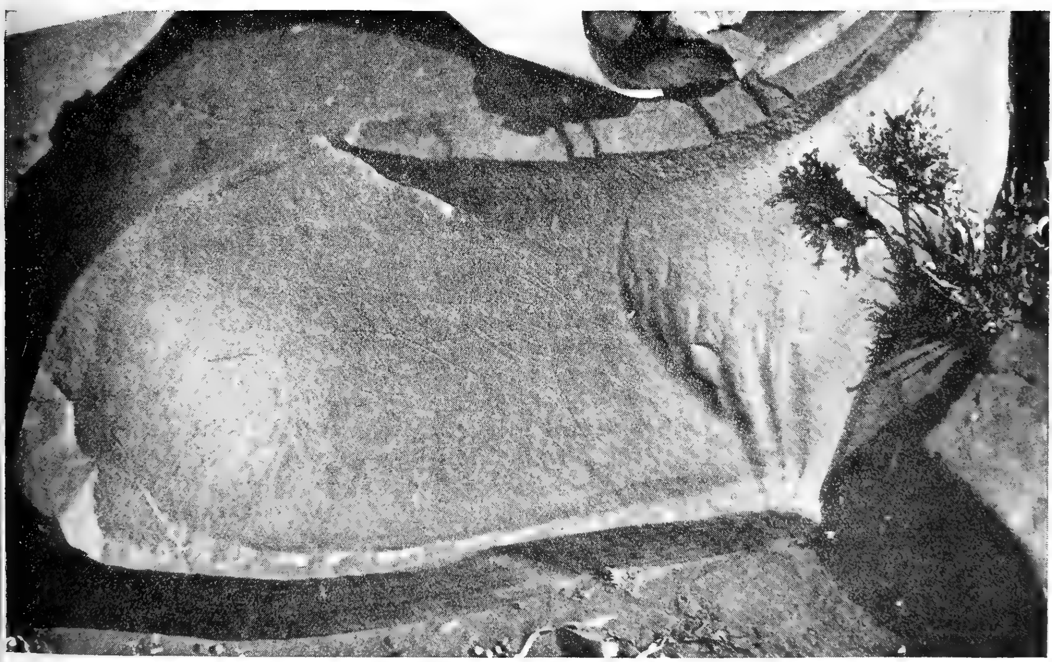

FIG. 8.—Quagga rubbed, with incised markings and outline. Rock AQ. Probably Style 7.

style, or possibly to Style 7 (Plate LIII). The three human figures below this buffalo belong to the same period (Style 10) as those added to the elephant on Rock 6.

On Rock 9 is a group of zebra, buck, and ostriches. These are grouped very much in the same way as those on Rock 11 (see above, Style 7), but are badly done and weakly sketched. On Rocks 16 and 17 are lightly rubbed elephants, with small trunks and wrongly attached tusks, suggesting sketches from memory. Near Distant Rock are several similar elephants, composing almost the only drawings present on this kopje.

10. We now reach the metal age with certainty. The lanceolate spears which are drawn, some with recurved barbs on the spearhead itself, can only have been made of metal. Rock 6 is the best example, as the spears overlie the figure in Style 5. The human figures often added to older engravings (Plate LIII) are all of this period. The Hottentot form of hut shown on Big Rock and elsewhere can be relegated to this period.

11. Here we first meet European influence. Outlined ostriches deeply scratched with a metal knife; men on horseback (text-figs. 9 and 10); some with guns; heavily skirted women with Boer sun-bonnets, all belong to this period (Burkitt's final phase). These are followed by contemporary love tokens, initials, and other trivialities. Interesting in this group is the presence of Nine Men's Morris boards, formed of three concentric squares, the midpoint of the sides of each being joined. This game is not African, and is not known to-day in the district.

The Painted Shelter.

The paintings still remain to be described. Although the local people speak of several sites at which paintings occur, only one could be located; this was the Painted Shelter. The position of this in relationship to the engravings has been described above, under Group IV.

At this point the crest of the hill, overlooking the Keurfontein-Vosburg Road (Panorama, Plate LX), is composed of ruiniform dolerite boulders, evidently the edge of a tilted volcanic sheet (Plate LIV). Among these clustered rocks is a small shelter, 4 feet wide at the mouth and less than 8 feet deep, and hardly covered by a roof. Paintings only occur on the three exposed faces of the largest dolerite block (Plate LV). They are all in one colour, a

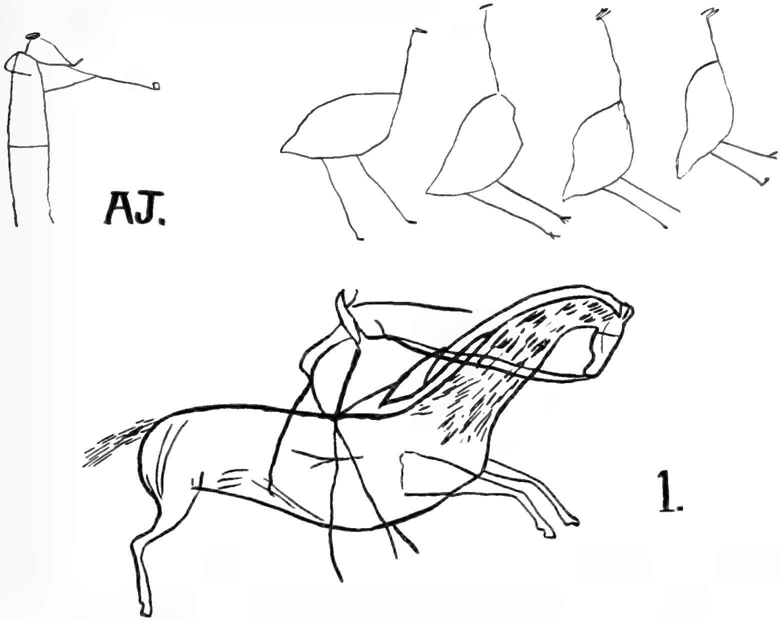

FIG. 9.—Ostriches, and a man on horseback, Style 11.

FIG. 10.—Zebra in Style 11.

maroon or plum, and all belong to the same period, no superpositions being present. They have suffered considerably from exposure to the actions of water and bird-droppings.

There are no human or animal figures depicted; or, if there are, they are so conventionalised that recognition is impossible. The paintings have all been drawn directly upon the rock with the tips of the fingers dipped in paint (Plate LVI). Two types of sign appear. The one consists of two concentric semicircles, mouth downward, with perpendiculars occupying the remainder of the space within the smaller semicircle. The second generally shows a circle, an inch in internal diameter, with a perpendicular line rising at right angles to the upper horizontal tangent. The line may bisect the circle and continue, or it may begin at the uppermost point of the circumference (text-fig. 5).

It is possible, even probable, that these designs are phallic, the first representing the female, the second the male symbols. There is another possible explanation, that the first represent tectiform pictures, suggesting huts of bent sticks, and the second an extreme conventionalisation of the human form. A variant of this second sign does in one instance certainly represent the human figure.

There is no method in grouping, save that the eastern face of the rock is mainly of the first (female or hut) type, and the northern face shows the second (male or human) type more generally.

It is important to note that these signs are very similar indeed to signs described by Dart (R. A. Dart, "Rock-engravings in Southern Africa and Some Clues to their Significance and Age," S. Afr. Journ. Sci., vol. xxviii, 1931, pp. 475–476, illust.) from a site on the Chifubwa stream near Solwezi. These he relates with later Stone Age implements. It is interesting, too, that the signs at that site are both pecked and painted.

Three yards north of the shelter is a relatively recent buck in Style 6; only the forequarters are properly depicted. A few yards farther is another, the whole animal being picked out in a similar style; while a little farther away, 10 yards north of the shelter, is a third. The two last are slightly more heavily pecked than the forequarters of the first, and may form a separate and slightly earlier form of Style 6.

Thirty yards below the shelter is an elephant in a deeply scratched style (Style 5) which is earlier than the buck in the neighbourhood of the shelter.

Considering how nearly the Style 6 approaches the shelter, and how little sign there is of the shelter having been regularly inhabited, we are justified in associating these paintings with Style 6, and both with the implements found in the shelter.

The paintings would seem to link up with various other sites in the Cape Province, and Miss Bleek has suggested several affinities. A site in the Griquatown Hills, Griquatown West; cave in Klein Aasvogel Kop, O.F.S.; Rooi Kuil, O.F.S.; Lichtenstein, Orange River, O.F.S. All these sites show similar colouring and technique, though at most of them the signs depicted are different. They all appear to be late.

Implements and Home Sites.

In open sites such as these it is impossible to associate implements and petroglyphs with any hope of accuracy. Vosburg has no true deposit-bearing shelters; the only one, the Painted Shelter, contains an inch or so of sand on a rock bottom, and a dozen or more implements were retrieved from here.

Scattered about among the rocks surrounding the petroglyphs are an abundance of artefacts, and considerable collections of these were made. The evidence afforded by their presence does not relate them happily with the engravings. As a long sequence of petroglyphs has been shown, and as a long sequence of artefacts has been found, we must presume that the implements and rock-engravings were parallel to some extent. But which group of implements represents the makers of which style of engraving is a problem which will eventually be solved only by elimination and the study of distributions of implements and styles at a vast number of sites. For this purpose those sites with the fewest styles will prove more valuable than the fuller series.

The only other proof which may be available is to discover the actual worn tools used in the making of petroglyphs and the relating of these with their cultural associations. At Vosburg, in spite of constant search over a period of years, I was unable to associate any tool with its type of engraving with any degree of certainty. For these reasons I have only found it possible to suggest the parallels existing between the petroglyph series and the artefact series. Farther than this I do not think we can at present go.

At Vosburg the problem is made more difficult by the absence of any real relation between the "homes" of the prehistoric folk and the petroglyphs. Here and there on the dolerite hills, and on the alluvial soil between them, are small flat patches of earth, about

30 feet in diameter (Plate LVII, A). These are sedimentary floors left dammed behind natural rock barriers in the process of denudation. They are generally surrounded by rocks, the tops of the boulders forming the natural dam, which yield a slight shelter from the wind. The prehistoric inhabitants evidently found these pan-like formations best suited to camping, as their implements are abundant here. These I have called Homes, as they suggest a sojourn, showing pottery and here and there a few microscopic remnants of decayed bone, in addition to stone implements (text-fig. 1).

Disregarding the find of a single implement of Fauresmith type, the implements range from Middle Stone Age to Later Stone Age material, and show four industries. The earliest we may refer to the heavily patinated and weathered flakes from Alexandersfontein Pan, Kimberley. (See Goodwin and Lowe, Ann. S. Afr. Mus., vol. xxvii, p. 140.) The second does not seem to be related to any described material, and it is perforce called the "Vosburg Industry." The third is fairly typical Smithfield B material, with associable pottery. The fourth seems to lie between Smithfield B and C. It has a retouch very similar to Mr. C. H. Heese's Britstown material, and resembles material found by me on Moonlight Kop, Victoria West. (See Goodwin and Lowe, *op. cit.*, p. 247.) The advanced forms found by Mr. Heese are missing from both this and the Moonlight Kop sites.

Eastern Home.

There is a small pan-like depression, of the type described above, near an outlined horse on the Eastern Outlyers Hill. This home is fairly well sheltered and consists of the usual earthy platform, nestling between the two ridges cresting the long hill where the engravings are found. It commands a magnificent view of a vast plain to the eastward. The home is not rich, and the general assemblage is not of much value. The implements consist of half a dozen heavily patinated flakes in lydianite, assignable to the Alexandersfontein Variation of the Middle Stone Age. With these are eight Smithfield flakes and tools, dulled by time but not patinated. They belong to Phase B of this industry and are also lydianite.

Alexandersfontein Type.

A crude point with faceted butt. The implement ends in a "nose" and is coarsely trimmed.

A long triangular sectioned point, similar to a willow-leaf type, with crude secondary trimming. This specimen shows usage at the blunted point. The butt is not visible.

A crude tool, flaked over both faces, probably a fragment of a disc, with rough edge-trimming. No butt visible.

A flake with faceted butt.

Smithfield Type.

One disc, may belong to an older period.
Portion of a circular scraper.
One heavy end-scraper.
One straight-edged scraper.
Four unworked flakes.

Home Site I.

Situated on the alluvial soil at the foot of Burkitt's Hill and north-west of High Rock, this home is of greater interest. It yielded a fragment of a bored stone which must originally have been ovate, measuring about 13 cm. by 11 cm. It is bored through the longer axis. The material seems to be a relatively soft dolerite. With this were fragments of pottery of a sort typical of several of these homes. It measures a centimetre in thickness, the outer surface is brown, while the bulk of the clay has been burned black. The inner face shows certain quartz inclusions, appearing as fine and not very numerous grains of white. These quartz inclusions are generally finer than those visible in the coastal pottery, though one or two quartz fragments as large as $\frac{1}{8}$-inch in diameter are also visible. More important, perhaps, are the impressions of grass visible on the inner face of the sherds, and also within the walls of the pot. These are probably a result of the mode of burning. The outer face bears a regular pattern, indented or impressed before the baking of the pot. The tool used seems to have consisted of a stylus or type-stick, bearing a row of at least three raised squares, the type-face measuring 9 mm. by $1\frac{1}{2}$ mm. This, when impressed on the pot, left three or more indentations, each measuring about 2 mm. by $1\frac{1}{2}$ mm. This unit was repeated in parallel to give much the effect of impressed basketry.* One small fragment shows a slight variation in the tool used, while another shows that the design was not imprinted over the whole pot. A few fragments of wind-worn ostrich shell were found,

* Compare Hewitt, Trans. Roy. Soc. S. Afr., vol. xix, 1931, plate xiii.

together with splinters of animal bone altogether too meagre to be of any value.

About forty stone implements were collected here. They are generally dulled and greyed, but otherwise not greatly patinated. End-scrapers, cores, a single notched scraper, and two side-scrapers suggest the Smithfield industry. For the main part the assemblage suggests phase B, but one or two specimens may denote a somewhat earlier style than the others. One specimen shows the coarse workmanship ascribed by Dr. van Hoepen to his Konig culture (E. C. N. van Hoepen, "Die Konigse Kultur," Argeologiese Navorsing, vol. i, Bloemfontein, 1928). Apart from these uncertain elements, the assemblage includes the usual small cores and fabricators of the Smithfield B. With these appears a single burin of the Vosburg industry. It is patinated a leathery brown, and has an uneven butt suggesting a prepared striking platform, and has been re-sharpened twice. The extreme point shows two transverse flake-scars a millimetre square, either the product of trimming or usage.

Vosburg Type.

One burin, 4·8 cm. by 1·9 cm. by ·6 cm.

Smithfield Type.

Fifteen end-scrapers ranging in size from 3 cm. by 1·2 cm. by ·6 cm. to 8·5 cm. by 3·7 cm. by ·5 cm.

Fragment of a bored stone.

A disc, used for hammering.

Two flake cores.

A redirecting flake.

A "tea cosy," probably half a broken disc.

A circular scraper.

A triangular scraper, similar in type and technique to the usual square and circular forms.

A burin.

Several potsherds and flakes.

Home Site II.

Possibly this is an extension of Home I. It lies 60 yards farther west and on the talus of Big Rock Hill, and it is cut off from Home I by a small erosion gulley and a modern farm road.

A few heavily patinated implements of Alexandersfontein type occur here, coarsely trimmed and generally formless (text-fig. 11, 5–8). A few flakes, less markedly oxidised and weathered, and smaller, belong to the Vosburg type. No tools are recognisable.

With these older implements appear two groups of Smithfield forms. The first of these may be at once compared with the Smithfield B material at Home I, but the presence of retrimmed flakes, a small jasper thumbnail scraper, and a quantity of unpatinated small tools suggest that we have here something later, perhaps even Smithfield C. The dulled Smithfield B material suggests that this site was at that period an extension of Home I. It shows the same typical assemblage of end-scrapers and cores, and has in addition two possible burins. The unpatinated material recalls Heese's material, mentioned above, but contains no tanged forms nor burins.

Alexandersfontein Type.

A crudely worked point, leaf-shaped, with a heavy ridge, 6·7 cm. by 2·9 cm. by 1·1 cm.

A small core of Moustierian type.

A few flakes.

Vosburg Type.

A flake. The remainder of the implements of this type have been retrimmed by Smithfield man.

Early Smithfield B Type.

A heavy scraper.

A burin made on a heavy flake.

A side-scraper.

An end-scraper.

A core scraper or small fabricator.

An older Vosburg flake retouched as a rod scraper.

Two patinated implements of Vosburg type retrimmed, one as a burin, one with under-trimming, probably usage.

Late Smithfield B Type.

Three large cores.

A fabricator.

A double end-scraper.

Three small circular scrapers of thumbnail form.
Two square end-scrapers.
Six graver-like tools.
A pebble " écaillée."
Two side-scrapers.
A rod scraper.
Some thirty flakes.

Smithfield B to C.

Three thumbnail scrapers.
Three cores.
An end-scraper.
Two graver-like tools.
A few flakes.

Home Site III.

This is on a considerably larger floor than the others. It lies some 100 yards north-east of Big Rock, with a good view to the north, and is marked by a large single cube of rock at its centre. No engravings are to be found on this rock, nor within 100 yards of the site, though the surface of the dolerite block would appear to have been suitable.

A single flake from here may be relegated to the Alexandersfontein Industry. The remainder of the material, some seventy specimens, reflects again the state of affairs visible at Home II. The dulled Smithfield B material is here, and also the clean, unpatinated artefacts of the later phase. The tendency, already observable at Home II, for these later flakes to be generally smaller and to show long, flat, narrow forms, is confirmed here. Thumbnail scrapers and small end-scrapers of jasper and similar material further bear out the identity of these two assemblages of implements. While no true burin forms are represented, a few artefacts suggest usage as engraving tools. A single specimen suggests the presence of Wilton elements (text-fig. 12).

Alexandersfontein Type.

One small scraper, roughly circular.

Early Smithfield B Type.

A flake, later retrimmed as an end-scraper.

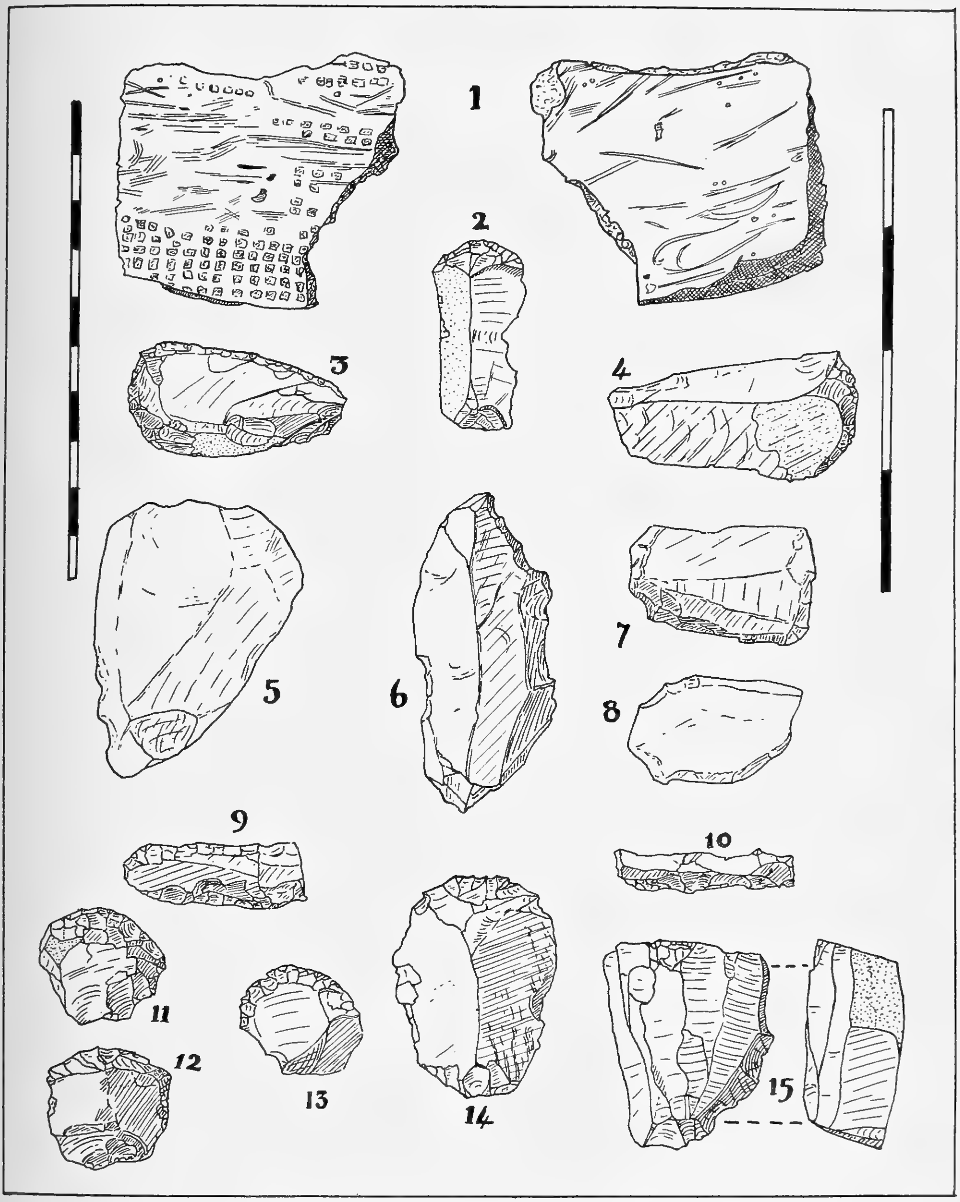

FIG. 11.—Pottery and implements from Homes I and II.

1. Two views of indented pottery. Home I; 2–4. End-scrapers. Home I; 5–8. Flakes of Alexandersfontein Variation. Home II; 9–10. Smithfield rod-scrapers. Home II; 11–14. Smithfield end-scrapers. Home II; 15. Two views of a Smithfield core. Home II.

Late Smithfield B, and Smithfield B to C Types.

Three end-scrapers.

An end-scraper, showing crude working on the under-face. It seems to have been a chisel, resembling European Neolithic chisel-forms (8 cm. by 2·2 cm. by 1·6 cm.).

Two discs.

A core.

Two side-scrapers.

A heavy circular scraper.

A redirecting flake.

A small battered jasper fragment.

Thumbnail scraper of agate.

A straight end-scraper of agate.

A crescent-like bead borer of lydianite.

Over a hundred flakes.

Wilton Type.

One small backed point or crescent of silcrete.

Home Site IV.

This is another pan-like floor, about 100 yards south of Home III and 60 yards east of Big Rock. Again there are no petroglyphs in the immediate vicinity.

One specimen belongs to the Alexandersfontein Variation. It is steeply worked all round with a crude heavy technique. With this are some thirty flakes and tools of the Smithfield B type. They are related to the material described above.

Alexandersfontein Type.

One backed side-scraper.

Smithfield B Type.

Two discs.

Three side-scrapers.

Two cores.

Two heavy end-scrapers.

A small side-scraper with under-working or usage.

Six small end-scrapers.

A score of flakes.

Home Site V.

This is in the usual hollow between rocks and affords a good view to the north. It is 80 yards north-west of Big Rock.

About a dozen artefacts from here may be regarded as belonging to the Alexandersfontein Variation. They show the usual crude workmanship, and in this larger assemblage they show more markedly their origin in a developed Moustierian. Small flakes struck from disc-shaped nuclei and a few of the cores of this sort are represented. One of the flakes has been retrimmed by Smithfield man as an end-scraper. Some forty specimens represent the Vosburg Variation. They are again patinated to the leathery brown visible at other sites and are unweathered. Faceted butts occur, but are not general, and the flaking shows a thorough knowledge of the "Neanthropic" or Capsian parallel flaking technique. The flakes are generally small, and some suggest use as gravers, though no true burins have been observed from this site.

Two or three specimens show similarities with the earlier Smithfield A–B material found at Home I. Here again this is followed by the normal Smithfield B material, represented by about sixty specimens, and divisible into three patination groups. It corresponds exactly with the comparable material at Homes I, II, III, and IV. Once again thick pottery is associated. It is baked black, and bears indented designs and quartz inclusions and again shows the presence of grass. The type of design is identical with that from Home I, but a different stamp seems to have been employed. Here the "basketry" rows of imprint have been arranged to meet in a chevron.

The later Smithfield material which I have called B–C is again represented, but at this site the specimens collected have additional associable material. Three fragments of a polished (probably natural) pebble which has been used as an anvil (text-fig. 12, 7), an ostrich egg-shell bead and several shell fragments, two stone bead-borers, two fragments of a bone point, and some pottery, all appear to belong to this later group. The pottery which I associate with this phase is thin (6 mm.) and has no signs of design on the outer face. It shows no grass inclusions, is reddish in colour, and is better preserved than the older pottery. It is important to note that the association of these last objects rests upon the state of preservation and the distribution of the forms between various Homes.

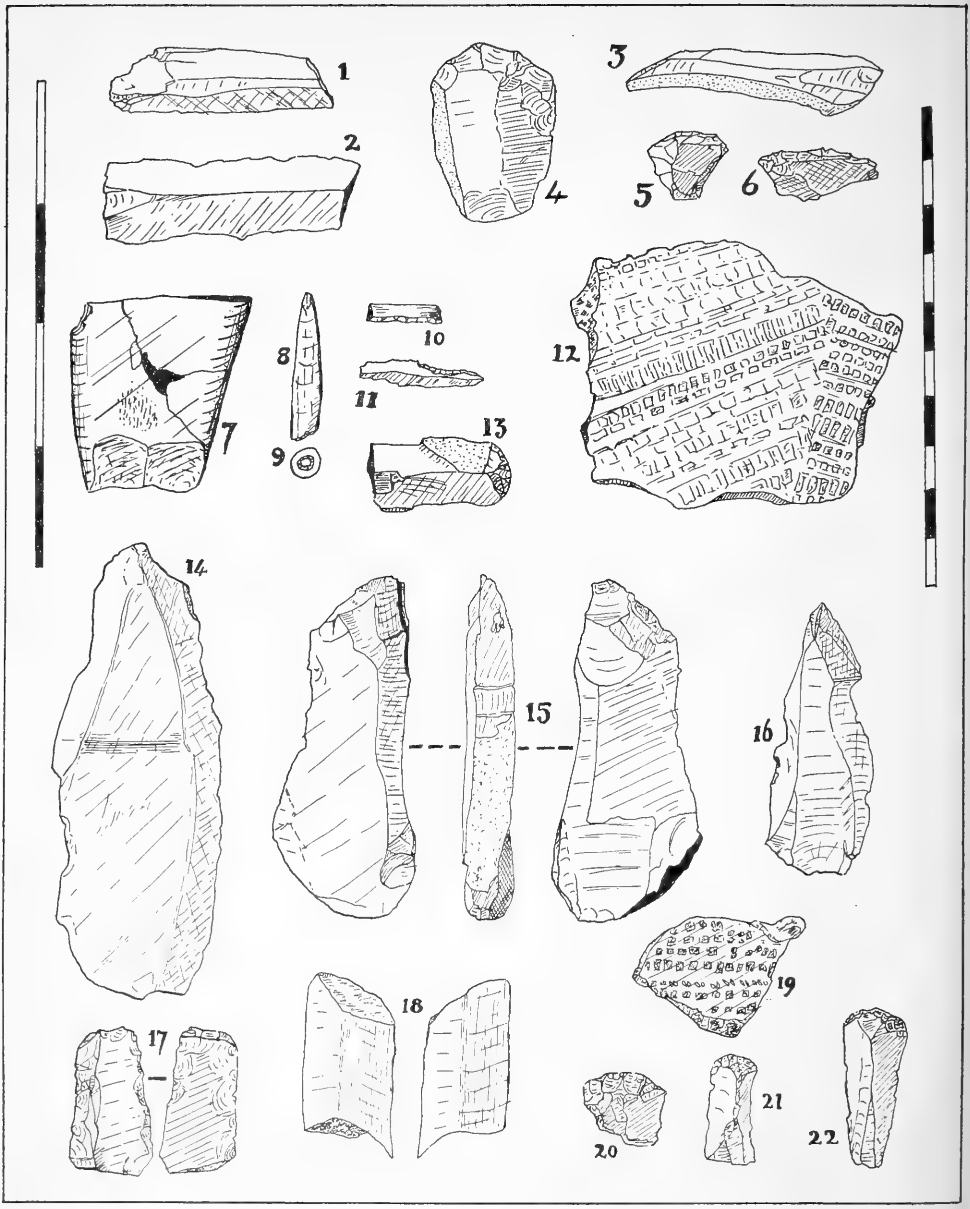

Fig. 12.—Pottery and implements from Homes III, V, VI, and the Painted Shelter.

1–3. Flakes. Home III; 4. End-scraper. Home III; 5–6. Small scrapers of jasper. Home III; 7. Polished or water-worn stone. Home V; 8–11. Bone arrow-point, ostrich egg-shell bead, and two bead-borers. Home V; 12. Indented pottery. Home V; 13. End-scraper. Home V; 14. Flake of Alexandersfontein type. Home VI; 15. Burin, Vosburg type. Home VI; 16. Flake used at point, Smithfield type. Home VI; 17. Used Smithfield flake. High Rock; 18. Used water-worn fragment. Painted Shelter; 19. Indented pottery. Painted Shelter; 20. Jasper thumbnail scraper. Painted Shelter; 21–22. Lydianite end-scrapers. Painted Shelter.

Alexandersfontein Type.

Two Moustierian end-scrapers.
One Moustierian core.
Ten flakes.

Vosburg Type.

Two flakes of Alexandersfontein type retrimmed.
Six cores, two elongated in form.
One polyhedral baton.
One flake showing a burin blow struck from the butt end to include part of the cleavage face.
Two circular scrapers.
A redirecting flake.
Two flakes worked on the cleavage face.
An end-scraper.
Thirty-six flakes.

Early Smithfield B.

Three end-scrapers, one large.
Two fabricators.
A point or chisel.
A rod scraper.
A redirecting flake.
Two side-scrapers.
Three core scrapers.
Half a dozen flakes.
A dozen potsherds.

Late Smithfield B.

An early Smithfield B flake retouched as an end-scraper.
One small and one large flake, with under-trimming.
A large circular scraper.
A large triangular end-scraper.
Two rod scrapers.
Five cores.
Two burins.
Two graver-like tools.
A flake "écaillée."
Three end-scrapers.
Medium circular scraper.
A dozen flakes.

Smithfield B to C.

Two fabricators.
A large disc.
Three end-scrapers.
A redirecting flake.
A circular scraper in jasper.
A crudely worked triangular end-scraper which may be a point.

Some sixteen pottery sherds may belong to this or to the previous Group.

Home Site VI.

This site is about 50 yards south-west of Home V and 100 yards west-north-west of Big Rock. It is in a similar pan-like depression, and again no petroglyphs are to be found in immediate association.

One or two specimens are assignable to the Alexandersfontein Variation. Several others, including an excellent burin which has been frequently retrimmed (text-fig. 12, 15), belong to the Vosburg Industry. The remainder consists of Smithfield B material, and the usual thick pottery, with design and grass inclusions. With these were a lower and an upper grindstone (Plate LIX).

Alexandersfontein Type.

Three points on thick flakes.

Vosburg Type.

A burin and a couple of flakes.

Smithfield B.

A crude end-scraper.
A grindstone (upper and lower).
A few flakes.
A dozen potsherds.

Home Site VII.

This lies in the valley between Burkitt's Hill and Big Rock Hill, 150 yards south-west of Home II and on the talus of Big Rock Hill. Once again there are no petroglyphs near. A hundred yards farther south of this site was found a single Fauresmith *coup-de-poing*, unassociated and alone. Apart from this individual heavily rolled specimen of lydianite, the site shows the same series as the others.

Weathered Alexandersfontein, patinated Vosburg, early Smithfield B, and the clean, unpatinated late Smithfield types all recur.

Alexandersfontein Type.

A point with a slightly faceted butt.

Vosburg Type.

Four nondescript flakes.

Early Smithfield B Type.

An Alexandersfontein flake retrimmed.
A small core-face used as a chisel.
A large end-scraper.
A tabular shale end-scraper, triangular in section.
A flake "écaillée."
A pointed flake showing use.
A small end-scraper.
A dozen flakes.

Late Smithfield B Type.

Two used graver-like tools.
Two medium end-scrapers.
One small end-scraper.
Two circular scrapers.
One side-scraper.
Two notched scrapers, one on a freak flake.
A fragment of jasper.
Some forty flakes.

High Rock Home (Burkitt's Hill).

This is the "shelter" referred to by Burkitt (see above) and little is left there now. Smithfield B artefacts are still to be found, together with the less patinated B–C phase material which again includes the later pottery, and a few scraps of disintegrating bone (Plate LVII, B, and LVIII, A).

(Additional to Burkitt's material.)

Vosburg Type.

Two pointed end-scrapers, plain butts.
Two cores, plain platforms.
A refacing flake.
A dozen flakes.

Early Smithfield B Type.

A large core.
Two small cores.
A dozen flakes.

Late Smithfield B Type.

Side-scraper.
Rod scraper.
A fragment of thin pottery.
A few flakes.

Big Rock Home.

This lies about the base of Big Rock (Plate LVIII, B). It is fairly scattered, extending some 20 yards in all directions, but is rich. Some fifty artefacts found in this area belong to the Alexandersfontein Variation and do not differ from the material described above. A hundred or so which were found immediately about the base of Big Rock belong to the Vosburg Industry. These, though small, show themselves to have closer morphological affinities with the Capsian of North Africa than with any South African culture. Tools of a recognisable conventionalised type are unfortunately rare. Most common are a number of batons or core-like tools, possibly gravers of a sort (text-fig. 13, 12). One tool shows serration (text-fig. 13, 17), and two burins are represented (text-fig. 13, 10 and 11). Here Smithfield B and B–C tools are represented but meagrely.

Alexandersfontein Type.

Six points, some broken.
Eight nosed-points.
Nine discs, usually with one face flattened, and generally 2·5 cm. diameter.
Seven end-scrapers.
Three side-scrapers.
A possible burin.
About thirty flakes.

Vosburg Type.

Seven cores.
Two long cores.
A triangular point.

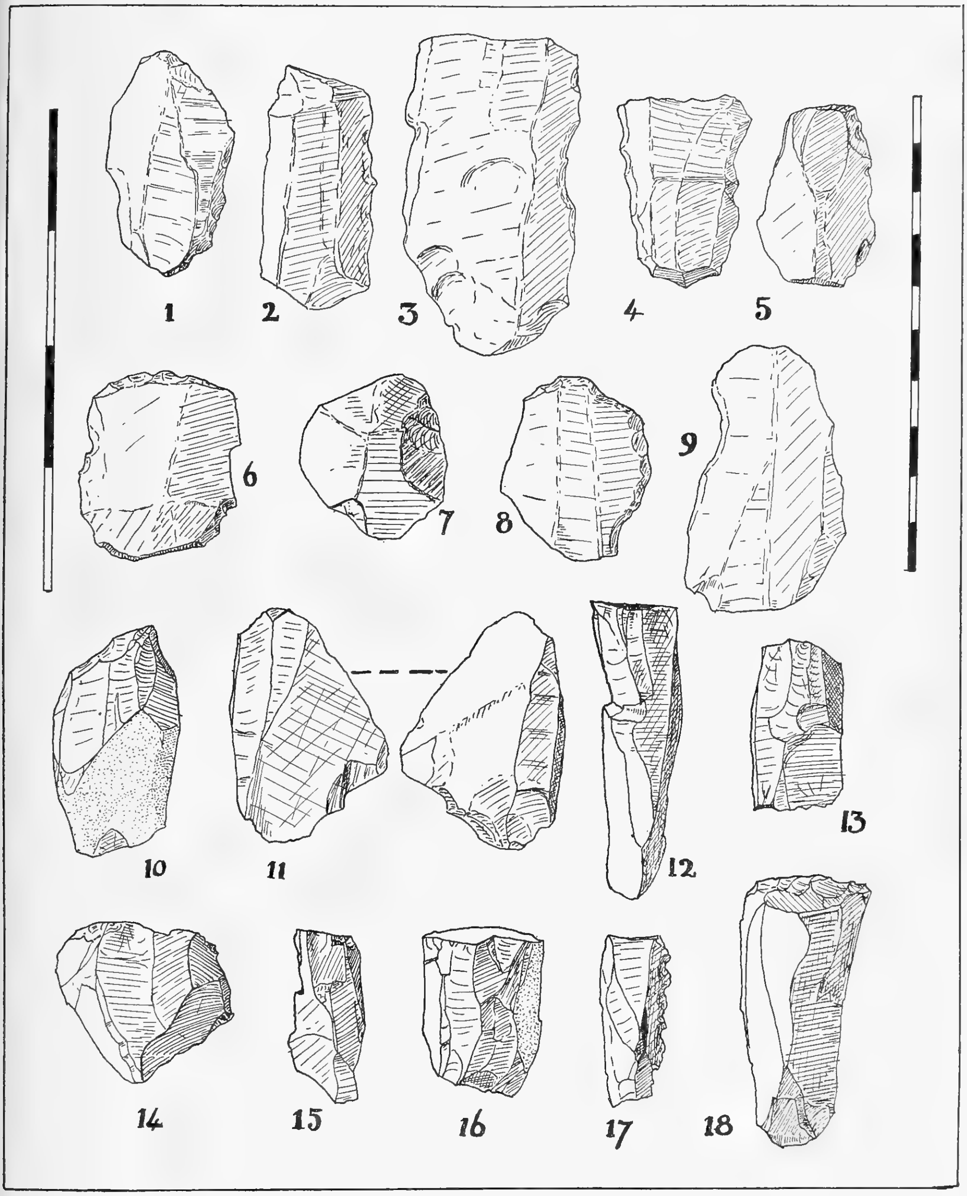

Fig. 13.—Flakes of Alexandersfontein and Vosburg types. Big Rock.

1–9. Flakes of Alexandersfontein type. Big Rock.
10–18. Flakes of Vosburg type. Big Rock.

A point used for pecking.
An end-scraper.
Five redirecting flakes.
Two discs (2·5 cm. diameter).
Five burins.
Two used gravers.
Sixty flakes.

Early Smithfield B.

An end-scraper and four flakes.

Home VIII.

An unimportant Home situated 200 yards east of Distant Rock on the slope of the hill.

Alexandersfontein Type.

One large burin.

Early Smithfield B.

One end-scraper.
A crude scraper, broken.
Five flakes.

Late Smithfield B.

Two end-scrapers.
An early Smithfield B flake, reused.
Two flakes.

Painted Shelter.

The little Painted Shelter, measuring only a few feet across and as few in depth, and almost completely unprotected from rain, has nevertheless yielded a fair number of implements. The floor deposit is less than an inch in depth, and lies directly upon dolerite blocks.

From the talus below the shelter come a few older implements, though whether they were ever in the shelter it is impossible to say. One is a flake of Alexandersfontein type, a few others are of Vosburg type.

Within the shelter, and immediately about it are numbers of Smithfield B implements. The usual associable pottery is found, and a single fragment of broken, water-worn lydianite, very similar to the anvil at Site V. There are no signs of any earlier or later inhabitants of the shelter.

In the general region of the Painted Shelter a number of additional implements were found.

Alexandersfontein Type.

One point.

Vosburg Type.

A disc and two flakes.

Early Smithfield B (mainly from the shelter).

Four fragments of thick pottery with grass inclusions.
A crude side-scraper.
Eight cores.
Five fabricators.
A battered hammer-stone.
One naturally polished stone, slightly used.
Two end-scrapers.
A dozen flakes.

Late Smithfield B.

Four cores.
A large end-scraper on an earlier flake.
Five small end-scrapers.
A jasper side-scraper.
A jasper thumbnail scraper.
A disc.
A trimmed flake.
Two unworked flakes.

The Motives for the Art.

There are various approaches to the general subject of prehistoric and primitive art. We may adopt the "Art for art's sake" attitude, divorce the piece of art entirely from any social or historical surroundings, and judge it by our own conventional standards. We may perhaps seek an ulterior and sublime motive behind the art, isolating religious from profane art. Prehistoric art as seen by the civilised eyes is labelled "sacred object—object of cult—magic," etc., while the places where such arts are practised become sacred spots.

Our own approach is based upon an attempt to be scientific. It is intended to prove historical sequences between styles of art, and to date these relative to deposits. From the petroglyphs themselves certain deductions have been made; they have been analysed into styles and techniques; an attempt has been made to analyse the animals and objects depicted, and attention drawn to those peculiar physical characteristics shown on Big Rock, and probably typical of the artists of that period.

Each of these approaches has its uses. In some of the petroglyphs a true artistry can be seen, most notably in the pair of heads on Big Rock. It would also be interesting to know why the artists drew at all, but our knowledge is insufficient to justify our labelling all these petroglyphs as religious or magical.

In a survey such as this, where a single site is taken into consideration, certain questions must arise, perhaps more or less particular to the site, perhaps of general application. We have already dealt with some of the environmental factors, we have seen, for instance, that fences affect the modern environment fundamentally, by preventing the normal game and human migrations of this region. We have already noted that the presence of a population too great for the region has sucked up the underground waters and lowered the water-table. Environment works in many other more subtle ways, and with some such effects we may deal here.

Let us look at these petroglyphs in their environment. We have an arid stretch of country, 60 miles from the Orange River, and thus 60 miles from the nearest regular water. In a wide plain we have the Keurfontein, a perennial spring. Immediately overlooking the Keurfontein are a few small hills, but without any petroglyphs or home sites; quarry sites, showing unworked flakes, crusts of lydianite and so on, all belonging to Smithfield B patination, but without a single implement, are relatively common.

Farther back are other hills, still overlooking the water-hole, but separated from it by a mile of plain. Here we have a number of homes, generally with a view of the spring. This is the region of petroglyphs.

Among the living Bushmen we know that the household or horde never camped near water. To do so would frighten away game and defeat the hunter's ends. A not-too-frequent visit to the water-hole or a nearby quarry site would be safe enough, but the camp must be some distance away. What better spot could be chosen than a raised plateau or hillock within view of water? From here the game could be observed as it made its migrations annually to the Orange River. The camp would not be permanent, but it would be used annually during the migratory season over a period of years. The Keurfontein is set in a region of aridity, which had a sparse animal population, supporting a few hunters whose main emotion was hunger. Prehistoric man was hungry, the hunger gnawed at him and became more and more insistent. He found that his hunger demanded expression in action. Set as he was in dolerite hills, watching over the plains for game, he had time for action. He needed food, and if game was scarce he drew food on the rocks, and so vented his feelings. Exactly the same primitive and simple reaction is seen in the pornographic scribblings which occur in our own society—though here food-hunger is not the predominating emotion.

This emotional satisfaction of a need must have been very basic to primitive art in its early stages. It may be followed by a second step, an attempt to rationalise this apparently irrational action, "Why do we draw when we are hungry?"—"Because we want to gain power over our food supply." Once this belief is accepted and socialised we have reached sympathetic magic. From this belief may arise other things. The *morale* of the hunter may be increased; or the belief may arise that to depict a thing is to give power over it, therefore it is "sorcery" to depict a man. In such a development there are three clear steps: wish fulfilment, rationalisation, and finally a fear reaction. No religious element has entered the field. There is no personification. The power is there to be evoked by the act of drawing; it is not "given" by a higher being.

While this simple series of psychological stages will account quite happily for the greater number of the petroglyphs at Vosburg, it is certainly not to be extended to all of these, nor to much of the prehistoric art in Africa and elsewhere. There are other developments present.

On Big Rock *ideas* are being drawn. The snakes, the grids, the concentric circles, the queer mythical beaver-like animal, and the devil himself, do not fit in with this theory. This art is more sophisticated, though often more crude, than the pure animal designs. We may draw a parallel between the figures on Big Rock and the animal and symbolic figures shown at initiation ceremonies all the world over. The "devil" is certainly a dancer, with animal horns and a tail, similar to dancers described by Miss Bleek (D. Bleek, The Naron, Cambridge, 1928, p. 23) among the living Bushmen:—

"When a girl reaches maturity the eland-bull dance is held in her honour. All men and boys leave the village, save two grandfathers, who tie elands' horns, or wooden imitations thereof, to their heads. . . . The Auen hold this dance in the same manner. The Nusan recognised the tune. A similar ceremony takes place among them, a man with a bird's beak on his head taking the eland bull's place."

Quite apart from the action of any tribal or transmitted tradition which bound these generations of artists together, there is a very potent and interesting factor which has affected these sites at Vosburg, and almost certainly had its effects at other sites. This we may call a "locality tradition." It manifests itself here as a strong desire on the part of every visitor to the site to imitate and emulate the older artists. Directly a herdboy, or even the more educated farmer, sees the petroglyphs, he will, without a moment's thought, attempt to produce something of the same type. The drawings themselves thus form a basis for tradition. How this has been met by various individuals can be seen in the palimpsests, especially the two ostriches on the Paintings Hill superposition. Modern drawings of farmers on horseback (on horses, be it noted, with the traditional neck of the thoroughbred and hence probably recent), some with guns, the ostrich hunts, the Victorian clothing, and the final phase of the lovers' hearts and initials, are all confined to just those areas in which the engravings are found. A hundred yards away they do not exist.

This locality tradition is thus strong to-day. It is a form of direct suggestion, and while the more educated generally repress it, most visitors, when I was at work, amused themselves by adding to the series.

How far did such suggestion create or foster native "tradition"? It has easily bridged the gap between the native mind and that of the European—what other gaps between earlier races were similarly bridged? It is obvious that tradition acting through transmitted word of mouth is not an essential. The practical example of the many designs already present is sufficient to call out any innate artistry in the newcomer.

This would seem to suggest very strongly that the peoples who were responsible for these various petroglyphs were not necessarily bound by a common tribal or cultural tradition, and also that they were not necessarily inspired by the same motives.

Deformations, Technique, and Extinct Species.

From time to time attempts are made to use the fauna depicted in petroglyphs as fossil evidence from which the art and the dying fauna can be correlated. A tertiary fossil is known, and the bones form the basis of a reconstruction which is similar to the form of an animal pecked on a rock-surface. The main source of error is the failure to realise how crude and rudimentary the various techniques employed in petroglyphs may be. It is only in the hands of a few outstanding artists that species can be made recognisable, and the measurable variation in two similar animals in like styles on adjacent rocks may be very considerable.

Another peculiar element at Vosburg is the presence of the quagga petroglyphs (of Style 3A), which have had elephant-like trunks added in the same technique by an artist of the same period. The quagga, being a striped animal, is easily recognisable, but the addition of a trunk throws an interesting light on several petroglyphs which supposedly represent Tertiary fossils. Some, at first sight, certainly suggest hippopotamus or rhinoceros with trunks added. The likeness to accepted reconstructions of prehistoric animals may have been quite unconsciously increased by the process of adding oil or graphite to "bring out" the petroglyph, and to conceal chippings or scratches which were "not intended" by the original artist.

It seems important in a question of this nature, where an extinct species is concerned, to retain the surface of the rock in its natural condition without any sort of preparation for photography. A petroglyph ceases to have any scientific value once it has been tampered with, and the patina, technique, and form have been touched up.

The acceptance of a petroglyph as depicting an extinct species becomes less and less justifiable as the time-gap which has elapsed since the fossil lived increases. No zoologist would accept a new species described from the evidence of a petroglyph alone: why should he accept such proof as post-dating the existence of an extinct form?

The question of technique is important. Any artist will admit to the relative inaccuracy of oils compared with water colours. Any sculptor will admit to the distortion of texture and form shown in a piece of work executed with coarse tools. In dolerite other factors come in: the textural inequalities of the rock and the unevenness of the rock-surface. Of the crudeness of the stone tools with which the work was done, little need be said, as workers in stone tools have often risen to heights hardly equalled among our own craftsmen.

Summary.

If we exclude the single find of a Fauresmith *coup-de-poing* of lydianite, in the region of Home V and some distance from the engraving, we are here presented with at least four cultural phases evidenced by stone implements, and with eleven stylistic periods shown in the petroglyphs.

The earliest of the implement phases is the Alexandersfontein Variation, an ugly development on a Moustierian theme. Apart from the neighbourhood of Big Rock, specimens are relatively scattered and seem not to form an integral part of any one congeries. They are spread more or less homogeneously over the whole region, so that within any area the size of a home site one or two flakes of this type will be found. If this distribution can be taken as evidence of disturbance by slow water-action, a long lapse of time is again suggested since the making of these tools. Much the same may be said of the material relegated to the Vosburg Culture, which is less evenly distributed, though quantities of these implements only occur together about Big Rock and Home V.

At all the home sites, save Big Rock, occur localised groups of Smithfield B implements, or of Smithfield B–C type and technique, or, in some cases, both together. At Big Rock both periods are relatively rare, and do not suggest that the makers of these implements lived near this rock. The general distribution of Smithfield implements shows that these hills were regular stopping-places for these folk. The hills command a clear view of the Keurfontein, and are sufficiently far away not to scare game from making use of that spring.

From these facts we must presume that Smithfield man made the greater number of these petroglyphs. It must be remembered that the makers of the Alexandersfontein and Vosburg types of tool were here before them, and that the Vosburg congeries include burins and also stones which show signs of having been used as gravers. It is not possible to link the Alexandersfontein implements with any type of engraving, but the localisation of the Vosburg artefacts in the region of Big Rock strongly suggests that these people made some of the earlier Big Rock engravings. To these Vosburg folk may be tentatively attributed my Style 2 (Burkitt's first phase), represented by the incised eland.

The next clear association is given us at the Painted Shelter, where the lightly pecked petroglyphs of Style 6 are associated with paintings and with Smithfield B implements as certainly as any elements of culture can be.

After this period the Smithfield B–C folk take up the task of decorating the hills, until the time marked by the appearance of metal spearheads (Style 10) and finally of our own facetious efforts.

My thanks are due to the Research Grant Board for their help on my second visit to Vosburg, to my wife, to J. G. Taylor, to B. D. Malan, and to Mr. and Mrs. Burkitt, for their help on the various visits. Throughout my work I became more and more indebted to the various members of the Vos family, most especially to Mrs. Vos and to Mr. Henry Vos; to them, therefore, I dedicate this paper.

EXPLANATION OF PLATES.

XXXII. Petroglyphs on Big Rock, flattened to show the relationship. Reconstruction from tracings.

XXXIII. Eastern face of Big Rock. Photograph.

XXXIV. North-eastern portion of Big Rock. Photograph.

XXXV. Northern portion of Big Rock. Photograph.

XXXVI. Two heads, buck and giraffe, north face of Big Rock. Photograph.

XXXVII. "The Devil," south-western face of Big Rock. Photograph.

XXXVIII. Palimpsest on Paintings Hill. Photograph and tracing.

XXXIX. Palimpsest on Rock 6. Photograph and tracing.

XL. A. General view on Big Rock Hill.
B. Palimpsest on Rock AK. Tracing.

XLI. Two views of design in Style 1, Rock AL. Photograph.

XLII. Animals in Style 3, from Rock 30. Compare Burkitt. Photograph and tracings.

XLIII. A. Ostriches in Style 3, Rock AO. Photograph.
B. Quagga with trunk added, Style 3A. Photograph.

XLIV. Quaggas with additions, Rock AF, and a neighbouring rock.

XLV. Young quagga, bearing light (and later) graffiti on the body. Probably Style 3B.

XLVI. Deeply pecked quagga, 100 feet west of Big Rock. Reversed tracing.

XLVII. Eland on Rock 14, Style 3B.

XLVIII. A "Dancing Buck," Style 3C, Rock AN.

XLIX. Buck in Style 6. Human figure above, probably in Style 4A, Rock AE.

L. Rhinoceros, Style 6A, Eastern Outlyers.

LI. The same, showing mode of occurrence on a cloven rock.

LII. An eland, Style 9, Eastern Outlyers.

LIII. Buffalo, followed by a man. The lower figures are later. The buffalo is in Style 7, or more probably 9.

LIV. General view of the Painted Shelter from below.

LV. The Painted Shelter, showing ruiniform rocks.

LVI. The paintings on the rock.

LVII. A. A typical Home Site (Home V).
B. General view of High Rock, Burkitt's Hill, from the east.

LVIII. A. View of High Rock.
B. View of Big Rock and site.

LIX. View of Home VI, showing upper and lower grindstones.

LX. Panorama from Painted Shelter, including Keurfontein homestead, the Eastern Outlyers, Burkitt's Hill, and Big Rock Hill.

PETROGLYPHS ON BIG ROCK, FLATTENED TO SHOW RELATIONSHIP.

EASTERN FACE OF BIG ROCK.

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NORTH-EASTERN PORTION OF THE ROCK.

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NORTHERN PORTION OF BIG ROCK.

TWO HEADS, BUCK AND GIRAFFE, NORTH FACE OF BIG ROCK.

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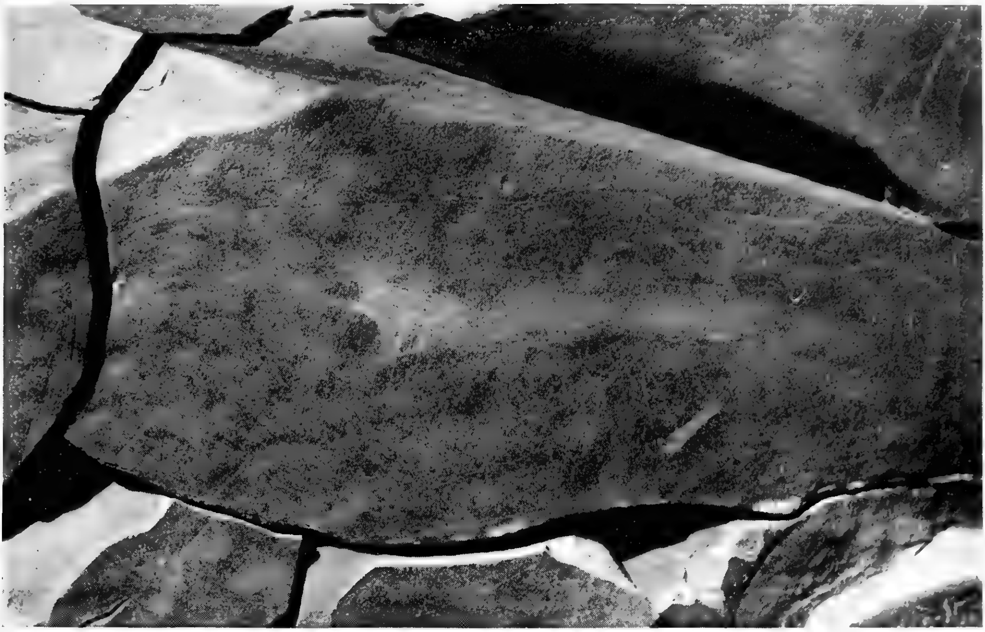
SOUTH-WESTERN FACE OF BIG ROCK.



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PALIMPSEST ON PAINTINGS HILL.

PALIMPSEST ON ROCK 6.

A. GENERAL VIEW ON BIG ROCK HILL.

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B. PALIMPSEST ON ROCK AK.

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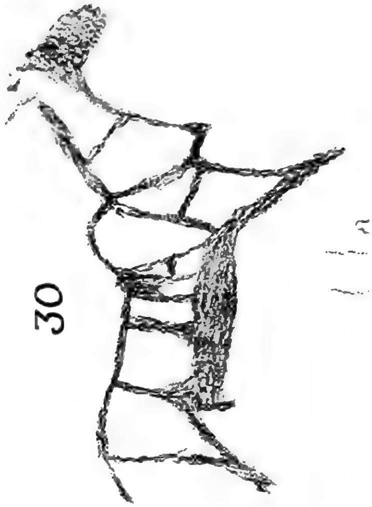
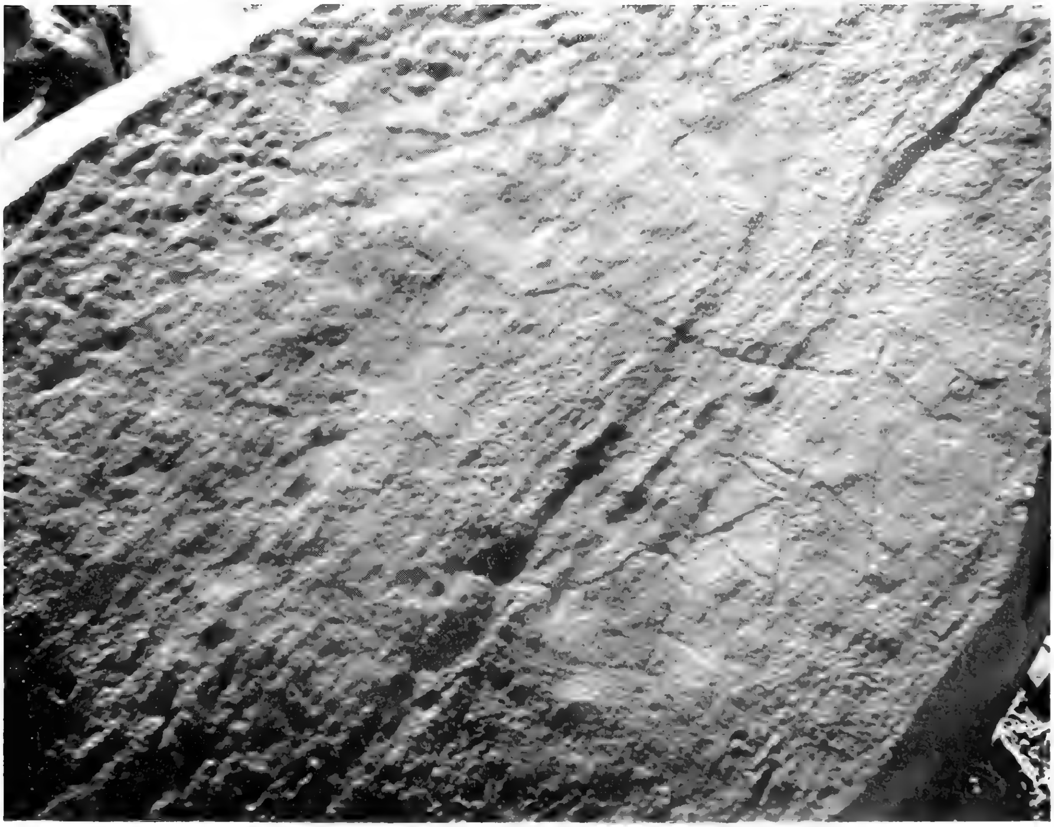
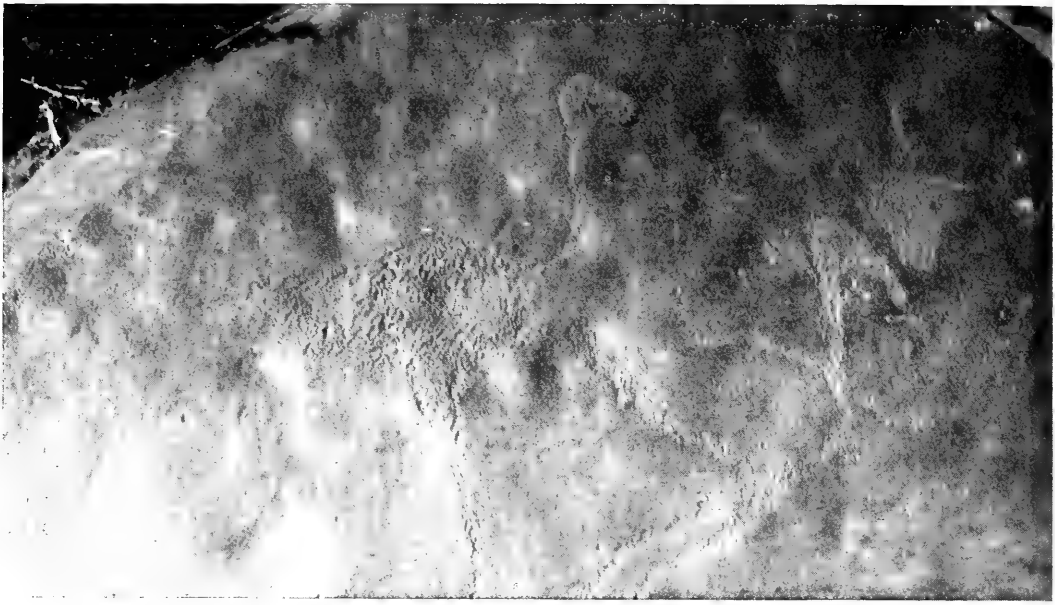
TWO VIEWS OF DESIGN IN STYLE 1. ROCK AL.

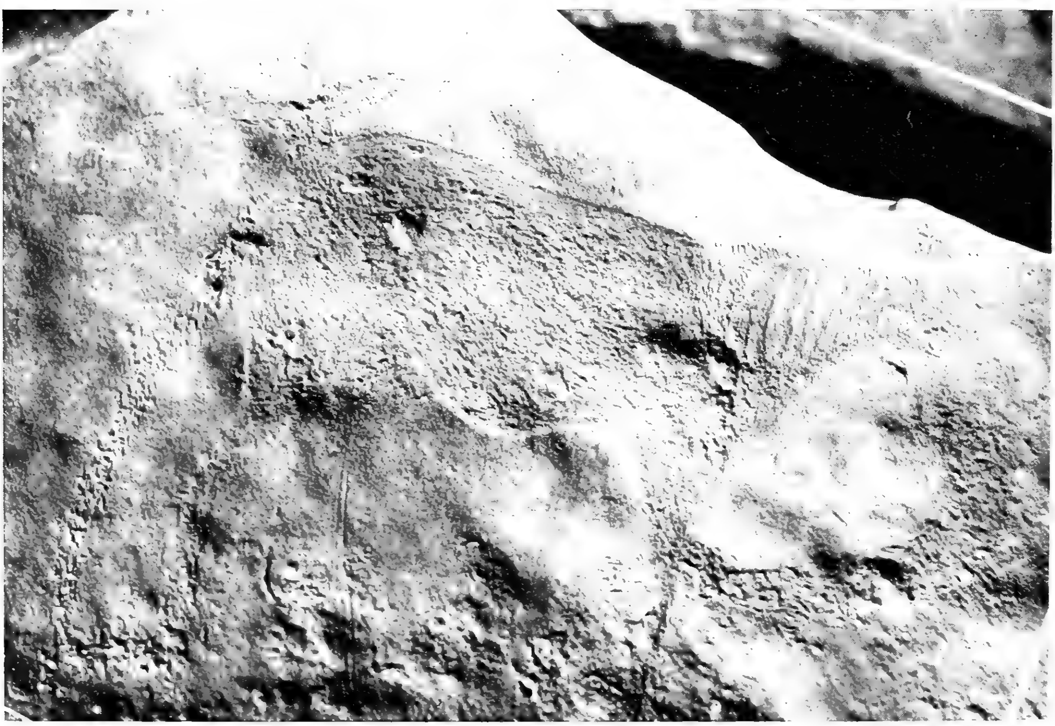




ANIMALS IN STYLE 3, FROM ROCK 30.



A. OSTRICHES IN STYLE 3. ROCK AO.



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B. QUAGGA WITH TRUNK ADDED.

QUAGGAS WITH ADDITIONS. ROCK AF.

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QUAGGA WITH ADDITIONS.

QUAGGA BEARING LIGHT (AND LATER) GRAFFITI ON THE BODY. PROBABLY STYLE 3B.

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QUAGGA. (100 FEET WEST OF BIG ROCK.) STYLE 3A.

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ELAND ON ROCK 14. STYLE 3B.

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"DANCING BUCK," ROCK AN STYLE 3b.

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BUCK IN STYLE 6. ROCK AE.

RHINOCEROS, EASTERN OUTLYERS. STYLE 6A.

SAME AS PLATE L, SHOWING OCCURRENCE.

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ELAND, EASTERN OUTLYERS. STYLE 9.

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BUFFALO FOLLOWED BY A MAN. LOWER FIGURES ARE LATER. STYLE 9 OR 7.

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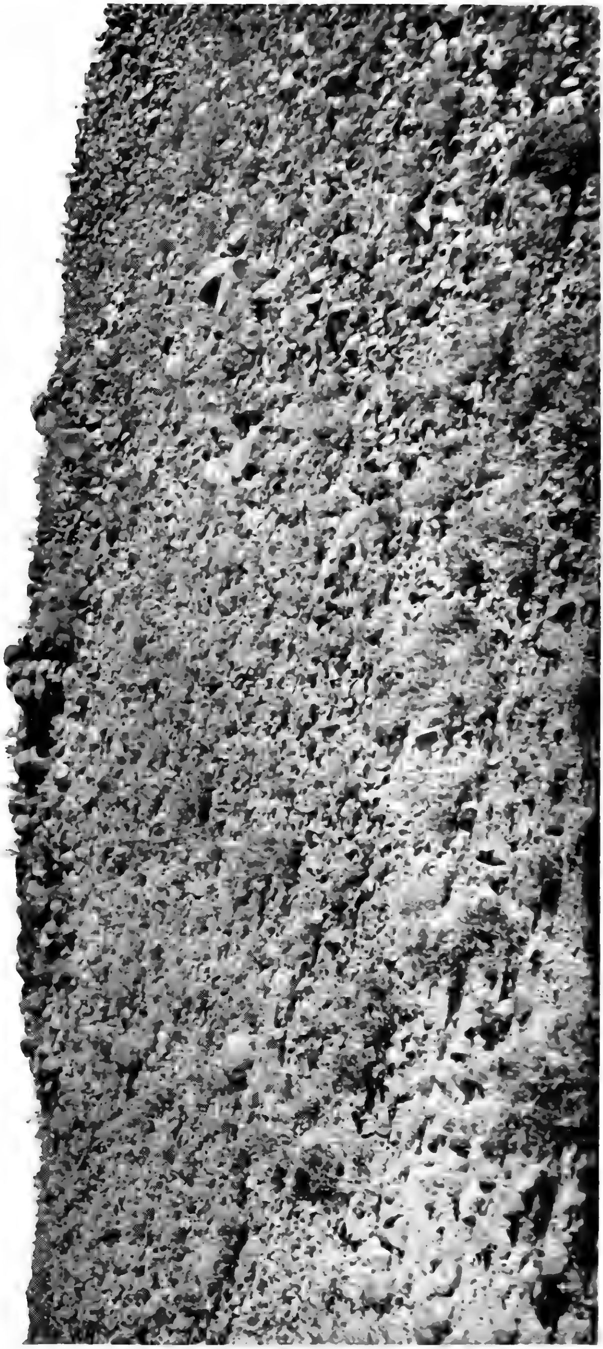

THE PAINTED SHELTER.

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THE PAINTED SHELTER.

THE PAINTINGS SCALE IN INCHES

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A. A TYPICAL HOME SITE (HOME V).

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B. GENERAL VIEW OF HIGH ROCK, BURKITT'S HILL, FROM THE EAST.

A. VIEW OF HIGH ROCK.

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B. VIEW OF BIG ROCK AND SITE.

HOME VI. SHOWING UPPER AND LOWER GRINDSTONES.

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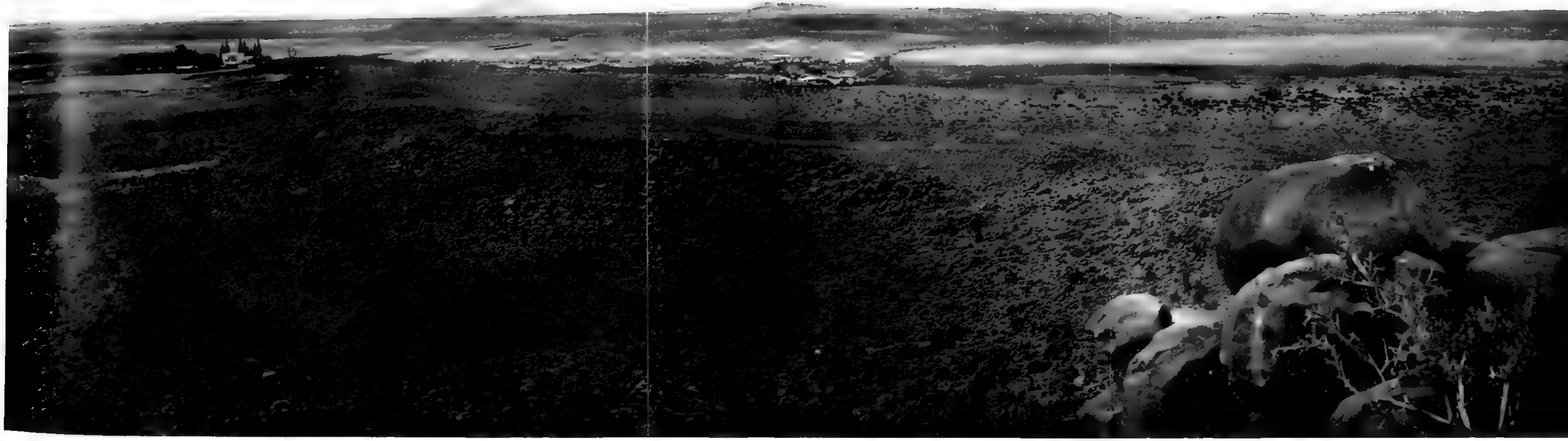

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PANORAMA FROM PAINTED SHELTER.

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9. *Klip Kop Cave, Hermanus.*—By A. J. H. Goodwin, M.A., F.R.S.S.A., Senior Lecturer in Ethnology and Archæology, University of Cape Town.

(With Plates LXI, LXII, and 1 Text-figure.)

History.

Klip Kop Cave is situated about half a mile or more from the coast, directly through Hermanus itself. The hill, which is just above the local school, is isolated from the surrounding hills, and has been made into a small nature reserve. The cave is a long shallow opening, about 100 feet long by 80 feet deep, and faces southward. It was cut almost certainly by water action in the Table Mountain Sandstone, and stands about 300 feet above sea-level. It is on the same level as a marked terrace or peneplain which is visible on the surrounding hills, and probably is a remnant of the 300-foot raised beach. This cutting would certainly have been long prehuman.

The first attempt at any sort of scientific excavation of the deposit was undertaken by Mr. James Drury of the South African Museum, and we may draw fully on his report of the cave as he found it in December 1925 (Plate LXI).

At that time the opening was in some places only a few inches above the floor level (see Section C). There were two entrances to the cavern, and these led into a fairly lofty cave seven feet high. The cave had been inhabited, some 40 or 50 years before his visit, by a poor-white or coloured family, and had been divided by them into two rooms, by means of a wall built from front to back of the cavern between the two entrances. The cave wall had also been colourwashed by these folk. This family must have cleared out nearly all the rear portion of the original deposit to make the rooms more lofty. They did, however, leave the front portion of the deposit untouched. The back of the cave showed marks suggesting that the deposit had at that point been two feet deeper than Drury found it. This is also partly to be accounted for by the removal of some of the material by farmers for guano.

The side and back walls of the cave are smooth vertical joints in the rock, and the roof is similar, consisting of a plane, here and there cracked, but otherwise almost unbroken. At the back of the longest of three natural passages leading into the hill the roof rose to a dome, some 15 to 18 feet high in Drury's time. The floor was quite flat, and here and there shell, etc. from the deposit had been thrown aside to level the floor.

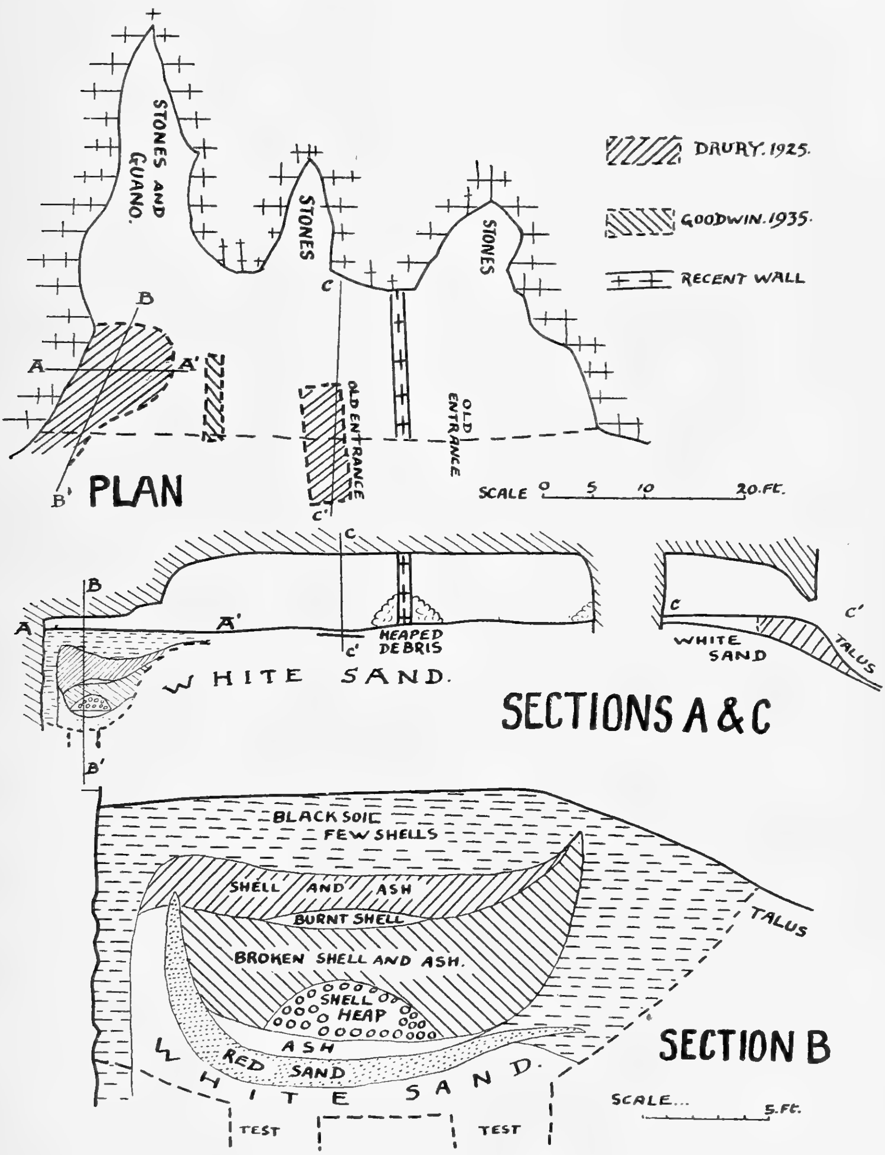
Mr. Drury sank a few test holes in the deposit, and found from these that in most of the cave there was only a few inches of deposit, overlying a deep layer of sand. At the one entrance his natives started a trench to enlarge the entrance and make access easier. The section at the entrance (see plan) was found to consist only of shell, ash and stones, about three feet thick, overlying white sand and stones. Meanwhile he commenced a test at the western end of the cave, and found that the deposit was somewhat thicker. A proper entrance was made from outside, and excavation started.

The natives now cut a deep entrance at the western end, and found that the occupational layer was deeper as it went back into the cave (Section B). The top layer consisted of a very dark sandy soil intermixed with a few shells, stones and animal bones. At its greatest depth, towards the centre of the section, this layer amounted to about three feet. The next layer was not quite so dark, and contained a quantity of crushed and broken shell mixed with stones and a few bones. Below this layer, and almost in the centre of the section, was a band of white burnt shell ash, about three inches thick, and covering a circle about three feet in diameter.

The next layer was not unlike the previous one, but contained more shell, bones and stones. It was in this deposit that almost all the finds of interest were made.

This layer started immediately below the lip of the cave, and dipped steeply to form a bowl-like deposit. In the bottom of this was a mound of loose shells. In this mound was found a lower jaw and fragments of the cranial portion of a skull. The human jaw was in the front part of the mound, and about ten feet from the cave lip. The skull was farther back, and more on top of the mound. Underlying the mound was a band of fire-ash extending over most of the floor of the bowl. In this Mr. Drury found a bored stone, about 15 feet from the entrance of the cave. Under this fire-ash was a layer of red sand which lined the bowl, thickening towards the back of the cave.

A hole was sunk from the bottom of the bowl, and it was found that the underlying floor consisted of soft white sand, similar to that encountered in the higher parts of the cave. No indication of rock was found at a depth of 2 feet. After further excavation in the bowl,



another shaft, 6 feet deep, was sunk with the same result. The white sand was soft and showed hollows, as though water had percolated through the deposit. The test hole was in danger of caving in and was abandoned.

Drury's finds were few. He was surprised to find so little material showing use. Nearly all the more interesting finds came from the bottom of the deposit. There were some half-dozen grindstones, showing little use; flakes and sections of round pebbles; four bone bodkins or arrow-points; a bored stone; and a long, slender, pointed bone from towards the surface immediately under the top black soil towards the cave rear. Animal bones were uncommon. He recognised hippo, eland and some small buck, seal, a few fragments of tortoise-shell, a few albatross and duyker bones, and a single fragment of ostrich egg-shell.

His report ends: "These people must have lived almost entirely upon shellfish, as the quantity of animal matter was exceedingly small for the amount of shell deposit. There were a few pieces of whalebone, and what might have been elephant. Practically all these finds were in the vicinity of the loose shells in the centre of the cave at the lower level.

"The front bank of talus or overflow consisted of shell, stones and ash, and covered the whole width of the cave front right down to the foot of the slope forty feet below. This deposit was up to three feet in depth in places, but thinned to nothing at the bottom.

"I put in four days excavating Section B, which measured roughly 30 feet in length, along the side of the cavern, and 20 feet wide at its greatest width. The greatest depth was 12 feet, and the base of the human deposit was just over 8 feet from the surface.

"This cave has certainly been of interest, as I have never yet found a cave containing so much deposit but so few used tools. It reminds me more of an outside midden deposit than of a cave. The small quantity of animal remains makes me wonder if there was any scarcity of animals at this place, or were they just too lazy to hunt?"

Since 1925 excavation has been carried on by Mr. W. H. Patterson, of Hermanus, who has been in charge of the nature reserve. His work has been carried on slowly through the years, and he has had every opportunity of watching for material in the deposit. All the material he has excavated has been passed through a sieve with ¼-inch mesh, and debris has been removed from the cave, so that all that remains is stratified human deposit, overlying disintegrated sandstone (Plate LXII). This careful removal of useless shell and bone material has made recent work very much more simple. In the course of his excavations Mr. Patterson has discovered a number of useful objects, none of very remarkable value, but all located with certainty.

Mr. Patterson discovered a few human bones, disturbed and in a bad state of preservation. I am led to suspect that these were parts of the same skeleton found in a disturbed state by Drury. This seems to have been the only interment in the cave.

Stone implements, apart from the usual broken and split pebbles used for breaking shellfish, etc., were rare for the size of the cave. There seems little reason to believe that specimens were missed by Mr. Patterson, as the portion of the deposit dug by us was as poor.

In his collection are three grooved stones, all with multiple groovings. One specimen is conical, and shows fine regular bead-groovings. All seem to have been bead stones. Three oblong rectangular "palettes" of slate, probably 4 or 5 inches long when intact, were found. All are broken. One measures 2 inches across, the other two measure $2\frac{1}{2}$ inches across. Judging from our knowledge of the present Bushmen, these are very probably shovels used to remove earth from edible roots. A fourth palette is intact, and is of interest, as one end has been tapered slightly by crude chipping on the edge of the slate to form a bat-like shovel or scraper, the thinned end forming the handle.

In addition to the bored stone found by Drury, Patterson found three other specimens. Two are flattened ovates, the third is a true ovate, the boring being through the greatest length. With these is a long bored-stone rimer. It is of rough *coup-de-poing* form, and shows signs of usage towards the point. (A similar specimen from a cave above Wellington is in the Stellenbosch University collection.) A few nondescript flakes, probably chance spalls from pebbles and hammer stones, make up the total of stone implements.

Bone material is present. A bone tube, made from a suitable section of bone, measures $2\frac{1}{2}$ inches long by $\frac{1}{2}$-inch in diameter. With this is an ivory tube, 4 inches long, down which a $\frac{3}{16}$-inch hole has been bored, apparently with a hot metal rod, a technique inviting considerable speculation. Four bone arrow-points, a bone awl and a few fragments of used bone complete the collection.

In addition Mr. Patterson noted the following raw material—two hippo tusks, a few balls of soft white clay containing no sand grains, possibly kaolin from a disintegrated granite deposit, or perhaps a sedimentary white clay from shale deposits. Among the faunal material are several lower jaws of porcupine. The remainder of the bones suggest small buck, sea-birds, etc.

Present Excavation.

The present excavation was carried out at the invitation of the Bureau of Archæology, University of the Witwatersrand. Mr. A. J. H. Goodwin was approached, and he and Dr. K. H. Barnard of the South African Museum undertook to excavate and analyse the midden deposit. The cave was visited on Monday, November 18, and excavation was carried on until Wednesday, November 20, 1935.

A section of midden, measuring about 6 feet by 4 feet in length and breadth by 6 feet in depth, had been left standing by Mr. Patterson (Plate LXII). The faces were examined and measurements taken, and it was realised that the standing section was contiguous to Drury's original section, the N.E. corner of Drury's trench coinciding with the S.W. corner of the standing portion. It was therefore thought advisable to start work on the eastern face of this section. A section, 2 feet wide, was dug from front to back, following the steeply falling layers of midden. In order to follow the stratification the section was dug in such a manner that the depth of each layer was 9 inches at the forward end of the section, rising to nothing at the back. The depths given therefore refer to the front of the section.

All material was passed over two sieves, the upper with $\frac{1}{2}$-inch mesh, the lower with $\frac{1}{8}$-inch mesh.

0–8 inches. Two fragments of crude circular scrapers, one 2 inches in diameter of sandstone, the other $1\frac{1}{2}$-inch in diameter of quartz. One unworked quartz crystal, 2 unworked surface quartzite flakes, one bead. Fish.

8–16 inches. Core-like fragment of surface quartzite, one double crescent, 6 untrimmed stone flakes, 2 fragments of red ochre, 20 ostrich egg-shell beads, a few fragments of egg-shell, some chips of crystal, a single shell crescent, upper and lower jaws of one or two small buck. Fish.

16–24 inches. Five shell crescents, 3 fragments of ochre, 5 ostrich egg-shell beads, a few fragments of egg-shell. Fish.

24–32 inches. Four shell crescents, 6 unworked flakes, a Wilton core, crystals, ochres, 3 small shells (? Nassa), possibly bored. Three ostrich egg-shell beads. Fish.

32–40 inches. One bone arrow-point. Three flakes. Crystal. Ochre. Two beads. One bored fish-shell. Fish.

The whole section overlay wind-blown sand, which was completely sterile. This had heaped up towards the rear of the cave, and overlay white sand, mixed with disintegrating fragments of Table Mountain

Sandstone, showing that this was the original floor of the cave, which had disintegrated very considerably. The forward portion of the shell deposit lay directly upon this sandstone. Following Drury's observations, it was deemed unnecessary to dig farther into this layer.

The absence of Middle Stone Age implements in this cave is peculiar, as Dr. W. E. Hardy of Cape Town has found Middle Stone Age implements a little behind the Klip Kop. These are of Table Mountain Sandstone, wind-worn, and badly made. They suggest a rather crude Mossel Bay type. The evidence is thus sufficient to show that the region was inhabited during Middle Stone Age times.

Shell Content.

Dr. K. H. Barnard very kindly accompanied me on the excavation and kept a careful note of the species and general quantities of shells discovered in the various layers. There is no marked difference in the types of shell throughout the deposit. What isolated forms occur are noted. It is important to realise that no exact ratio between the shells was possible to ascertain, as most of the shell material was considerably broken. The shells have therefore been given a rough ratio:—

Mollusca—

Gasteropods:

Patella cochlear	moderately abundant.
,, *patriacha*	abundant.
,, *barbara* (*plicata*)	very abundant.
,, *oculus*	a few.
,, *umbella*	one.
,, *longicosta*	moderately abundant.
,, *argenvillei*	very abundant.
Turbo cidaris	abundant.
,, *sarmaticus*	very abundant.
Oxystele merula	abundant.
Nassa kraussiana	a few.
Bullia laevissima	a few.
,, *rhodostoma*	a few.
Burnupena cincta (olim. *Cominella porcata*)	
,, *limbosa*	abundant.
,, *lagenaria*	
Purpura squamosa	two.
,, *cingulata*	two.

Mollusca (*continued*)—

Gasteropods:

Turritella knysnaensis . . .	a few.
Haliotis midae	abundant.
,, *sanguinea* . . .	moderately abundant.

Lamellibranchs:

Mytilus edulis (*meridionalis*) . .	very abundant.
Donax serra	moderately abundant.
Ostrea sp.	

The following are probably all adventitious, having been brought into the cave attached to larger shells like *Haliotis* and *Patella*:—

Patella spp. juveniles, *Helcion pectinatus* (one), *Mytilus crenatus* (one), *Gibbula* spp., apical whorls of *Vermetus*, and *Crepidula hepatica*, the last-mentioned being fairly abundant. Coral (one). *Pulmonate* (land snail), *Trachycystis tollinii* (six), probably wandered in from the surrounding bush, not collected by humans. (Layers 8–16 and 16–24 inches.)

Crustacea.	Barnacles	abundant.
Vertebrates.	Fishes of genera *Dentex*, *Pagrus*, *Sparus*, *Diplodus*, etc. (all belonging to the family *Sparidæ*)	abundant.
	Tortoise	fairly abundant.
	Shrew (Insectivore) . . .	a few.
	Vlei-mouse	a few.
	Hyrax	a few.
	Small buck	a few, upper and lower jaws.
Inorganic.	Pisolites. Concretions from the recent Limestone, 2 in layer 24–32 inches.	

Conclusions.

1. Klip Kop Cave has been inhabited by a people with a single mode of life. No change in the culture, climate or food habits throughout the period of occupation was observed.

2. The culture is typified by the eating of shellfish, the catching of fish, the use of bone awls and points similar to arrow-points used by the living Bushmen; the making of stone crescents, shell crescents, ostrich egg-shell beads, bored stones, slate "palettes"; the use of ochres, white clays, etc., and is also marked by the complete absence of pottery.

3. The great bulk of the used stones found have been broken in use rather than to any plan. They consist of chipped and split sea pebbles.

4. The fish enumerated show no change in the temperature of the sea-water during the period of occupation; nor do they present any species extinct or unusual in these waters.

My thanks are due to Mr. James Drury for the use of his photographs and manuscript; to Mr. W. H. Patterson for allowing me to make full use of the material excavated from this cave by him; to Dr. K. H. Barnard for the valuable list of shells and bones compiled by him; to the Commission for the Preservation of Natural and Historical Monuments, Relics and Antiques for a grant towards the excavation of the cave; and to the Municipality of Hermanus for permission to excavate.

EXPLANATION OF PLATES.

Plate LXI.

1. View outside the Cave, 1925 (Photo, J. Drury).
2. Mouth of the Cave when excavated by Mr. Drury (Photo, J. Drury, 1925).

Plate LXII.

Interior of the Cave after excavation by Mr. Patterson, showing section of original midden (Photos, A. J. H. Goodwin, 1935).

Fig. 1.

Fig. 2.

Goodwin. Neill & Co., Ltd.

Goodwin. Neill & Co., Ltd.

10. *South African Native Snuff-Boxes.*

By Miss M. Shaw, B.A., Assistant in Ethnology.

(Plates LXIII–LXXV.)

The following supplement to my previous paper (Ann. S. Afr. Mus., vol. xxiv, p. 141) has been added for the purpose of describing a very outstanding collection of over a hundred South African native snuff-boxes which belong to Mr. R. C. Camp, of Plumstead, Cape Province. As post-rider, and later as campaigner, Mr. Camp has had great opportunities, extending over a period of forty years, for making his collection.

A few newly acquired specimens in the South African Museum Collection have been added to the list.

Technological Notes.

1. In all cases a polish is produced by frequent handling and rubbing, by occasional deliberate and more frequent accidental application of fat or grease, and sometimes by rubbing with fine clay.

2. *Gourds.*—To hollow out a ripe gourd a small hole is made at the end where the stalk has been, as much of the flesh as can be reached is taken out with a piece of wire, and the cavity is filled with water to help rot the remainder of the flesh. The gourd is hung up, and from time to time is shaken vigorously to loosen the rotting flesh, which finally comes away quite cleanly from the rind, and can be shaken out through the hole, leaving the hollow shell, which is then dried. In small gourds, those generally used for snuff-boxes, the majority of the flesh can be scraped out with the wire, and the remainder is cleaned out by putting in stones and water and shaking them about.*

3. *Tough-shelled fruits* such as Strychnos are treated and used in a similar manner to the gourds.

4. *Nut-shells* have the flesh scraped out with an awl through a small opening.

* Mr. F. Cornner of St. Cuthbert's, Tsolo.

5. *Moth cocoons* are prepared by cutting off one end and removing the grub, and fitting the end with a small stopper. They harden with use.

6. *Bone.*—

a. A shin bone from which the marrow has been removed is usually chosen for snuff-boxes. The original shape is generally kept, but the surface may be scraped down with a knife or spear-blade to form a rim.

b. A solid piece of bone is carved to the desired shape with a knife or spear-blade, and hollowed out with an awl.*

c. Pieces of bone are carved into snuff-spoons.

7. *Horn.*—The original outer surface of the horn is seldom left untouched, but usually scraped down with a knife and polished.

a. The natural hollow of the horn, after the removal of the soft matter, is used as a container, with the solid tip frequently carved to a conventional or naturalistic shape.

a, 1. In this case the bottom may have to be filled in, and wood, calabash, or horn is used. A fairly thick disc is cut to fit exactly, forced in, and held with brass, copper, or iron tacks, or wooden or horn pegs, rubbed flush with the sides, and varying in number from two upwards. Holes of the necessary size are first made in the horn with an awl for the tacks or pegs to be hammered in.

a, 2. In some cases both ends of the horn are cut off and have to be filled in as described above.

b. A solid piece of horn is chosen for the snuff-box and carved to the desired shape with a knife or spear-blade. The hollow is gouged out with an awl.*

c. Pieces of horn are carved into snuff-spoons.

8. *Bamboo.*—A suitable length of bamboo is cut and the ends are filled in with discs of gourd rind. At one end the disc is cut to fit exactly and remains immovable, and at the other it forms a movable lid.

9. *Wood* is carved with a knife or spear-blade. The boxes are cut out of a single piece without joins. The hollowing is done with an awl or gouge of some sort, frequently made red-hot to burn out the hollow. Sometimes a central column is burnt from which to work outwards.

a. In some cases a hole is made in a convenient place in the wall of the box to assist in the hollowing. This is filled in later

* Casalis, The Basuto, p. 140.

with a round of calabash rind or of wood, cut to fit exactly and forced in.

b. To make small holes in wood, a red-hot awl can be passed through, burning a passage as it goes.

10. *Stoppers* are made of—

a, 1. A round disc of gourd rind cut to fit the hole.

2. The same, with a thong knotted through a hole in the centre to attach it to the neck of the box.

b, 1. A wad of rag wound into a roll and sewn with cotton.

2. The same, decorated on top with beads.

c. A piece of hide.

1. The stopper is carved out of a thick piece of hide.

2. A piece of leather is rolled and sewn down one side or on top, with sinew.

d. Wood is carved to various shapes.

e. Bone is carved to various shapes.

f. Horn is carved to various shapes.

11. As an alternative to fitting a wooden bottom in bone or horn snuff-boxes, a piece of skin is thoroughly wetted, placed over the hole and bound down with string to reach a certain distance up the side. When dry the string is removed and the skin remains fixed firmly to the box.

a. The same method is used to make a cap, instead of having a stopper. By putting a little grease under the skin before binding, and by removing the string and easing the cap while it is setting, it can be kept movable.

b. The same method is used for the strengthening bands of skin which are often placed round the mouth or the neck of a snuff-box to prevent splitting, or as a mend after splitting has occurred, or simply as a decoration. In this case a jointless ring is cut either from the tail skin or a narrow leg skin, drawn over while wet, and moulded into position while it sets and contracts.

12. *Carving.*—A sharp knife or spear-blade is used to carve conventional or naturalistic forms on wood and horn.

13. *Branding* is done with a red-hot iron.

1. The pattern is first outlined with a sharp point and then filled in with branding.

2. The outline is branded and then filled in with branding.

3. The required surface is branded without any preliminary outlines.

4. A sharp point is heated to make branded punching, cross-hatching, and other types of fine line decoration.

14. *Incising* is done with a sharp point, usually iron.

a. On materials where it does not show up sufficiently it is rubbed with some black substance, generally charcoal and fat mixed to a paste, which sticks in the incisions and shows up the pattern.

15. *Wire* is used as a decoration—

a. By insertion into gourd shells. Holes are made with an iron point the same diameter as the wire to be used, which is generally brass or copper. Short pieces of wire are inserted at each end into the holes, close together to form a motif, frequently a diamond or triangle. The ends are left unfinished inside as the aperture in the gourd is generally too small for the maker to be able to fasten them in any way.

b. By sewing, on leather straps; the holes are bored with an awl and the wire is passed through.

c. By twining, round objects of any material, particularly round projecting portions, to form a band of varying depth.

d. By winding simply, to form a band round objects.

e. Several strands of wire are plaited to form a ring round the object.

16. *Lead* can be inlaid by carving the required pattern on the object to be decorated and pouring molten lead into it. If it is to be used as a repair a corresponding hollow is carved on each side of the crack and the lead poured in. It is generally seen on pipes.*

17. *Beads* are inserted into the skin of a gourd by making tiny holes in it while it is yet soft, and inserting the beads, which are fixed in quite firmly as the gourd dries.†

18. Two parallel rows of holes are bored in a gourd shell. A length of thread is passed through one of the end holes, from the inside, and sufficient *beads* are threaded on it to cover the distance to the corresponding hole in the next row. The thread is passed through and down inside the gourd to come out again through the next hole of the commencing row, when more beads are threaded on it, and so on.

19. *Beadwork over Gourds.*—The work commences at the top or

* Fleming, Southern Africa, pp. 202–203.

† Junod, Life of a South African Tribe, vol. ii, pp. 132–133.

bottom of the gourd, and is taken down or up, increasing and decreasing to fit the gourd exactly.

1. *Diamond Network.*—When finished the work gives the effect of a series of interlocking diamonds. The points of the diamonds are one or sometimes two beads, placed with their bores vertical. They are connected by one or more beads which have their bores diagonal left and right. Two sinew threads pass through the points, dividing for the sides, and joining again at opposite vertical points. Sometimes the diamonds are distorted by two of the sides having one bead and two having two.
2. *Diamond-strung Rows.*—The stringing is exactly the same as above, but only the points of the diamonds are there, which gives the effect of horizontal rows of beads, opposite in each alternate row. All the beads have their bores vertical. In this type the colour arrangement determines whether the diagonal or horizontal aspect shows up.
3. *Wound Rows*—
    a. On straight objects like bottles or bamboos the beads are strung in rows with their bores horizontal. On first sight it appears as if the beads were wound round the box on a long string and then had a thread run down at one point to hold them together. Actually, as each coil is completed the string is passed through the first bead of the coil for a second time, and then the beads of the next coil are threaded on. To keep the line vertical the string can sometimes be taken forward and sometimes backward.

    b. Similar to the above in every respect, but that each coil, instead of being attached by the thread to the preceding one, is sewn to a single vertical thread, which passes down the box.
4. *Hanging Rows.*—The same type as above, modified for use on gourds, which are curved, so that one support only would not hold the beads up. Several strands of sinew, from three upwards, are stretched tightly down the sides, attached at the top to a single coil of beads and at the bottom to each other, to a single bead, to a ring of beads, or to a wad of cloth. The stringing commences horizontally, and each time a vertical string is reached the horizontal string is passed once round it before putting on the next bead. More often than

not the colour pattern is based on this arrangement, by changing the colour each time a vertical strand is met.

20. *Bands of metal* are fastened in the following manner. A hole is bored through each end, and when the band is in position a short piece of thick wire—brass, copper, or iron—is passed through the holes, and the ends are bent once and hooked round each other.

21. "*Blood and Clay*" *Technique.*—When cleaning a fresh skin (usually that of an ox) the blood and remaining tissues that are scraped off are mixed with ochre or powdered clay, and a little more blood added to form a stiff paste. A clay model of the desired shape has been prepared and baked in the sun. The paste is spread over this and given any further modelling that is desired (ears, tails, eyes, etc.), and when nearly dry a rough nap is pricked up with an awl. When quite dry a round hole is cut for the opening, and through it the clay model is picked out.* This is a dying art.†

22. *Brass, copper,* or *iron hoops* are inserted in the side of a box to secure the strap. Two holes, exactly the same diameter as the wire, are bored with an awl, at about $\frac{3}{4}$ inch distance, and both ends of a short piece of thick wire (about $\frac{1}{16}$-inch diameter) are inserted in the holes.

23. A single hole or two holes are bored in the side of a snuff-box for a leather strap to pass through. The holes are usually near the mouth, so that the thong can be passed through from both sides, the ends knotted at the mouth, and then pulled up inside.

24. *Straps.*—Materials used—

1. Plain thin thong.
2. Plain flat piece of leather of varying width and thickness ($\frac{1}{64}$ inch to $\frac{1}{8}$ inch).
3. Two-ply-twisted cord, *i.e.* two thin thongs twisted together.
4. Three thongs plaited together—generally for bands.
5. Beads strung on sinew or, less frequently, cotton:
   a. single; *b.* two single; *c.* double (two twisted together); *d.* treble (three plaited together).
6. Cloth—a single strand or a two-ply twist.
7. Strands of wire, twisted or coiled to make a loop.

Attachment—

A. End passed through a hole and knotted.
B. End passed through a hole and a bead and knotted.
C. Both ends passed through the same hole and knotted inside.

* Fleming, Southern Africa, pp. 204–205.

† Mr. F. Cornner.

D. Both ends passed through the same bead, tightly enough to hold.

E. Ends knotted together.

F. Ends plaited together by threading one through holes in the other.

G. Ends plaited together by threading each through holes in the other.

H. In the case of two-ply cord, the single thong is passed through a loop or hoop as far as its centre, before making the twist.

I. In the case of bead cords they are generally fastened to the other beadwork, either (1) direct; (2) through a white porcelain or brass button; or (3) through a large bead, generally of outstanding colour.

J. Ends sewn with sinew.

K. Ends passed and held down under a band of metal.

L. Ends passed and held under a band of leather.

M. A band of leather passed through slits in the ends.

(The figures T. 1, etc., beside each description refer to the paragraphs in the Technological Notes.)

Zulu.

There are twelve snuff-boxes from the Natal-Pondoland border and Zululand, of which five typical examples are illustrated on Plate LXIII. They are all made of gourds, but with three forms of ornamentation—branding, beadwork, and wirework.

Of the first there are two. One is a bottle-necked gourd, decorated with four rings of incised and branded triangles, and having a wooden stopper, and a leather strap to attach it to the waistband. The other (fig. 6) is a plain round gourd, reddish brown and highly polished, with a design like a spider web on one side. It has a round of gourd rind as a stopper. (T. 1, 2, $10_{(a1)}$, $13_{(1)}$.)

Height, $2\frac{9}{16}$ inches.

Greatest diameter, $3\frac{3}{8}$ inches.

Diameter of stopper, $\frac{3}{8}$ inch.

Of the second there are three, all bottle-necked gourds covered with a network of beads and practically identical with fig. 1, Plate XXIV, of the previous article. (T. 2, $19_{(1)}$, $24_{(5b \text{ and } H)}$.)

All the others are decorated with conventional designs in brass and copper wire. Tiny holes are bored in the rind in the required pattern, and short pieces of wire are inserted, each end in a hole. They are not turned over or fastened off in any way inside. The majority are plain round gourds, but two are bottle-necked.

(T. 1, 2, $10_{(a1)}$, $15_{(a)}$.)

Fig. 5 is a dark brown gourd decorated with triangular motifs in a spiral arrangement, alternately of brass and of copper wire. A round of gourd rind serves as a stopper.

Height, $3\frac{7}{8}$ inches.

Diameter of lower bowl, $2\frac{7}{16}$ inches.

Diameter of upper bowl, $1\frac{3}{4}$ inch.

Diameter of stopper, $\frac{3}{8}$ inch.

Fig. 2 is a dark brown leathery gourd, with four long diamonds, half of brass and half copper wire, arranged alternately. It has a gourd rind stopper.

Height, 3 inches.

Diameter of bowl, $2\frac{15}{16}$ inches.

Diameter of stopper, $\frac{1}{2}$ inch by $\frac{7}{16}$ inch.

Fig. 3 is a reddish brown gourd with a triangle design placed between two horizontal bands. Again copper and brass are used alternately. The stopper is missing.

Height, $2\frac{9}{16}$ inches.

Diameter of bowl, $2\frac{5}{8}$ inches.

Diameter of mouth, $\frac{3}{8}$ inch.

Fig. 4 is a dark brown gourd with a lumpy surface to the skin. The triangle design is of brass and copper wire alternately. The stopper is missing.

Height, 3 inches.

Diameter, $4\frac{1}{4}$ inches.

Fig. 1 (S.A.M., $5480_{(1)}$) is a dark brown gourd decorated with brass wire. Four sets of concentric rings are placed between bands top and bottom. The stopper is missing.

Height, $3\frac{7}{8}$ inches.

Diameter, $3\frac{1}{2}$ inches.

Transkei.

A very fine example from Pondoland (Plate LXIV, fig. 7) is a highly polished light brown bottle gourd, decorated extensively with brass wire, in the same manner as the Zulu snuff-boxes. On the nozzle of the upper bowl the wire is twined. The gourd has broken off at the neck and has been mended by boring a series of holes each side of the crack, through which to pass twisted fibre, which is knotted at each hole and passed twice round the neck. It also holds in position the leather strap, which is passed under it at each side and held by a yellow glass bead. The mouth is reinforced with a band of skin, put on wet, and has a very small leather stopper. There is a small hole in the base filled with a round of calabash. It has been suggested that this was used to fill the snuff-box, as it is considerably larger than the mouth and would be quicker to work with.

(T. 1, 2, $10_{(c2)}$, $11_{(b)}$, $15_{(a \text{ and } c)}$, $24_{(2 \text{ and } B)}$.)

Height, $6\frac{1}{2}$ inches.

Diameter of lower bowl, $2\frac{3}{4}$ inches.

Diameter of upper bowl, $1\frac{3}{4}$ inches.

Diameter of mouth, $\frac{9}{16}$ inch.

Diameter of stopper, $\frac{3}{16}$ inch.

Of the remaining eight examples from the Transkei, six are illustrated on Plate LXIV.

Fig. 1, from Butterworth, is made out of light-coloured, hard, fine-grained wood, and is cut so that the grain shows very prettily on one side. It is oval in horizontal section. Two holes are bored in one side for the passage of a short hide loop, which still has the hairs on. The wooden stopper is mushroom-shaped.

(T. 9, $9_{(b)}$, $10_{(d)}$, 23, $24_{(1 \text{ and } A)}$.)

Height, $2\frac{5}{8}$ inches.

Diameters of bowl, $1\frac{11}{16}$ inch by $1\frac{3}{4}$ inch.

Diameter of stopper, $\frac{7}{16}$ inch.

Depth of stopper visible, $\frac{1}{4}$ inch.

Fig. 2, from Butterworth, is the top portion of a light-coloured bottle-necked gourd, which has probably broken off at the neck and been converted thus. The hole at the base has been filled in with a round of gourd rind, and a similar piece acts as a stopper for the mouth. Two holes are bored in one side and a short leather strap is passed through. (T. 1, 2, $7_{(a1)}$, $10_{(a1)}$, 23, $24_{(1 \text{ and } A)}$.)

Height, $2\frac{13}{16}$ inches.

Diameter, $1\frac{9}{16}$ inch.

Fig. 3, from Tembuland, is made of horn, light brownish in colour, with patches of darker brown and of grey. The base is filled in with a round of wood held in place by tiny copper tacks. The stopper is cut out of a thick piece of hide. A two-ply twisted leather cord is attached to a double leather band round the neck.

(T. $7_{(a)}$, $7_{(a1)}$, $10_{(c1)}$, 12, $24_{(1, 3, \text{ and } E)}$.)

Height, $5\frac{1}{2}$ inches.

Diameter of base, $1\frac{13}{16}$ inch.

Diameter of mouth, $\frac{7}{16}$ inch.

Greatest diameter of stopper, $\frac{3}{8}$ inch.

Fig. 4 is an example of the "blood and clay" snuff-boxes described on p. 148 of the previous article (Ann. S.A.M., xxiv, 3). It is a well-worn specimen, khaki-coloured, and made in the shape of a ram. It has a wooden stopper in the opening in the head.

(T. $10_{(d)}$, 21.)

Total length, $4\frac{1}{2}$ inches.

Greatest height, $2\frac{5}{8}$ inches.

Greatest width, $1\frac{11}{16}$ inch.

Total length of stopper, $\frac{9}{16}$ inch.

Diameters of stopper, $\frac{9}{16}$ by $\frac{7}{16}$ inch.

Fig. 5, from Kingwilliamstown, is made of greyish horn, with two white rings at the base and a white streak down one side. The base is filled in with a very thick convex piece of brown wood, held in by a few small horn pegs. It has a leather stopper, attached by a thong to the plain leather strap which is fastened round the neck.

(T. $7_{(a\text{ and }a1)}$, $10_{(c2)}$, 12, $24_{(1,\,2,\text{ and E})}$.)

Total height, $5\frac{3}{8}$ inches.

Length over outer curve, $6\frac{1}{2}$ inches.

Depth of wooden base, $\frac{1}{2}$ inch.

Diameters of wooden base, $1\frac{5}{8}$ inch by $1\frac{7}{8}$ inch.

Length of stopper visible, $\frac{5}{16}$ inch.

Diameter of stopper, $\frac{1}{4}$ inch.

Fig. 6 is an insect powder tin, decorated with twined zinc and copper wire in alternate bands. It belonged to a Fingo.

(T. $15_{(c)}$.)

Height, $2\frac{7}{16}$ inches.

Diameter, $1\frac{3}{8}$ inch.

Plate LXV illustrates some recently acquired specimens in the Museum collection, from the Pondomisi, of Tsolo District, Transkei.

Fig. 1 (S.A.M., 5557) is the lower part of a necklet. Four bead-work flaps are suspended from a beaded cloth necklet, which is fastened by a white bead loop over a conical brass button. The flaps are white, with sky-blue edging, and a double vertical row of continuous diamonds outlined in sky-blue down the centre. One flap is considerably larger than the others, and has on its lower edge three small flaps of alternate rows of white and sky-blue beads. To each of these flaps is attached a round snuff-tin, bearing the head of King George V. The tins are purchased at the trading stores, and are used either for snuff or to hold the little paper receipts given to the natives by traders for grain brought to the store, and which entitle them to the same value of articles from the store. (T. $19_{(2)}$.)

Length of flap (including small flaps), $9\frac{7}{8}$ inches.

Width of flap, $3\frac{1}{8}$ inches.

Diameter of tins, $1\frac{3}{8}$ inch.

Depth of tins, $\frac{3}{4}$ inch.

Fig. 2 (S.A.M., 5495) is a small round gourd entirely covered with china-blue and white beads ($\frac{1}{8}$ inch), arranged in alternate rectangles and triangles, with a little knob at the base. The beads are strung on sinew and hang loosely between vertical strands of sinew, to which they are attached at each change of colour. Round the mouth is a tiny vandyked frill of blue and white beads, with white-centred red at the upper points. The top of the cloth stopper is beaded in alternate rows of blue and white. There is a short handle of two strands of beads, one blue and one white, twisted together and attached on each side just below the frill.

(T. 2, $10_{(b2)}$, $19_{(4)}$, $24_{(5c \text{ and } I1)}$.)

Height, $2\frac{3}{8}$ inches.

Diameter of bowl, $2\frac{3}{16}$ inches.

Diameter of stopper, $\frac{5}{8}$ inch.

Depth of stopper visible, $\frac{5}{16}$ inch.

Fig. 3 (S.A.M., 5558) is a white glass bottle covered with black cloth, over which alternate rows of sky-blue and white beads are wound. Round the edge of the base is a frill of loops—white in the centre, with white, dark blue, red, dark blue, and white beads top and bottom. The bottle is attached to a short necklet of three strands of sky-blue and white beads, in alternate pairs, plaited and fastened at one end to the top row of the beading, and at the other by a white porcelain button through a white bead loop. The stopper is missing.

(T. $19_{(3a)}$, $24_{(5d \text{ and } I\,1 \text{ and } 2)}$.)

Height, $3\frac{1}{2}$ inches, plus $\frac{7}{8}$-inch fringe.

Diameter of bowl, $1\frac{1}{16}$ inch.

Diameter of bottle neck, $\frac{5}{8}$ inch.

Fig. 5 (S.A.M., 5509) shows a light-coloured horn snuff-spoon (slightly shortened to fit the plate). The handle is semi-circular in horizontal section, the flat portion being in front. It is decorated on the back with incised cross-hatching, filled in with black. The bowl is set at a slightly obtuse angle, is widely oval and rather flat. The tip of the handle is black. (T. $7_{(c)}$, $14_{(a)}$.)

Length of handle, $15\frac{1}{2}$ inches.

Width of handle, $\frac{1}{4}$ inch.

Length of bowl, 1 inch.
Width of bowl, $\frac{3}{4}$ inch.
Outer depth of bowl, $\frac{1}{4}$ inch.

Fig. 6 (S.A.M., 5514) is a light-coloured horn spoon, the handle of which is entirely covered with rows of china-blue and white beads, arranged more or less in alternate pairs of rows. In the centre are two groups of three rows—dark blue between two white-centred red. The leaf-shaped bowl is curved at an obtuse angle. A hole is bored through the projecting horn tip of the handle for a double stranded loop of alternate china-blue and white beads.

(T. $7_{(c)}$, $19_{(3a)}$, $24_{(5b)}$.)

Length of handle, $10\frac{1}{4}$ inches.
Length of bowl, 1 inch.
Length of loop, $2\frac{3}{4}$ inches.

Basuto.

Of fourteen snuff-boxes from Basutoland two are bottle-necked gourds, and the remainder carved of horn in various shapes. Typical examples are shown at Plates LXVI and LXVII.

Plate LXVII, fig. 1, comes from the Maluti Mountains. It is a light-coloured highly polished gourd with a design of punched dots, made with a red-hot iron point. It has a wooden stopper carved to hour-glass shape, and a plain thong strap fastened round the neck.

(T. 1, 2, $13_{(4)}$, $24_{(2 \text{ and } D)}$.)

Height, $4\frac{5}{8}$ inches.
Diameter of lower bowl, $2\frac{15}{16}$ inches.
Diameter of upper bowl, $1\frac{13}{16}$ inch.
Diameter of stopper, $\frac{13}{32}$ inch.

The other gourd snuff-box is decorated with a branded conventional design of diamonds and triangles, and has a similar stopper.

Of the horn snuff-boxes the most outstanding are fig. 3, Plate LXVI, and fig. 3, Plate LXVII. Each is carved from a single horn.

Fig. 3, Plate LXVI, is carved out of dark greeny-brown horn, and highly polished. Its ornamental value far exceeds its utility. The actual container is a conventionalised human head, with white bone eyes. The head is hollowed from the opening at the top, and has not a very great capacity. It is set on a long neck and shoulders, from which extend two long curved prongs by which it was probably stuck through the hair or the belt. (They are slightly shortened in the illustration to fit the plate.) (T. $7_{(b)}$, $10_{(e)}$, 12.)

Length of head, $1\frac{1}{16}$ inch.

Width ear to ear, $1\frac{1}{4}$ inch.

Diameter of stopper, $\frac{5}{8}$ inch.

Length of neck, $1\frac{9}{16}$ inch.

Length of prongs, $11\frac{3}{4}$ inches.

Width across prongs, $\frac{3}{4}$ inch.

Fig. 3*a* is a front view of the same snuff-box.

Fig. 3, Plate LXVII, is the same type, but is plainer, and the container holds more snuff. It is made of light-coloured horn, with a few dark brown streaks in it and not very highly polished. It has an hour-glass-shaped wooden stopper, with a hole through the waist, probably meant for a strap. (T. $7_{(b)}$, $10_{(d)}$, 12.)

Total length, $21\frac{1}{2}$ inches.

Length of container, 4 inches (neck, $1\frac{1}{16}$ inch).

Diameter of bowl, $1\frac{1}{4}$ inch.

Diameter of mouth, $\frac{11}{16}$ inch.

Length of stopper visible, $1\frac{5}{8}$ inch.

Greatest width across prongs, $1\frac{1}{4}$ inch.

(It is drawn to half the scale of the others, as it was too long for the plate.)

Plate LXVI, fig. 1, shows a highly polished double snuff-box, carved out of the solid part of a black horn to an hour-glass shape. The hollow does not go right through the centre. One bowl contains snuff and the other lead shot. The mushroom-shaped stoppers are of the same black horn. The box is suspended from a necklet of black porcelain beads, with large blue- or pink-centred white spots, and two red glass beads with the same spots, threaded on a thong which passes round the centre of the snuff-box and is held with a plain black porcelain bead. The beads do not cover the whole thing, which is plain at the back and has slits at the ends to fasten.

(T. $7_{(b)}$, $10_{(f)}$, $24_{(1\text{ and }G)}$.)

Length of left-hand bowl, $1\frac{7}{8}$ inch; of right-hand bowl, $1\frac{13}{16}$ inch.

Diameter of bowls, 1 inch.

Depth of stopper visible in both, $\frac{1}{4}$ inch.

Diameter of stoppers, $\frac{7}{16}$ inch.

Diameter of waist, $\frac{1}{2}$ inch.

Beads: length, $\frac{7}{16}$ inch; average diameter, $\frac{3}{8}$ inch.

Plate LXVII, fig. 4, shows a snuff-box hollowed out of the solid part of a light-coloured horn, with quite thin walls, so that it is slightly translucent. There is a small flat rim round the mouth. The leather stopper has a ring of double-plaited leather at its base, and a loop of copper wire coiled on a copper wire foundation passed through the centre. (T. $7_{(b)}$, $10_{(c2)}$, $24_{(4 \text{ and } 7)}$.)

Length, $3\frac{1}{2}$ inches.
Greatest diameter, $1\frac{1}{16}$ inch.
Diameter of mouth, $\frac{3}{8}$ inch.
Height of stopper visible, $\frac{7}{16}$ inch.
Length of wire loop, $\frac{3}{4}$ inch.

Plate LXVI, fig. 4, is a light brown horn snuff-box, with patches of dark brown. It is carved to imitate a winged fruit, with a long nozzle with flanging lip at the fore end, and a ring for a thong at the base of the bowl (to hang upside down). The wooden stopper has a large hole through the centre, and through it a copper ring. (T. $7_{(b)}$, $10_{(d)}$, 12, $24_{(7)}$.)

Height, $4\frac{13}{16}$ inches.
Greatest width of bowl, $1\frac{3}{8}$ inch.
Diameter of mouth, $\frac{1}{2}$ inch.

These five last described snuff-boxes are carved out of the solid part of the horn, and have their cavities artificially produced by the maker. The two next to be described make use of the natural cavity of the horn after the soft matter has been removed.

Plate LXVI, fig. 2, is a dark greeny-black polished horn snuff-box, the top of which is carved to represent an antelope, with an opening in the mouth fitted with a leather stopper. The base is oval, and is filled in with a disc of wood, held by four brass tacks. One of the horns has apparently cracked and has been mended with a piece of skin wetted before binding on, so as to look as if jointless. A thong is knotted round the neck and looped. (T. 1, $7_{(a \text{ and } a1)}$, $10_{(c2)}$, $11_{(b)}$, 12, $24_{(2 \text{ and } E)}$.)

Height, $6\frac{1}{4}$ inches.
Length over outer curve, $8\frac{1}{8}$ inches.
Diameters of base, $1\frac{3}{8}$ inch by $2\frac{3}{4}$ inches.
Diameters of mouth, $\frac{7}{16}$ inch by $\frac{1}{2}$ inch.
Total length of head and horns, $3\frac{1}{2}$ inches.
Width across horns, $\frac{5}{8}$ inch.

Plate LXVII, fig. 2, is carved out of black horn to a very conventionalised, single-horned, animal's head. It is highly polished. The base is filled in with a round of fine-grained, very highly polished wood, held in by brass tacks. The back of the horn is carved to a raised edge, and on this edge, near the base, is inserted a brass hoop for the attachment of a two-ply twisted leather cord, the other end of which is fastened to a plaited leather band round the neck. The opening is in the mouth and has a leather stopper.

(T. 1, $7_{(a \text{ and } a1)}$, $10_{(c2)}$, 12, $24_{(3,\,4,\,\text{A and E})}$.)

Height, $7\frac{1}{2}$ inches.

Length over outer curve, $11\frac{11}{16}$ inches.

Diameters of base, $2\frac{3}{16}$ inches by $2\frac{1}{4}$ inches.

Depth from back to front of head, $1\frac{1}{4}$ inch.

Width of head, $\frac{15}{16}$ inch.

Diameter of mouth, $\frac{1}{2}$ inch.

Length of horn, $4\frac{3}{4}$ inches.

Diameter of top ring of horn, $\frac{3}{8}$ inch.

There are two more snuff-boxes, variations of this form, with nozzles instead of carved heads.

Bechuana.

Bechuanaland is very well represented in the collection, and as all the specimens were collected by Mr. Camp personally, he can in most cases give the exact locality from which they were obtained.

The Bechuana use horn in a similar way to the Basuto, but their snuff-boxes are carved to nozzles rather than heads, and seldom highly decorated. There are fourteen of these specimens, of which seven are illustrated on Plate LXVIII.

Fig. 1, from the Batlapin at Daniel's Kuil, Griqualand West, is a light horn shading to black at the top, where the mouth has a small flanging lip and a rag stopper. The base is filled in with a flat disc of assegaibosch wood, held in by a single row of widely spaced brass tacks. The lower part of the horn is decorated with a rough conventional design, incised and rubbed with some black substance. (T. $7_{(a \text{ and } a1)}$, $10_{(b1)}$, $14_{(a)}$.)

Total height, $3\frac{1}{4}$ inches.

Length over outer curve, $4\frac{11}{16}$ inches.

Diameters of base, $1\frac{5}{8}$ inch by $1\frac{1}{2}$ inch.

Diameters of mouth, $\frac{7}{16}$ inch by $\frac{1}{2}$ inch.

Depth of stopper visible, $\frac{1}{8}$ inch.

Fig. 2 is a similar type, from the same tribe and locality. It is made of black horn, and the base is filled in with a convex disc of polished gourd rind, held in by small wooden pegs. The nozzle is separated from the bowl by an inverted shoulder. The mouth has a small flat rim, and the leather stopper is rolled and sewn down one side. (T. $7_{(a \text{ and } a1)}$, $10_{(c2)}$.)

Height, $3\frac{3}{8}$ inches.

Diameters of base, $1\frac{3}{8}$ inch by $1\frac{3}{4}$ inch.

Diameter of mouth, $\frac{9}{16}$ inch.

Length of nozzle, $\frac{11}{16}$ inch.

Depth of stopper visible, $\frac{3}{16}$ inch.

Diameter of stopper, $\frac{5}{16}$ inch.

Fig. 3, collected from the Batlaro in 1897, is made on the same principle but rather more elaborately carved. The lower portion is light coloured, with one long dark streak. The nozzle, which comes nearer the centre of the horn, is quite black. Below the nozzle is a grooved flanging rim, and immediately below that a raised lug with a round horizontal bore, through which a plain thong is looped. Another short thong which is attached to the leather stopper is held by a knot through the same hole. This part is divided from the rest of the bowl by a narrow sloped shoulder. The round wooden base is held by three wooden pegs. (T. 1, $7_{(a1)}$, $10_{(c2)}$, 12, $24_{(1 \text{ and } E)}$.)

Total height, $4\frac{9}{16}$ inches.

Diameter of base, $1\frac{7}{8}$ inch.

Height of lower part of bowl, $2\frac{7}{16}$ inches.

Length of nozzle, $\frac{9}{16}$ inch.

Greatest diameter of nozzle, $\frac{9}{16}$ inch.

Length of stopper visible, $\frac{1}{2}$ inch.

Diameter of stopper, $\frac{3}{8}$ inch.

Length of lug, $\frac{11}{16}$ inch.

Height of lug, $\frac{1}{4}$ inch.

Fig. 4, from the Barolong of Mafeking District, is made of black and fawn horn cut off at both ends. The base is filled in with a convex wooden disc, and the top with a conically sloped round of wood which has a raised rim round the mouth. Both are held in with wooden pegs. Two brass rings are inserted horizontally in holes on the inner curve of the horn. To the lower one a two-ply twisted leather cord is attached by passing the cord through singly before commencing the twist. The double-twisted cord is then passed through a brass bead, under the second brass ring and through the bead again, by which it is held quite firmly, and the free end is attached to a rolled leather stopper.

(T. $7_{(a \text{ and } a2)}$, $10_{(c2)}$, 22, $24_{(3, \text{ D and H})}$.)

Length, $4\frac{5}{16}$ inches.
Diameter of base, $2\frac{5}{16}$ inches.
Diameter at top of horn, $1\frac{1}{2}$ inch.
Diameter of mouth, $\frac{1}{2}$ inch.
Length of stopper visible, $\frac{7}{16}$ inch.
Diameter of stopper, $\frac{5}{16}$ inch.

Fig. 5, collected from the Batlaro in 1897, is made of a polished black twisted goat horn, oval in section, with an oval wooden base held in with wooden pegs. The neck ends in an inverted shoulder, below which there is a wide band of leather, sewn down the front and projecting at the back in a folded tongue, all in one piece of leather. The fold is sewn with three rows of chain-stitch in brass wire. In the centre of the stitching is a small hole through which is knotted the thin strap of leather which attaches the oval leather stopper. (T. 1, $7_{(a \text{ and } a1)}$, $10_{(c2)}$, $15_{(b)}$, $24_{(1, 2, \text{ and J})}$.)

Total height, $6\frac{1}{4}$ inches.
Diameters of base, $1\frac{15}{16}$ inch by $1\frac{1}{16}$ inch.
Diameters of neck, $\frac{5}{8}$ inch by $\frac{5}{16}$ inch.
Depth of leather band, 1 inch.
Length of leather tongue, $2\frac{3}{8}$ inches.
Width of leather tongue, 1 inch.
Diameters of stopper, $\frac{5}{8}$ inch by $\frac{5}{16}$ inch.

Fig. 6, from the Bakxatla, of Mochudi, is made of a section of a light greyish white horn, oval in horizontal section, and cut off at both ends, which are filled in with oval discs of wood, held by copper tacks. A conical wooden stopper is inserted in a hole in the top side, and in the same line are inserted two copper rings, through which a plain leather strap is passed and fastened by threading each end through slits in the strap itself.

(T. 1, $7_{(a \text{ and } a2)}$, $10_{(d)}$, 22, $24_{(2 \text{ and F})}$.)

Length (centre), $2\frac{5}{8}$ inches.
Diameter (centre), $2\frac{1}{8}$ inches.
Height of stopper visible, $\frac{7}{16}$ inch.
Diameter of base of stopper, $\frac{9}{16}$ inch.
Diameter of mouth, $\frac{7}{16}$ inch.

Fig. 7 is a more elaborate snuff-box from the Batlaro of the Taungs District. It is made out of a light-coloured horn which has a high polish and an irridescent sheen. The base is filled in with a flat disc of horn of the same colour, held with iron tacks. A deep flat shoulder separates the bowl from the nozzle, which narrows towards the flanging lip round the mouth. There is a highly polished conical wooden stopper. The bowl is decorated with copper wire inlaid in the sides. (T. 1, $7_{(a\ \mathrm{and}\ a1)}$, $10_{(d)}$, $14_{(a)}$, $15_{(d)}$.)

Total height, 4 inches.
Diameter of base, $2\frac{3}{16}$ inches.
Diameter of top, $1\frac{7}{16}$ inch.
Diameter of nozzle below lip, $\frac{5}{8}$ inch.
Length of stopper visible, $\frac{11}{16}$ inch.
Greatest diameter of stopper, $\frac{7}{16}$ inch.

Plate LXIX illustrates some of the Bechuana snuff-boxes made of materials other than horn.

Figs. 1 and 2 show two snuff-boxes from the Batlaro made of shin bones. Fig. 1 comes from Gamasep, Langberg. The bottom is covered with a piece of skin wetted before being drawn over, and then bound round with string so that when dry it fits quite tightly almost half-way up the side. Above it there is a further band of hide similarly drawn on wet. The uncovered part of the bone is decorated with deeply incised lines filled in with black. The mouth is fitted with an oval wooden stopper. (T. $6_{(a)}$, $10_{(d)}$, 11, $11_{(b)}$, $14_{(a)}$.)

Height, $2\frac{15}{16}$ inches.
Diameters of base, $1\frac{7}{16}$ inch by $1\frac{3}{16}$ inch.
Diameters of mouth, $\frac{7}{8}$ inch by $\frac{11}{16}$ inch.
Depth of stopper visible, $\frac{3}{32}$ inch.

Fig. 2 is a similar example from Pudduhusche, Langberg. It differs from the above in that it has no second band of leather, the mouth has a lip, and the incised decoration is in a triangular design. The string marks where the skin has been bound are plainly visible. (T. $6_{(a)}$, $10_{(d)}$, 11, $14_{(a)}$.)

Height, $4\frac{1}{4}$ inches.
Diameters of base, $1\frac{3}{4}$ inch by $1\frac{1}{8}$ inch.
Diameters of mouth, $\frac{15}{16}$ inch by $\frac{5}{8}$ inch.
Depth of stopper visible, $\frac{7}{32}$ inch.
Diameters of stopper, $\frac{3}{4}$ inch by $\frac{9}{16}$ inch.

There is a third example, only differing from the above in size and decorative design.

Fig. 4 is an entirely different type of snuff-box from Kolobeng. It is carved out of light-coloured wood and forms the head of a stick or ornamental club, the shaft of which tapers towards the grip. The greater part of the bowl, and a band on the shaft just below it, are branded brown; the neck is left plain and light coloured. The bowl is further decorated with four vertical columns of three deep triangular grooves. The stopper is a round of gourd shell with notches round the edge. (T. 9, $10_{(a1)}$, 12, $13_{(3)}$.)

Height of box, $2\frac{1}{2}$ inches.
Greatest diameter, 2 inches.
Diameter of mouth, $\frac{3}{4}$ inch.
Height of stopper visible, $\frac{3}{16}$ inch.
Diameter of stopper, $\frac{5}{8}$ inch.
Length of shaft, $27\frac{3}{4}$ inches.
Diameter at top, $\frac{7}{8}$ inch.

Fig. 3 is another wooden snuff-box, from the Bakxatla, of Mochudi. It is made of fairly soft light wood, branded brown all over, and has a flanging base. The mouth is fitted with a leather stopper, to the top of which is sewn a short wide leather strap.

(T. 9, $10_{(c2)}$, $13_{(3)}$, $24_{(2 \text{ and } J)}$.

Height, $3\frac{1}{4}$ inches.
Greatest diameter, $1\frac{1}{4}$ inch.
Depth of stopper visible, $\frac{1}{4}$ inch.
Length of strap, $1\frac{3}{4}$ inch.

Of seven gourd snuff-boxes from Bechuanaland three are shown. Fig. 5 is a specimen collected in Griqualand West, but not of Bechuana type. It is a light-coloured round gourd decorated in a diamond design with brass and copper wire, in the same manner as the Zulu snuff-boxes illustrated in Plate LXIII. As well as this, and probably a later addition, there are three groups of five rows of porcelain beads, alternate sky-blue ($\frac{1}{16}$ inch) and black ($\frac{1}{32}$ inch), threaded on sinew and fastened through holes in the gourd shell. There is a band of branding round the mouth, with a ring of dots beyond it.

(T. 2, $13_{(1 \text{ and } 4)}$, (14_a), 18.)

Height, $2\frac{1}{2}$ inches.
Diameter, $2\frac{3}{4}$ inches.
Diameter of mouth, $\frac{7}{16}$ inch.

Fig. 6 is a reddish bottle-necked gourd, from the Barolong of Mafeking. Most of the lower bowl is covered with a jointless piece of hide, drawn on wet and moulded to the bowl. The stopper is a round of gourd shell. A small hole in the upper bowl has been filled in exactly with a similar round of gourd shell. A leather strap is fastened round the neck and knotted to a loop.

(T. 1, 2, $10_{(a1)}$, $11_{(b)}$, $24_{(2,\text{ E and F})}$.)

Height, 4 inches.
Diameter of lower bowl, $2\frac{13}{16}$ inches.
Diameter of neck, $1\frac{1}{4}$ inch.
Diameter of upper bowl, $1\frac{3}{8}$ inch.
Height of stopper visible, $\frac{1}{8}$ inch.
Diameter of stopper, $\frac{1}{2}$ inch.

Fig. 7 is a narrow-necked gourd, collected from the Batlapin of Barkley West. It is light coloured, and has incised and branded decoration in a triangle and diamond design. The mouth is strengthened by a jointless band of skin, and below it there is a leather strap which passes round the neck and through the rather elaborately carved wooden stopper. The stopper can slide up and down on the strap, but is prevented by the knot from coming off.

(T. 1, 2, $10_{(d)}$, $11_{(b)}$, $13_{(1)}$, $24_{(1,\text{ E and F})}$.)

Height, $4\frac{11}{16}$ inches.
Greatest diameter, $2\frac{7}{8}$ inches.
Diameter of mouth, $\frac{11}{16}$ inch.
Height of stopper visible, $\frac{15}{16}$ inch.
Width across wings of stopper, $\frac{11}{16}$ inch.

Two other bottle-necked gourds are quite plain, with leather straps. A third is decorated with a single row of branded triangles, and has a crack at the neck mended with giraffe tail hair. A fourth is covered entirely with twined brass and zinc wire, in Zulu style, and looks like a relic of the Matebele invasion, rather than a Bechuana product.

Mashonaland.

From Mashonaland there are twenty-eight snuff-boxes of various styles. Typical examples are illustrated on Plates LXX and LXXI.

Two specimens from Salisbury District, one of which is shown on Plate LXX, fig. 1, are made of hard shiny nut-shell, reddish brown in colour, and fitted with a calabash stopper. A leather loop, which is made of a single rectangular piece of leather slit down the centre, is inserted in a single hole in the side, and held by a knot.

(T. 1, 4, $10_{(a1)}$, 23, $24_{(2\text{ and C})}$.)

Length, $1\frac{3}{8}$ inch.
Width, $\frac{7}{8}$ inch.

Diameter of stopper, $\frac{1}{4}$ inch.
Length of strap, 2 inches.

Two specimens are converted brass cartridge cases. Plate LXX, fig. 2, is an "Express" cartridge case with a faintly incised triangular decoration round the mouth, which is fitted with a conical wooden stopper. A knotted strap is inserted in a single hole in the side.

(T. $10_{(d)}$, 14, 23, $24_{(1,\ \mathrm{C\ and\ E})}$.)

Length, $2\frac{13}{16}$ inches.
Diameter of base, $\frac{3}{4}$ inch.
Diameter of stopper, $\frac{5}{8}$ inch.
Height of stopper visible, $\frac{1}{2}$ inch.

Plate LXX, fig. 3, is a "Martini Henry" cartridge case (made by G. Kynock of Birmingham). It has a leather strap attached in the same way as described above, and below the hole for the strap a band of plaited copper wire. The conical stopper is made of reddish wood. (T. $10_{(d)}$, $15_{(e)}$, 23, $24_{(1\ \mathrm{and\ C})}$.)

Length, $2\frac{15}{16}$ inches.
Diameter of base, $\frac{3}{4}$ inch.
Height of stopper visible, $\frac{3}{8}$ inch.
Diameter of stopper, $\frac{1}{2}$ inch.

A third type, of which there are three specimens, is illustrated on Plate LXX, fig. 5. It is hollowed out of a solid piece of black horn, lozenge shaped, with a flanging round base, which is decorated with triangular notches all round the edge. Round the mouth there is a band of leather, put on wet, and moulded to fit. The stopper is made of leather, and from the top of it there is a short leather loop.

(T. $7_{(b)}$, $10_{(c2)}$, $11_{(b)}$, $24_{(1\ \mathrm{and\ J})}$.)

Length of box, $1\frac{7}{8}$ inch.
Greatest diameter, $\frac{3}{4}$ inch.
Diameter of stopper, $\frac{7}{16}$ inch.
Length of loop, $\frac{11}{16}$ inch.

A fourth type, of which there are seven specimens all from Salisbury District, is made of a length of bamboo, fitted with a round of calabash at each end, one movable, to act as a stopper, and the other fixed. The bamboo is decorated with incised cross-hatched lines in conventional patterns, and has a leather strap, by which it could be suspended from the waistband or necklace. None of these would be stuck through the ear lobe as in Zululand. Three examples are illustrated on Plate LXXI.

Fig. 3 is quite a small specimen, of rather reddish colour, with five bands of cross-hatched triangles, separated by double lines. The cross-hatching in the triangles is further enhanced by filling in with branding the top half of the diamonds formed by the crossing lines. (T. 8, $10_{(a1)}$, $13_{(4)}$, 23, $24_{(1, \text{C and F})}$.)

Length, $2\frac{15}{16}$ inches.

Diameter, $\frac{3}{4}$ inch.

Diameter of stoppers, $\frac{9}{16}$ inch.

Fig. 1 differs only in size and in slightly different technique of decoration (though the effect is much the same), in which the incised lines run parallel to all three sides of the triangle instead of only two sides, and of the tiny triangles thus formed, alternate ones are cut out, and enhanced by rubbing with soot. There are six bands, divided by three lines. A two-ply twisted cord is looped through a hole and knotted on the inside.

(T. 8, $10_{(a1)}$, $13_{(4)}$ or $14_{(a)}$, 23, $24_{(3 \text{ and C})}$.)

Length, $7\frac{1}{8}$ inches.

Diameter, $\frac{7}{8}$ inch.

Diameter of movable stopper, $\frac{5}{8}$ inch.

Diameter of fixed stopper, $\frac{1}{2}$ inch.

Fig. 2 is a shorter stouter reed, reddish in colour. The leather loop and the fixed stopper are attached in the same manner as described above. The movable stopper is attached by a short length of two-ply twisted leather cord, one end of which is knotted through a hole in the centre of the stopper, and the other end through a hole in the wall of the reed near the end. Round each end is a band of single continuous chevron, or zig-zag, carved in the rind. The remainder is divided into three wide bands, each containing a large plain single continuous chevron obtained as a result of carving, in the manner described above, series of triangles with their apices interlocking and fairly widely spaced.

Length, 4 inches.

Diameter, $1\frac{1}{2}$ inch.

Diameter of stoppers, $1\frac{1}{8}$ inch.

All of the remainder are carved out of various hard woods. Plate LXX, fig. 4, from Salisbury District, is of hard polished black wood, apparently ebony; at its widest circumference it has a reddish tinge. It is decorated with sparse regularly spaced triangles, enhanced by rows of triangular grooves and ridges, which run parallel to the base of the triangle. The neck, with the exception of two triangular ridges at its base, is covered with twined brass wire. On one side a rounded lug is bored horizontally for the passage of a two-ply twisted leather cord. There is a small calabash rind stopper in the mouth, and another larger one in a hole in the base, fastened in flush with the surface. This may have been used to fill the box from the bottom, as this hole is larger than the mouth, but it was more probably originally intended to facilitate the hollowing out of the bowl. (T. 1, 9, $9_{(a)}$, $10_{(a1)}$, 12, $24_{(3 \text{ and } A)}$.)

Total height, $3\frac{1}{4}$ inches.
Depth of neck, $1\frac{1}{16}$ inch.
Diameter of bowl, 3 inches.
Diameter of top of neck, $\frac{13}{16}$ inch.
Diameter of stopper in base, $\frac{11}{16}$ inch.
Length of lug, $\frac{7}{8}$ inch.
Height of lug, $\frac{1}{2}$ inch.
Width of lug, $\frac{15}{32}$ inch.

Figs. 8 and 8*a* are two views of a similarly shaped snuff-box from the same district. It is made of dull light-brown wood, and its only decoration is a semi-circular groove round the circumference and a circle of diamonds carved round the base of the nozzle. The mouth is fitted with a small calabash stopper, and a larger hole in the base has a similar stopper, as in fig. 4. The snuff-box is suspended by a raised lug on the circumference from a necklet of light wooden beads, which are carved to an hour-glass shape and branded dark brown. They are strung on two-ply twisted fibre and fit into each other. (T. 1, 9, $9_{(a)}$, $10_{(a1)}$, 12, $24_{(5a)}$.)

Height of bowl, $1\frac{1}{8}$ inch.
Length of nozzle, $\frac{7}{8}$ inch.
Diameter of bowl, 2 inches.
Diameter of nozzle, $\frac{11}{16}$ inch to $\frac{9}{16}$ inch.
Diameter of stopper, $\frac{9}{32}$ inch.
Diameter of stopper in base, $\frac{5}{8}$ inch.
Height of lug, $\frac{5}{16}$ inch.
Width of lug, $\frac{5}{16}$ inch.
Length of necklet, $16\frac{1}{2}$ inches (thirty-six beads, eighteen on each side).
Length of beads, $\frac{3}{8}$ inch to $\frac{7}{16}$ inch.
Diameter of beads, $\frac{7}{16}$ inch.

Fig. 7, from the same district, is made of dark reddish wood. The nozzle is covered with skin, drawn over while wet, turned over about $\frac{1}{8}$ inch inside the mouth, and bound round with string until dry. The string marks are clearly visible. The mouth has a brown wooden stopper, so regular in shape that it might have been turned on a wheel. In addition to a lug carved at the base in the same piece of wood, by which the box could be suspended upside down, there is a second lug carved out of thick hide and inserted in a hole in the side of the snuff-box, near the nozzle. The bowl is decorated with vertical grooves on each section, divided by a plain horizontal band and covering the whole surface, with the exception of a plain vertical band. (T. 1, 9, $10_{(d)}$, $11_{(b)}$, 12.)

Total height, $5\frac{3}{4}$ inches.
Greatest diameter, $1\frac{1}{4}$ inch.
Height of basal lug, $\frac{1}{2}$ inch.
Diameter of lug near nozzle, $\frac{7}{16}$ inch.
Length of nozzle, $\frac{13}{16}$ inch.
Diameter of nozzle, $\frac{5}{8}$ inch.
Length of stopper visible, $\frac{7}{16}$ inch.
Diameter of stopper, $\frac{1}{2}$ inch.

The following three examples are the typical pear-shaped snuff-boxes of the Mashona. They are all from Salisbury District.

Plate LXX, fig. 6, is of dark greyish brown wood with longitudinal triangular ridges and grooves over the whole of the bowl. The flanging nozzle is covered with twined fairly thick brass wire. The mouth has a calabash stopper attached by a two-ply twisted leather cord to a raised lug on the side of the bowl. The same sort of cord is used for a long loop, which would go round the waist or over one shoulder, and is also passed through the lug and held in position by three cone-shaped ivory beads of graduated sizes.

(T. 9, $10_{(a2)}$, 12, $15_{(c)}$, $24_{(3, A, C, D \text{ and } E)}$.)

Height, $6\frac{9}{16}$ inches.
Greatest diameter, $\frac{15}{16}$ inches.
Length of nozzle, $\frac{7}{8}$ inch.
Diameter at top, $\frac{11}{16}$ inch.
Diameter of mouth and stopper, $\frac{13}{32}$ inch.
Length of lug, $\frac{3}{4}$ inch.
Height of lug, $\frac{1}{4}$ inch.
Length of strap, $13\frac{1}{4}$ inches.

Beads: (1) $\frac{17}{32}$ inch by $\frac{5}{16}$ inch; (2) $\frac{3}{8}$ inch by $\frac{1}{2}$ inch; (3) $\frac{7}{16}$ inch by $\frac{5}{16}$ inch.

Plate LXXI, fig. 4, is made of hard dark brown wood decorated in a diamond design in flat ridges and triangular grooves. On one side there is a large patch of lead, inlaid into the wood, possibly to cover a crack. The plain rounded lug is bored horizontally and has a long leather strap. The flanging nozzle is covered with twined brass wire, and the mouth has a rag stopper.

(T. 9, $10_{(b1)}$, 12, $15_{(c)}$, 16, $24_{(2\text{ and }A)}$.)

Height, $4\frac{7}{8}$ inch.
Greatest diameter, $1\frac{5}{8}$ inch.
Height of nozzle, $\frac{3}{4}$ inch.
Diameter at top, $\frac{13}{16}$ inch.
Height of stopper visible, $\frac{9}{16}$ inch.
Diameter of mouth, $\frac{1}{2}$ inch.
Length of lug, $\frac{3}{4}$ inch.
Height of lug, $\frac{5}{16}$ inch.

Plate LXXI, fig. 5, is outstanding for its size. It is made of wood, light both in weight and colour, carved in longitudinal triangular grooves and ridges, with small groups of horizontal and diagonal grooves and ridges at irregular intervals. The large angular lug is plain. The whole box is branded black. The round stopper is of brown wood with a hole through the centre and a row of circular depressions along the top. A plain leather strap is passed through the lug. (T. 9, $10_{(d)}$, 12, $13_{(3)}$, $24_{(2,\ A\text{ and }F)}$.)

Total height, $8\frac{1}{4}$ inches.
Greatest diameter, $2\frac{1}{2}$ inches.
Length of nozzle, $\frac{5}{8}$ inch.
Diameter of nozzle at top, $\frac{7}{8}$ inch.
Diameter of mouth, $\frac{1}{2}$ inch.
Depth of stopper visible, $\frac{1}{2}$ inch.
Diameter at top, $\frac{5}{8}$ inch.
Length of lug, $1\frac{3}{4}$ inch.
Height of lug, $\frac{5}{8}$ inch.

Plate LXXI, fig. 6, also from the Salisbury District, is a very slight variant of the preceding type. It is made of fairly heavy, highly polished dark reddish wood, with a carved stopper of the same. The base of the bowl is plain, and cut off bluntly instead of diminishing to a point. The upper part is carved into flat ridges. The nozzle is covered with twined copper and zinc wire. A two-ply twisted leather cord is passed and knotted through a hole in the stopper and attached to the plain raised lug.

(T. 9, $10_{(d)}$, 12, $15_{(c)}$, $24_{(3,\ A\ and\ H)}$.)

Height, 6 inches.
Greatest diameter of bowl, $1\frac{1}{8}$ inch.
Length of nozzle, $\frac{13}{16}$ inch.
Diameter of nozzle at base, $\frac{27}{32}$ inch; at top, $\frac{3}{4}$ inch.
Length of lug, $\frac{3}{4}$ inch.
Width of lug, $\frac{3}{8}$ inch.
Length of stopper, 1 inch.
Greatest diameter of stopper, $\frac{1}{2}$ inch.

Ovambo.

There are in the collection five Ovambo snuff-boxes, all of which are illustrated on Plates LXXII and LXXIII, together with three recently identified specimens in the Museum collection.

There appear to be two main types of snuff-box made by the Ovambo; one of horn or dark wood, decorated in very much the same way as the last described Mashona type, and the other of light wood decorated with branded designs.

On Plate LXXII.

Fig. 1 is made of black polished horn, plain but for a slight bulb at the base. There is a plain copper band round the top, fastened over the leather strap which attaches the stopper, thereby holding it in place. The band is fastened by a piece of copper wire passed through a hole in each end and hooked to itself. (This is the typical Ovambo method of fastening bands of metal.) The other end of the strap passes through a hole in the centre of the gourd rind stopper.

(T. 1, $7_{(a)}$, $10_{(a2)}$, 20, $24_{(1\ and\ K)}$.)

Length, 5 inches.
Diameter at mouth, $\frac{3}{4}$ inch.
Diameter of stopper, $\frac{9}{16}$ inch.
Depth of stopper, $\frac{5}{16}$ inch.
Depth of band, $\frac{3}{16}$ inch.
Length of strap, $6\frac{1}{2}$ inches.

Fig. 2 is outstanding in that two snuff-boxes are suspended from one strap, which is folded in half and divided at each end, the front ends being knotted through the gourd stoppers and the back ends fastened under the band of tin round each mouth—the one on the left is fastened with brass wire, and the other with copper wire. The boxes themselves are made of dull black horn, decorated in a triangle pattern of flat ridges and triangular grooves. The peduncles are plain. (T. $7_{(a)}$, $10_{(a2)}$, 12, 20, $24_{(2 \text{ and } K)}$.)

	Left.	Right.
Length	$5\frac{1}{16}$ inches.	$5\frac{3}{16}$ inches.
Greatest diameter . . .	$\frac{13}{16}$ inch.	$\frac{13}{16}$ inch.
Length of peduncle . .	$\frac{13}{16}$ inch.	$\frac{13}{16}$ inch.
Diameter of base of peduncle .	$\frac{7}{16}$ inch.	$\frac{7}{16}$ inch.
Depth of bands	$\frac{5}{16}$ inch.	
Length of strap (folded) . . .	$4\frac{7}{8}$ inches.	
Width of strap at fold . . .	$\frac{15}{16}$ inch.	

Fig. 3 is a single box of the same type, made of light-coloured wood branded black. The neck flanges slightly and has a band of leather sewn down one side with sinew, and from it, in the same piece of leather, runs the strap. The strap narrows towards its end, and after passing through two holes in the gourd rind stopper, is knotted through a hole in the handle of a light-coloured wooden spoon, which is decorated with incised branded lines.

(T. 9, $10_{(a2)}$, 12, $13_{(3 \text{ and } 4)}$, $24_{(2, A \text{ and } J)}$.)

Length, $8\frac{3}{4}$ inches.
Greatest diameter, $1\frac{3}{16}$ inch.
Diameter of mouth, $1\frac{1}{16}$ inch.
Length of peduncle, $1\frac{1}{16}$ inch.
Diameter of peduncle at base, $\frac{5}{16}$ inch.
Depth of stopper, $\frac{1}{8}$ inch.
Diameter of stopper, $\frac{13}{16}$ inch.
Depth of band, $\frac{7}{16}$ inch.
Total length of strap, 16 inches.
Total length of spoon, $6\frac{3}{16}$ inches.

Fig. 4 is carved out of dull black horn, and decorated with interlocking triangles enhanced by flat ridges. The peduncle at the base is quite plain. Round the mouth is a brass band, fastened, as described above, over the leather strap which attaches the gourd rind stopper. (T. $7_{(a)}$, $10_{(a2)}$, 12, 20, $24_{(1 \text{ and } K)}$.)

Length, $6\frac{3}{4}$ inches.
Greatest diameter, $\frac{7}{8}$ inch by $\frac{13}{16}$ inch.

Length of peduncle, $1\frac{1}{16}$ inch.
Diameter of peduncle at base, $\frac{7}{16}$ inch.
Depth of stopper, $\frac{5}{16}$ inch.
Diameter of stopper, $\frac{1}{2}$ inch.
Depth of band, $\frac{7}{16}$ inch.
Length of strap, $6\frac{1}{2}$ inches.

Three further examples of the same type, from the Museum collection, are shown on Plate LXXIII.

Fig. 1 (S.A.M., 3337) is carved out of hard black wood decorated in a triangle design enhanced with flat topped ridges. The peduncle, as well as the neck, is covered with a band of tin, fastened as described above. The band round the neck holds in place a thick leather strap, the end of which passes through the centre of the gourd rind stopper. An ivory spoon, which is decorated on the back of the handle with incised vertical cross-hatching rubbed with black, is passed through a hole in the strap, near the box.

(T. 9, $10_{(a2)}$, 12, $14_{(a)}$, 20, $24_{(2\text{ and K})}$.)

Length, $6\frac{3}{16}$ inches.
Greatest diameter, $\frac{7}{8}$ inch.
Diameter of mouth, $\frac{5}{8}$ inch.
Length of peduncle, $1\frac{1}{8}$ inch.
Diameter of peduncle, $\frac{3}{8}$ inch.
Depth of bands, $\frac{3}{4}$ inch.
Depth of stopper, $\frac{3}{16}$ inch.
Length of spoon, $4\frac{3}{16}$ inch.
Length of strap, $14\frac{1}{2}$ inches.

Fig. 2 (S.A.M., 3338) is made of black horn carved in longitudinal triangular grooves and ridges. The peduncle is plain, with a rounded base. The band of leather round the neck is in the same piece as the strap which attaches the gourd rind stopper, and is cut from a tail piece and drawn over while wet. (T. $7_{(a)}$, $10_{(a2)}$, 12, $24_{(2)}$.)

Length, $6\frac{11}{16}$ inches.
Greatest diameter, $1\frac{1}{8}$ inch.
Length of peduncle, $1\frac{1}{2}$ inch.
Greatest diameter of peduncle, $\frac{1}{2}$ inch.
Depth of stopper, $\frac{1}{8}$ inch.
Diameter of stopper, $\frac{11}{16}$ inch.
Depth of band, $\frac{3}{8}$ inch.
Length of strap, $6\frac{3}{4}$ inch.

Fig. 3 (S.A.M., 3339) is made of plain light-coloured horn. The peduncle has a band of tin, fastened as described above, with a single ring of flat, native made, copper wire at the top of the peduncle. A thin thong is bound round the mouth and tied firmly at the back, by passing through slits in itself, and of the two ends, one is attached to the gourd rind stopper and the other left loose. The part of the thong which goes round the mouth is bound with twisted sinew string.

(T. $7_{(a)}$, $10_{(a2)}$, 20, $24_{(1 \text{ and } E)}$.)

Length, 7 inches.
Greatest diameter, $\frac{7}{8}$ inch.
Diameter at mouth, $\frac{3}{4}$ inch.
Length of peduncle, $\frac{3}{4}$ inch.
Diameter of peduncle, $\frac{3}{4}$ inch.
Depth of stopper, $\frac{1}{8}$ inch.
Diameter of stopper, $\frac{5}{8}$ inch.
Length of strap, $22\frac{1}{4}$ inches.

Fig. 4 illustrates the only example of the second type. It is made of light brown, hard, fine-grained unpolished wood, and shaped like a barrel, with slightly concave base. The motif of the incised and branded decoration is a series of single chevrons, in vertical columns divided by a plain cross-hatched band. There is a rectangular lug at the mouth, bored vertically for a strap, which is held at the base by a knot and a pale green glass bead, and divided at about two-thirds its length into two two-ply twisted cords, one of which is knotted through the centre of the gourd rind stopper and the other through the top of a wooden spoon. The spoon is of the same wood and slightly decorated at the top with incised branding.

(T. 9, $10_{(a2)}$, $13_{(4 \text{ and } 2)}$, $24_{(2,\ A \text{ and } B)}$.)

Height, $3\frac{1}{4}$ inches.
Greatest diameter, $1\frac{1}{16}$ inch.
Diameter of base, $1\frac{1}{4}$ inch.
Diameter of mouth, $1\frac{1}{8}$ inch plus $\frac{5}{16}$ inch (lug).
Length of lug, $\frac{5}{8}$ inch.
Length of strap, 5 inches.
Length of spoon, $4\frac{1}{4}$ inches.
Bowl, $1\frac{1}{4}$ inch by $\frac{3}{8}$ inch.

Bathonga.

Finally there are two snuff-boxes from the Bathonga of Delagoa Bay, both illustrated on Plate LXXIV.

Fig. 1 is a light brown bottle-necked gourd, highly polished, and decorated with rows of white porcelain beads ($\frac{1}{16}$ inch), inserted in the rind, and enclosing alternate bands of cross-hatching and plain black, all branded. A two-ply twisted leather cord wound several times round the neck, holds the plain leather loop strap—the lowest coil passing through a slit in the strap. The stopper is a round of gourd rind. (T. 1, 2, $10_{(a1)}$, $13_{(2 \text{ and } 4)}$, 17, $24_{(2, 3 \text{ and } L)}$.)

Height, $6\frac{1}{4}$ inches.
Diameter of lower bowl, 3 inches.
Diameter of upper bowl, $1\frac{7}{16}$ inch.
Diameter of stopper, $\frac{1}{2}$ inch.
Depth of stopper visible, $\frac{1}{16}$ inch.
Width of strap, $\frac{15}{16}$ inch.
Depth of neck binding, $\frac{11}{16}$ inch.

Fig. 2 is a dark brown highly polished leathery looking gourd, decorated with branded triangles and alternating bands of plain branding and branded cross-hatching, all outlined with white porcelain beads ($\frac{1}{16}$ inch). A band of leather round the neck passes through slits in a plain leather strap with fringed ends. The dark wooden stopper is carved to an hour-glass shape.

(T. 1, 2, $10_{(d)}$, $13_{(2 \text{ and } 4)}$, 17, $24_{(2 \text{ and } L)}$.)

Height, $7\frac{7}{8}$ inches.
Diameter of lower bowl, $4\frac{7}{8}$ inches.
Diameter of upper bowl, $2\frac{3}{8}$ inches.
Greatest diameter of stopper, 1 inch by $\frac{3}{16}$ inch.

Bavenda.

The remaining three figures on Plate LXXIV are three snuff-boxes in the collection of the University of Cape Town, which I have been permitted to reproduce here, as they illustrate three stages in the making of the lead-covered snuff-boxes which are peculiar to the Bavenda.*

Small gourds or the hard-shelled fruits of the *mutasa* tree are chosen for the snuff-boxes, and hollowed out. Eight divisions are made on the outside of the shell, and alternate ones are scraped down to the depth of about $\frac{1}{16}$ inch. Lead, bought at the trader's store, is inlaid in these hollows, sufficiently thickly to stand up about $\frac{1}{16}$ inch above the shell. Then with a stone as a tool, it is worked over the

* Stayt, The Bavenda, pp. 50, 53, and 159.

uncovered portions of the bowl until the latter is entirely encased in lead, and only very faint lines show the junctions.

Fig. 3 (U.C.T., 29:101) is a *mutasa* fruit snuff-box in the first stage, with four hollows scraped out. It has a wooden stopper.

(T. 3, $10_{(d)}$, 12, 16.)

Height, $1\frac{13}{16}$ inch.
Greatest diameter, $1\frac{13}{16}$ inch.
Length of stopper, $\frac{7}{8}$ inch ($\frac{3}{16}$ inch visible).
Diameter of stopper, $\frac{3}{8}$ inch.

Fig. 5 (U.C.T., 36:4) is a bottle-necked gourd snuff-box at the second stage, when the lead has been inlaid into the four hollows. This box has been fitted with a strap of native spun two-ply cotton twine. A skein is passed round the neck, held together by a sewn ring of the same material, then divided into four groups and plaited, thereby making a long loop of two plaits each side, joined at the ends by a similar sewn ring. The wooden stopper is missing.

(T. 2, $10_{(d)}$, 12, 16.)

Height, $4\frac{11}{16}$ inches.
Diameter of lower bowl, $1\frac{3}{4}$ inch.
Diameter of mouth, $\frac{1}{2}$ inch.
Length of loop, 16 inches (approx.).

Fig. 4 (U.C.T., 29:101) shows the final stage, when the fruit shell is entirely covered with lead. It has a wooden stopper.

(T. 1, 3, $10_{(d)}$, 12, 16.)

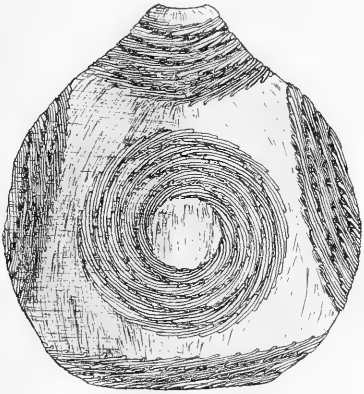
Height, $2\frac{1}{8}$ inches.
Diameters, $1\frac{7}{8}$ inch by $1\frac{29}{32}$ inch.
Length of stopper, $\frac{7}{8}$ inch ($\frac{3}{16}$ inch visible).
Diameter of stopper, $\frac{3}{16}$ inch.

The seven snuff-spoons in Mr. Camp's collection are illustrated on Plate LXXV. They are all from the Transkei, with the exception of fig. 6, which comes from Bechuanaland. They are made of bone, with incised decoration rubbed with some black substance. In figs. 2 and 3 the decoration is the same back and front, and in fig. 4 the same on both sides. (T. $6_{(c)}$, $14_{(a)}$.)

[TABLE.

	Length of Prongs.	Width across Prongs.	Length of Neck.	Width of Neck.	Length of Bowl.	Width of Band.
	Inches.	Inch.	Inch.	Inch.	Inches.	Inch.
Fig. 1	$4\frac{3}{8}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{5}{16}$	$1\frac{7}{16}$	$\frac{7}{8}$
Fig. 2	$3\frac{1}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{5}{8}$	$1\frac{3}{4}$	$\frac{5}{8}$
Fig. 3	4	$\frac{9}{16}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{7}{8}$	$\frac{21}{32}$
Fig. 4	$5\frac{1}{2}$	$\frac{1}{4}$	$\frac{5}{8}$ plus $\frac{5}{8}$	$\frac{1}{4}$	$1\frac{1}{8}$	$\frac{5}{8}$
Fig. 5	$3\frac{3}{16}$	$\frac{1}{4}$			$1\frac{3}{4}$	$\frac{5}{8}$
Fig. 6	Total length, $5\frac{5}{8}$ inches				$3\frac{1}{2}$	$\frac{5}{8}$
Fig. 7	$4\frac{13}{16}$	$\frac{7}{32}$			$1\frac{1}{16}$	$\frac{21}{32}$

I should like to thank Mr. Camp for allowing me to publish his collection, and for the assistance he has given me during the work. My thanks are also due to Mr. A. J. H. Goodwin for permission to reproduce the Bavenda snuff-boxes; to Professor Lestrade for information about the latter; and to Mr. Frank Cornner for technological information.



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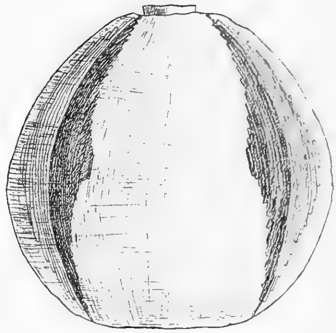

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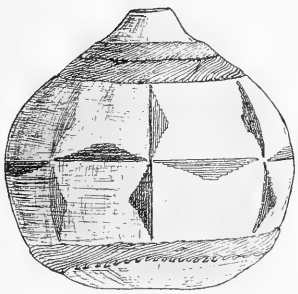

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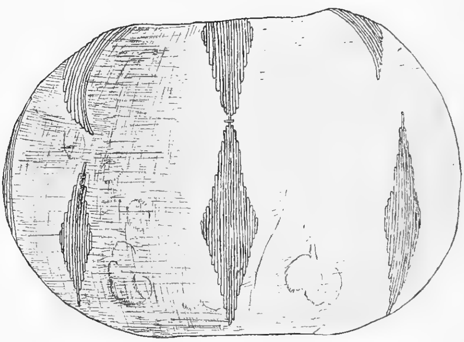

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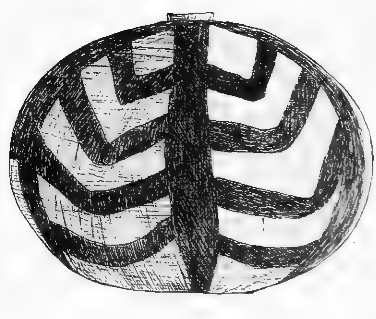

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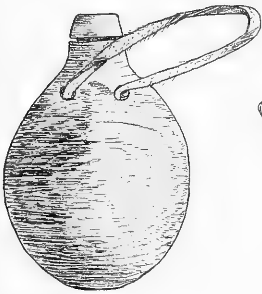

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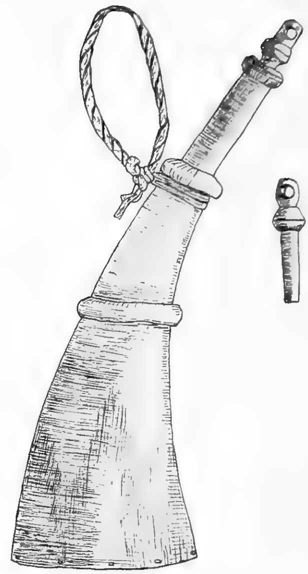

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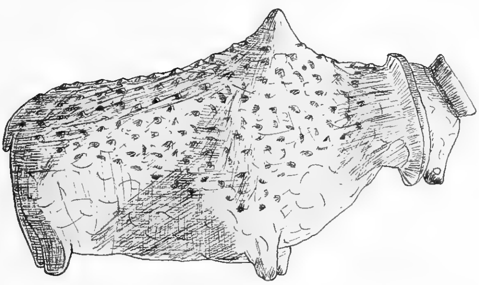

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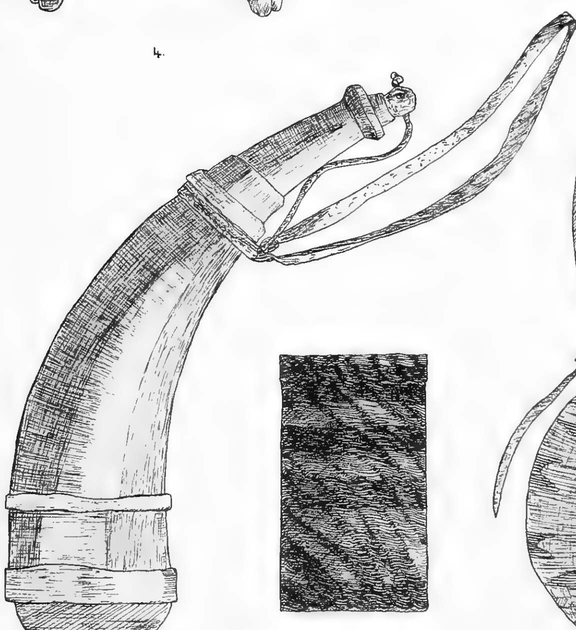

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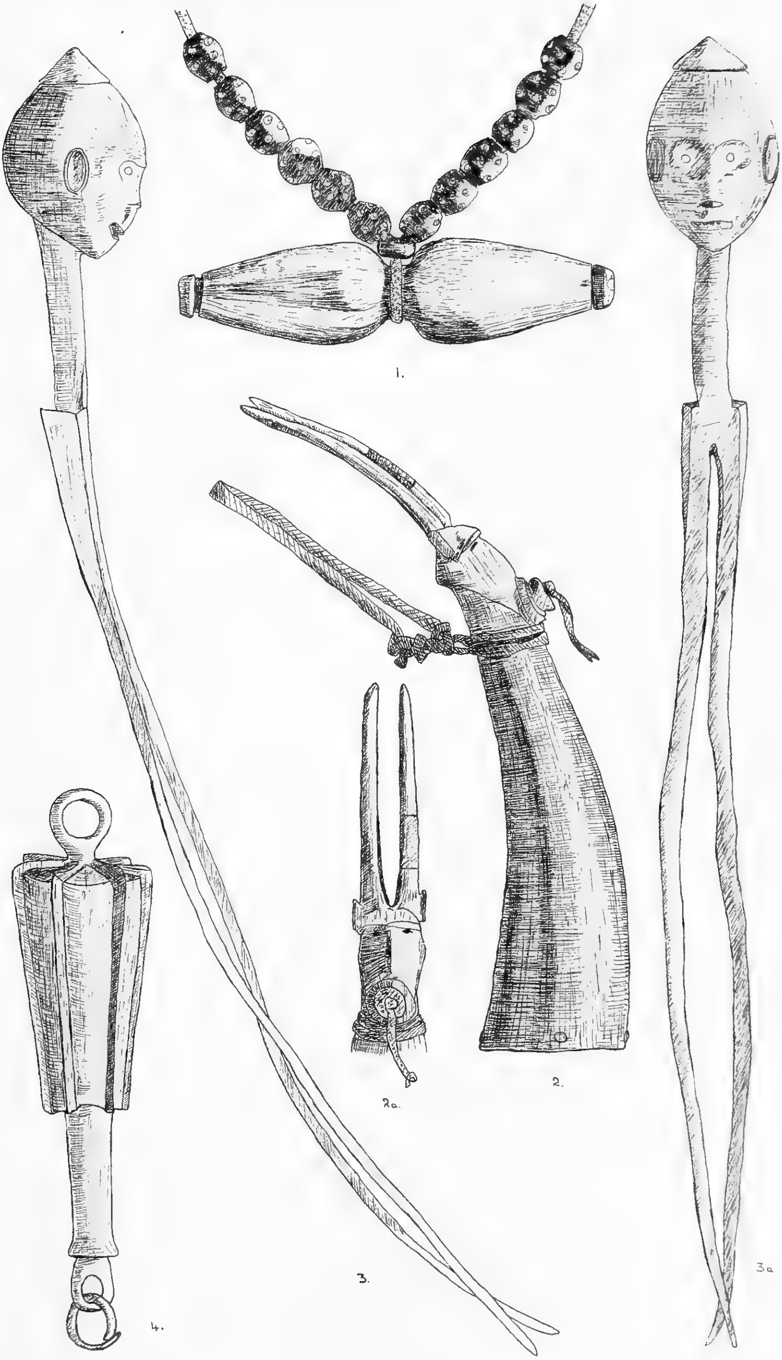

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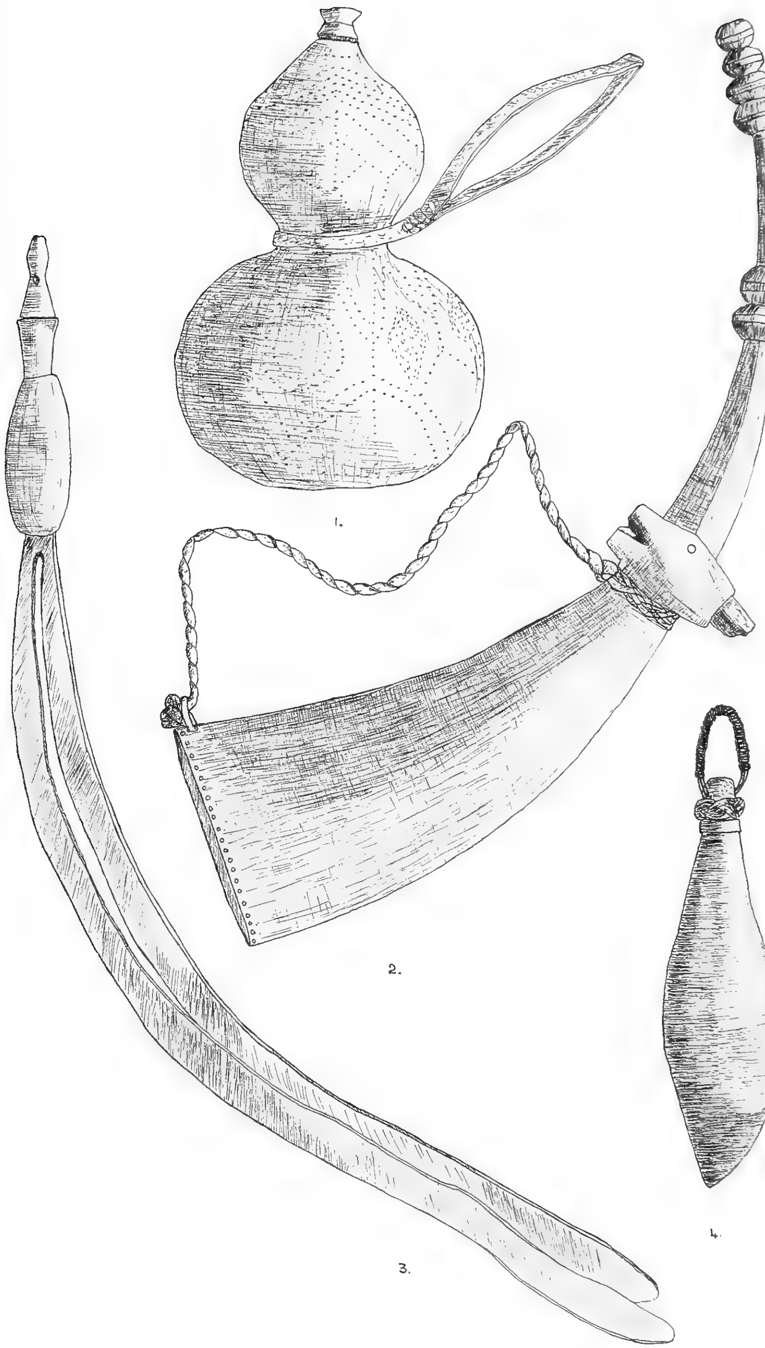
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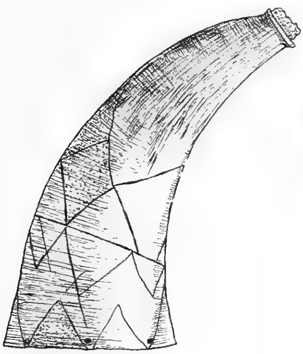
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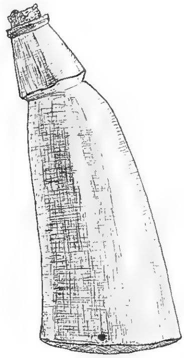
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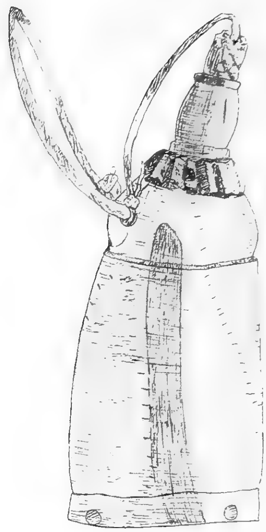
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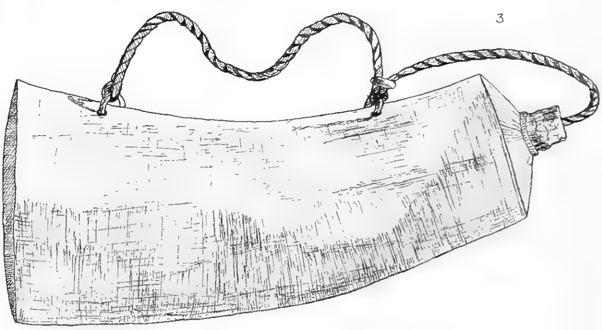
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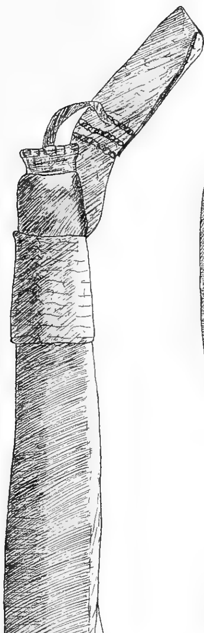
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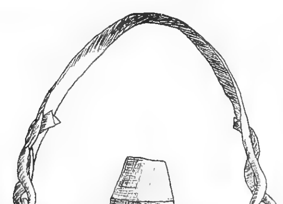
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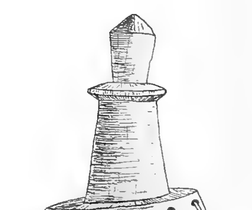
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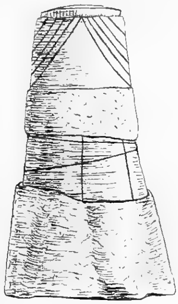
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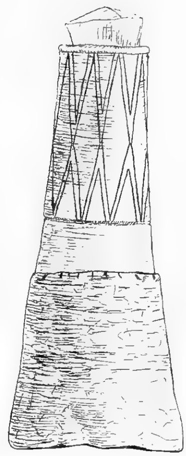
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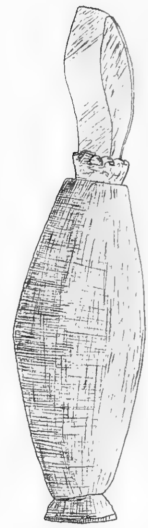
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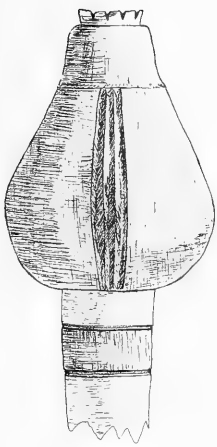
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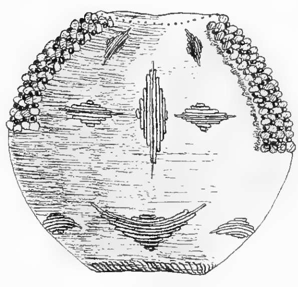
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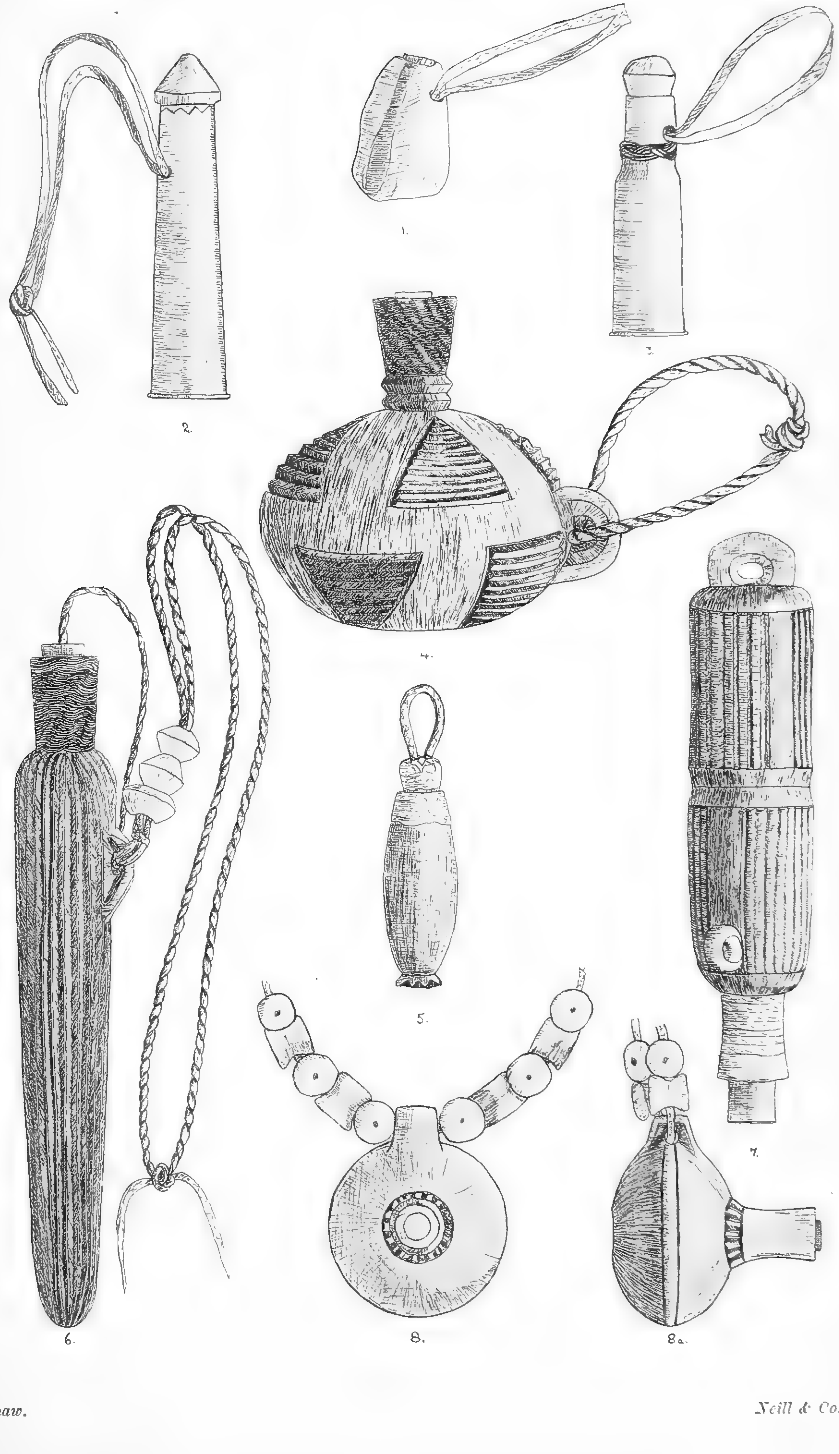
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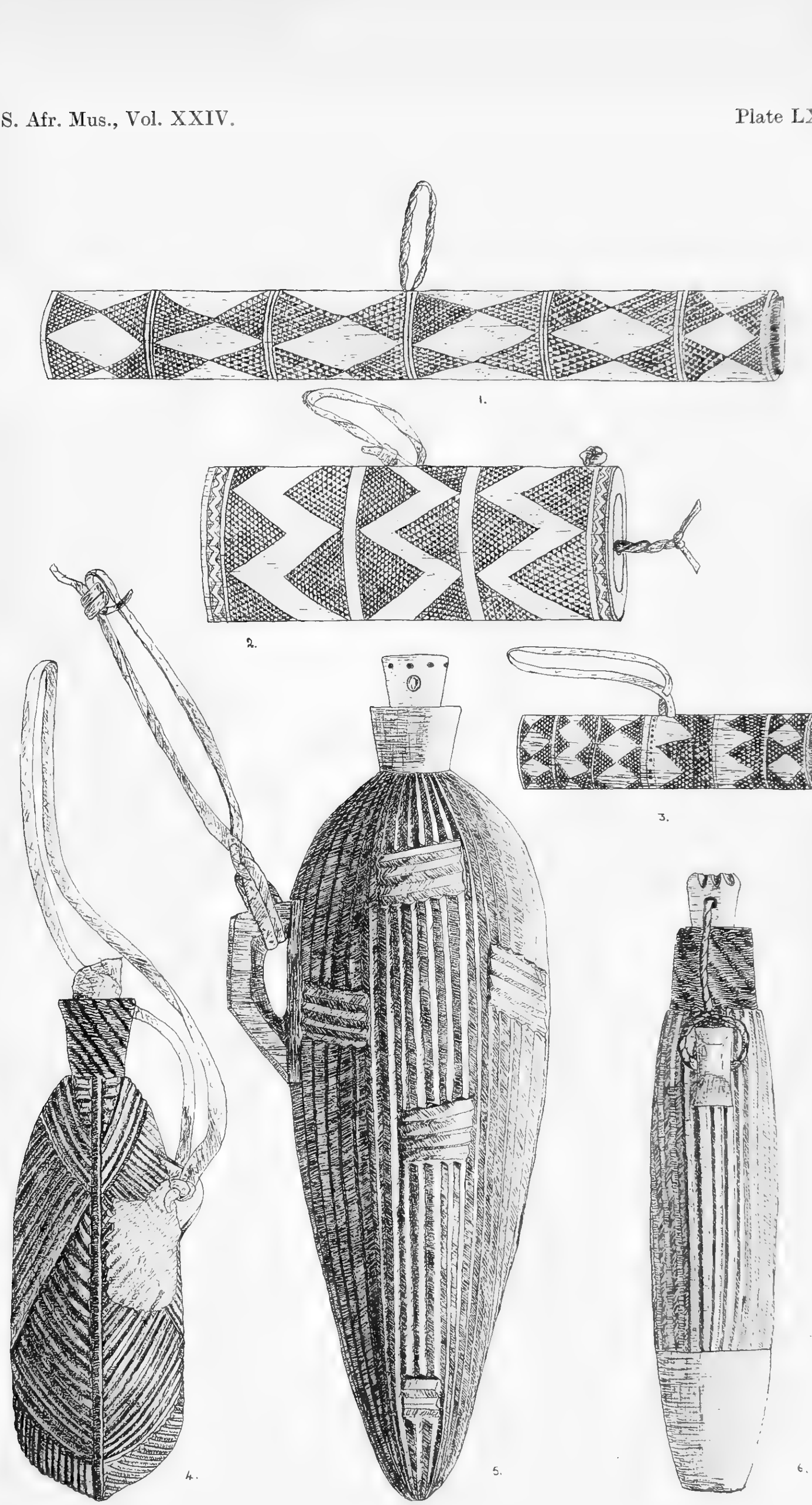

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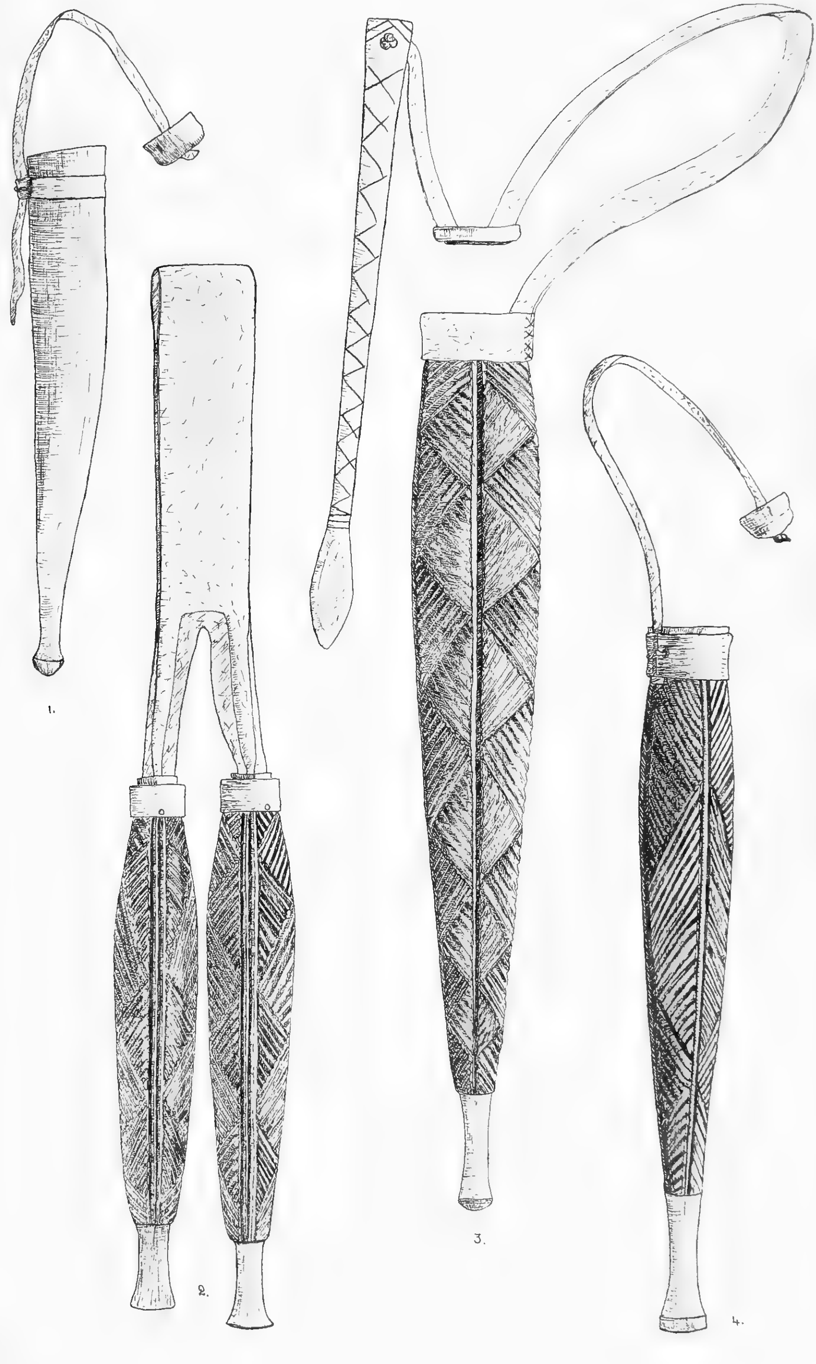

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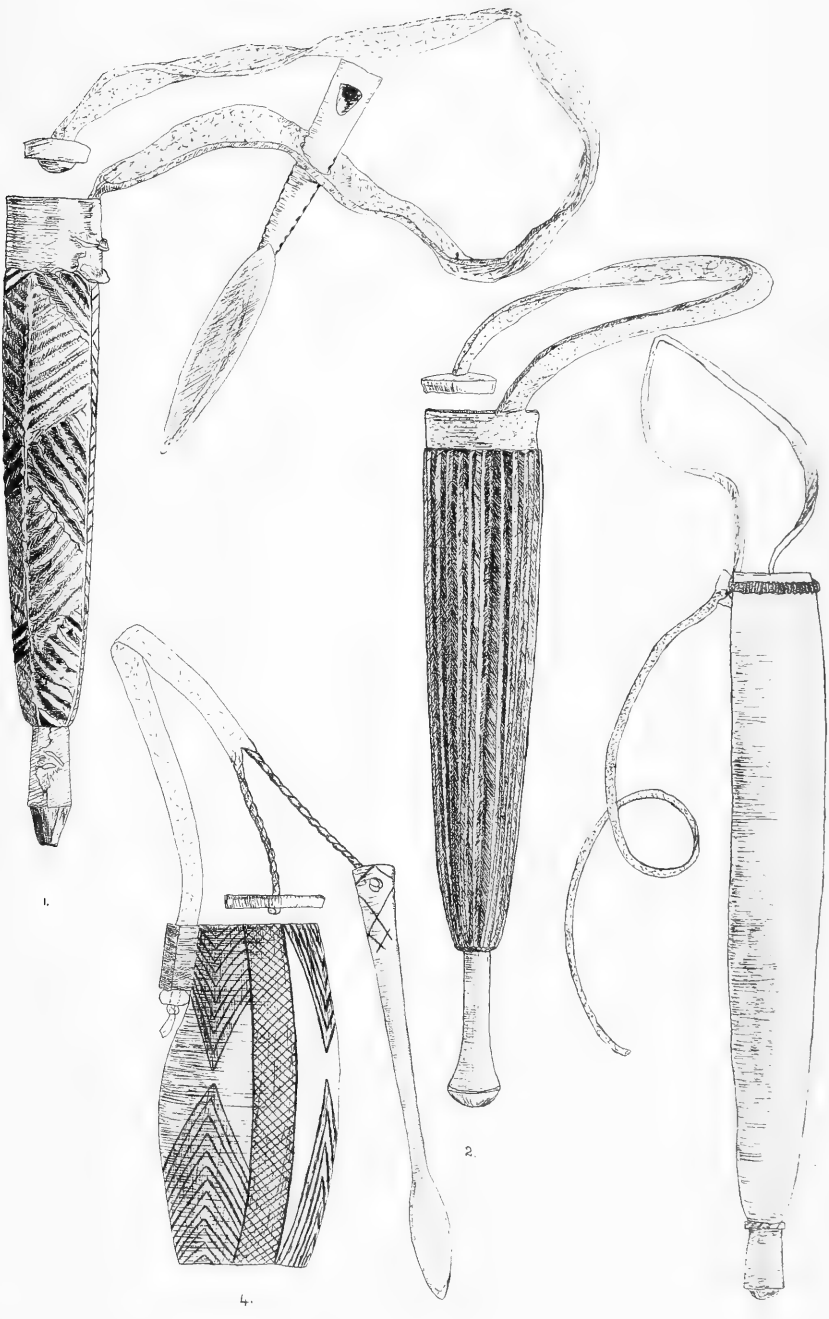

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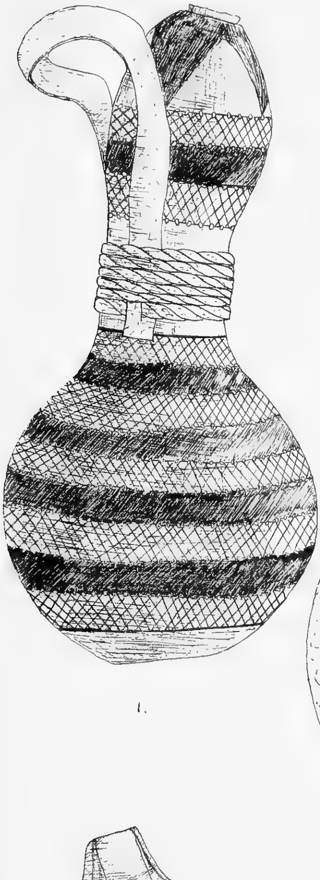

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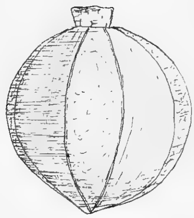

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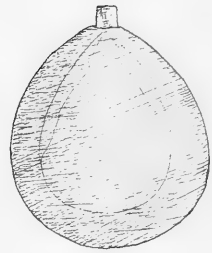

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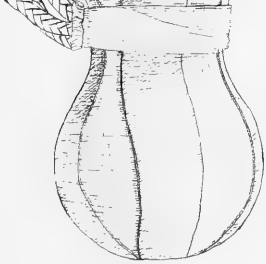

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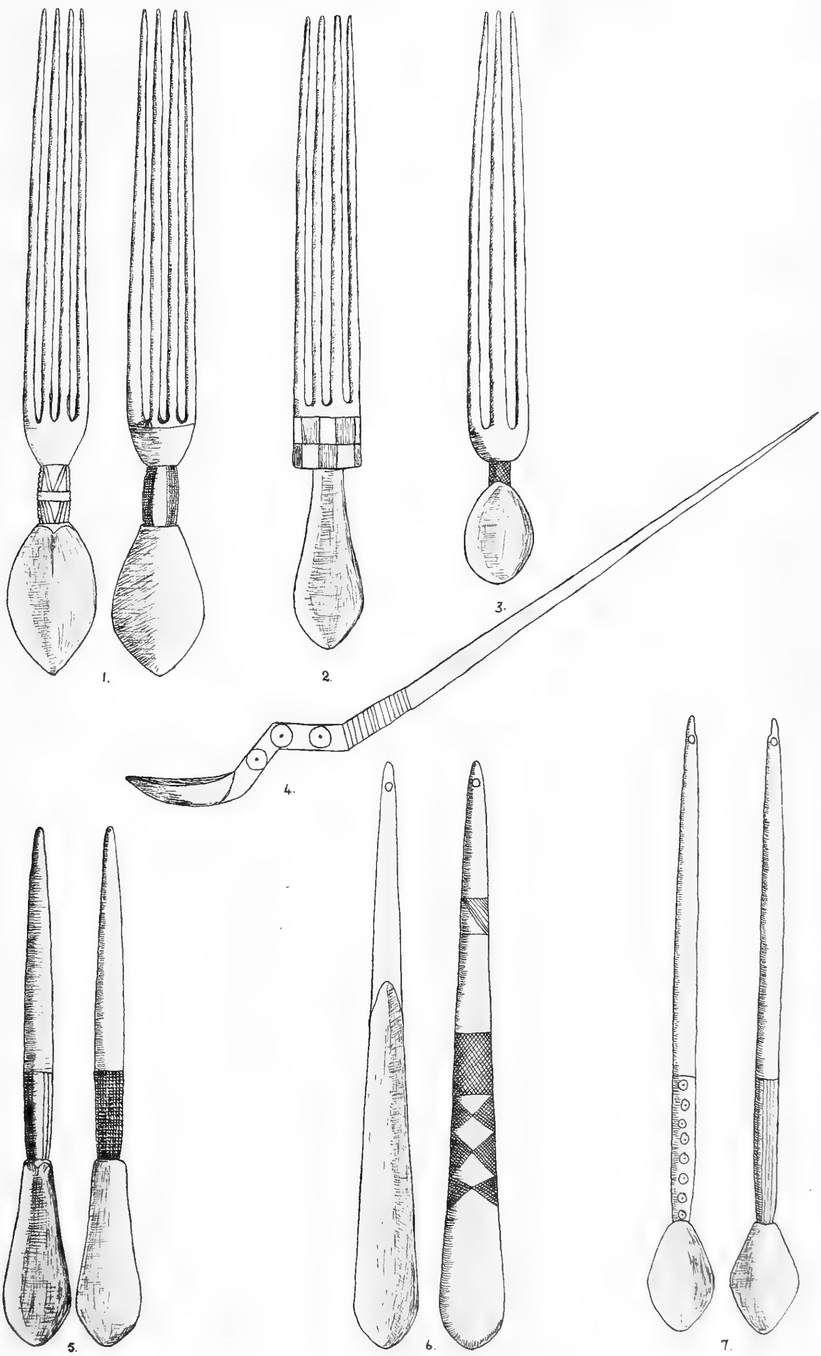

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11. *Ovambo Knives.*

By Miss M. Shaw, B.A., Assistant in Ethnology.

(With Plates LXXVI–LXXXIV.)

The knives made and used by the people of Ovamboland and their neighbours to the north and east are in many ways unique, and are restricted to a comparatively small area. They are so outstanding in shape that it is somewhat strange that they should have been so little remarked on by travellers in that region. Galton, one of the earliest travellers in Ovamboland (1851), says of the Ondonga tribe: "Their dagger-knives were creditably made and very pretty. The knife was set into a wooden handle . . . in a wooden sheath, but both handle and sheath were in part covered with copper plating and in part wound round with copper wire beaten square." (**3**). He does not remark on the shape, but the description might apply to any of the knives on Plate LXXVI. A better description comes from Schinz (**11**), who travelled in South-West Africa in 1884–87. Speaking of the dress and outfit of a man, he includes "the long dagger-knife, which is stuck in a sheath that has a window-like opening on the upper side. . . . The grip of the knife, which is used sometimes as a weapon, and sometimes as an implement or plaything, is made of wood and is often wound round with copper wire for ornament and for greater strength. Very often the wooden end is cut sloping out, and then has the strange form that is said to represent ox-horns." Passarge, in an article on the Mambukushu (**10**, p. 297), has two illustrations, reproduced on Plate LXXXIII, figs. 1 and 2, showing knives very similar to S.A.M., 1735 $_{(1)}$ (Plate LXXXIII, fig. 3). He writes: "The knife, without which one seldom sees a Mambukushu, consists of a lance-shaped blade with a wooden hilt. The most outstanding part is the wooden sheath, the bottom of which is T-shaped. This type of knife has a wide distribution in the north Kalahari and Ovamboland." Tönjes (**13**) describes among the weapons used in hand to hand fighting, "the two-edged dagger, which varies in length from 20 cm. to 75 cm., stuck in a wooden sheath. Particularly artistic examples are found among the Ondonga, neighbours of the Oukuanyama. Outstanding is one with the big triangular sheath, covered with copper wire or copper plating." Finally, Hambly (**7**, p. 175) describes the knives of the Vakuanyama of South Angola as being unique among the knives of Angola, and as "varying in length from 48 cm. to 73 cm., with a breadth of 5 cm. to 7 cm. across the scabbard. The general outline is a well-balanced ellipse. The wood is hard in texture, and dark red in colour. On one side the scabbard is left open in such a way as to display the blade, which is long, keen, and tapering. A leather thong is attached to the back . . . there is a crescentic-shaped expansion at the tip of the scabbard."

There are two sorts of knives, the ordinary ones with wooden handle and wooden sheath, and the special knives with handle and sheath covered with copper wire or copper plating. The copper-covered knives were a sign of great importance and the highest order among the Ovambo. They were the property of the chief, who gave them as a special mark of distinction to his body-guard and military leaders (**13,** p. 59), and were worn hanging on a belt on the left hip. It has been stated (**8**) that this type of knife is not made for ordinary use, but that during a war when the chief leads his warriors he wears one knife in front and one at the back. If he is in need of anything he gives the knife to a messenger, who, when he shows it, is given whatever he asks for, "a sort of king's signet, having authority to commandeer anything in the name of the chief." The ordinary wooden knives are worn on a thin leather strap, over the shoulder or on the left hip, towards the back, and are used for all everyday purposes—for hunting, as a tool, or as a weapon in fighting. One special function is mentioned by Hahn (**6,** p. 10), who says "the most favoured mode of 'smelling out' the possessors of evil spirits, wrong-doers and other culprits, is with the aid of an ordinary Ovambo knife. . . . It is placed in the fire until it is red-hot, and then, with the edge downwards, drawn across the palm of his (the witch-doctor's) hand. While doing this the witch-doctor utters the names of several suspects, and as long as the knife runs smoothly after a name has been mentioned and does not stick or blister his hand the person concerned is innocent. When, however, the progress of the knife across the palm is interrupted, causing his hand to be burnt, he jumps up, and pointing at the last-mentioned man declares him guilty. His finding is accepted as final." Another special function is mentioned by Tönjes (**14**) in speaking of a witch-doctor, "who has power to cause the death by magic of someone living at a distance. If, for example, certain people want to kill someone whom they cannot get hold of, they go to an omutikili so that the latter can assist them in the attainment of their object.

The witch-doctor asks the name of the man who is to be removed. Then he takes a pot of water and places it before him, holding his knife in his right hand. He looks steadfastly into the water and suddenly stabs the knife into it with a lightning stroke. Then he takes the vessel, covers it carefully, and puts it on one side. At this point the people . . . are taken into another place and given some food. The omutikili takes a little blood from some animal and puts it into the water in the vessel. Then he recalls the people and, carefully uncovering the pot, shows them the blood-stained water—a certain sign for them that the omutikili has got their man. They believe, in fact, that he can see in the water a picture of the man they want killed, and can murder him directly."

The main features of the Ovambo knives (omukonda) which distinguish them from other South African knives are the winged foot, the triangular opening down the front, the hole in the base of the foot, the knob-shaped top of the handle, and the shape of the opening at the top of the sheath for the blade, and of the raised projection on the back of the sheath for the attachment of a leather strap. The general outline is elliptical, the widest part being either at the mouth of the sheath or, more frequently, just below it. The horizontal section of the main part of the sheath and handle is a rather thin oval, while the horizontal section of the foot is an ellipse, widest at the centre but generally more curved on one edge than the other—most frequently the back. The two-edged blade is tanged, and the tang runs the whole length of the handle, and is visible, slightly, or bent over and beaten down, at the top. This is a common feature in South African knives. Unlike so many South African blades, the blade is not ogee in section—nor are the Ovambo iron arrow blades or assegai blades. The opening at the top of the sheath varies in shape from a plain ellipse to an ellipse with a circular hole in the centre, corresponding to the hole in the foot. The projection for the thong at the back of the sheath is generally cylindrical, sometimes quite round, and sometimes inclined to be square in section. S.A.M., 5058 $_{(1)}$ (Plate LXXIX, fig. 1) and 5368 (Plate LXXX, fig. 1) are exceptions to this, both being saddle-shaped. In nearly every case the projection is unbranded, and longer than the part above the opening in front; in a few it is the same length, and even less frequently, shorter. It is bored vertically, horizontally, or in some specimens both ways.

The decoration is done mostly with a branding iron, and is based on the general outline of the scabbard, the edges of which are branded quite black, leaving an unbranded portion in the centre, raised and well-defined in front, but in the majority of specimens less regular on the back. Some have a further slight decoration on the front, carved and then branded, always some arrangement of triangles which are the basis of nearly all the branded decoration on wooden articles manufactured by the Ovambo; the only other form used, as far as is exemplified in the Museum collection, is a ridged design.

The ornamentation is in the shape of the foot itself, and in bands of metal or wire. Many South African knife sheaths have a projecting and ornamental foot, but, with the exception of those from Ovamboland, the sheaths are in two pieces bound together, and the foot serves to keep the lower binding from slipping off. In the Ovambo knives it has no such function to serve, as the sheath is in one piece. It is possible that this form may have developed from the two-piece form, and that the foot, remaining as an ornament after its use was forgotten, may have developed as such from the reasonable dimensions of fig. 4, Plate LXXIX, to the very unwieldy size of fig. 2, Plate LXXVI. According to Schinz (**11,** p. 279), the foot is said to represent ox-horns, but this could not apply to some of the smaller feet. Mr. A. Macdonald (**8**) suggests that the shape of the foot of the ordinary knives is copied from the chief's knife, which represents the large golden hawk, which appears to have some mythical significance among the Ovambo (**5,** p. 3). It is an interesting suggestion for which I have not yet been able to find any further corroboration. Hambly states that the foot is often held between the feet to facilitate the withdrawal of the knife (**7,** p. 175), but it would hardly be developed for that purpose. The shape of the head, too, is often ornamental. The original metal ornamentation was undoubtedly copper, which is mined in the country, but contact with Europeans has brought brass (Plate LXXXIII, fig. 3) and hoop iron (Plate LXXXII, figs. 1, 2, and 3) into use. Besides being ornamental, these bands serve at the same time to prevent the sheath from splitting, as, slender to begin with, the continual friction of the knife blade tends to wear away the edges inside. The wire is fastened by inserting each end into the wood of the sheath, and the metal plating is fastened at the back, either by nailing with small copper nails down each edge (Plate LXXVI, fig. 4, handle)—seldom do they overlap—or by hooking a short piece of thick copper wire through holes in each side (Plate LXXVI, fig. 3), or even by tying with string (Plate LXXVI, fig. 4, sheath).

The wood used for the handle and sheath is taken from the Omuandi tree (*Diospyros mespiliformis*, Hochst.), which is also valued as an edible fruit tree. Other woods are sometimes used, but not as commonly. Several specimens, particularly in Class I, look as if the whole scabbard has been made in one piece, then cut in two, horizontally, for the handle and sheath, and then hollowed out for the tang and blade. The first step in the hollowing appears to have been to pass a red-hot wire through the sheath and revolve it, thus producing the hole in the base of the foot and the circular centre of the elliptical opening at the top of the sheath. The same would be done for the handle, or if handle and sheath were carved in one the wire might be passed through the whole scabbard before separating the two parts. The method described by Mr. A. Macdonald (**8**) is that "first they scoop out as much as is possible with a knife, and then burn the rest out with the blade of the knife." He says nothing about the hole, but it might quite possibly act as a starting-point. The opening in the sheath is probably cut at the same time to facilitate the work. Schinz (**11,** p. 279) gives it as his opinion that this was the whole function of the opening, "because the native not only lacks the tools to hollow out a thin or narrow object, but also lacks the skill to make a wooden object out of two pieces fastened together." In contradiction to the first point, the Museum has two specimens, $3134_{(1 \text{ and } 2)}$ (Plate LXXVII, fig. 3), with no opening down the front, nor have any of the handles an opening down the front. (It is interesting to note that the only specimens in the Museum collection with no opening down the front have a hole in the foot, and the only specimen without the hole (S.A.M., $4846_{(2)}$, Plate LXXVIII, fig. 3) has an opening.) The second point seems to be too unlikely to be worth consideration, particularly as all the other tribes in South Africa make their knife sheaths in two pieces. On the other hand, the copper-covered specimens, even those made for covering, all have the **V**-shaped opening in the wood under the copper, which would seem to support Schinz's theory.

The copper was mined in the country (**2**). It was smelted from ore obtained in the vicinity of the present mines in the Grootfontein-Otawi district, south-east of Ondonga. The Ondonga tribesmen were the most noted copper-smiths, and obtained their ore half as tribute, half as barter, from the Bushmen who collected it. It was all taken to the chief, who had it smelted and sold in ingots. The Ondonga were the only tribe that exported copper, trading it a great distance for pottery and tobacco (**11,** p. 293; **4**; **5,** p. 35). The copper plate in the knives is beaten quite thin, and the wire is flat rectangular in section, and in every case but one is twisted spirally before binding on the knife. The exception is S.A.M., 3310 $_{(1)}$ (Plate LXXVI, fig. 3), on which it is flat, with diagonal incisions on the edges. On most of the specimens, particularly S.A.M., 5059 (Plate LXXVI, fig. 1), the wire appears from the sharpness of the edges to have been cut in thin strips rather than drawn.

Iron was also formerly obtained from native mines in the country, and a great deal was and still is obtained in South Angola, north of Evale. "In former years iron was obtained from native ores mined in Angola, but since access to the mines has been cut off" (presumably by European political divisions) "scrap-iron of every description has taken the place of native iron" (**5,** p. 35). Tönjes (**13,** p. 59) writes that each smith fetched his own iron from the mines north of Uukuanyama. These are probably the Angolan mines mentioned above, as the northern portion of the Uukuanyama tribe is situated in South Angola. According to custom, they could only fetch it once a year at the time of the great national festival (Osimanja). They took helpers with them, and if possible smelted the iron ore on the spot, so as to make it easier to carry. Estermann (**2**) contradicts Hahn's statement that access to the Angolan mines has been cut off, and says the yearly pilgrimage still takes place. Only certain tribes make iron articles and trade them to the others. The Uukuanyama are the most noted iron-smiths (**11,** p. 293; **5,** p. 36), and their knife blades are much better than those of the Ondonga. Native smiths undergo a long period of training and show great skill, considering their primitive implements, which consist of a hammer (ofilua), tongs (onuato), anvil (osikalo), and bellows (omupepo) (**5,** p. 36; **13,** p. 59). Some smiths specialise in certain articles. A large number are still to be seen at work in certain districts, particularly in Uukuanyama, but European contact and competition is fast causing their disappearance (**3**; **13,** p. 59).

The knives are distributed firstly over the whole of Ovamboland, spreading from there north into Angola, where they are found among those of the Uukuanyama tribe who live over the border (**7,** p. 175), and among the Humbe natives, their neighbours to the west, on the north and west banks of the Kunene. (Baum, pp. 55 and 70, has photographs of natives, presumably Ovahumbe, wearing these knives.) In the east they are found among the Ovakuangari in the bend of the Okavango River (Baum, p. 67, photograph of the Kuangari chief, "whose subjects belong to the Ovambo tribe," wearing this type of knife), and farther down the river among the Mambukushu (**10,** pp. 296 f.), from where they have had a definite influence on those of the Barotse tribes living on the western bank of the Zambesi. Presuming that the form was evolved in Ovamboland, it is very easy, in view of the constant trading, and the presence of three big rivers, Kunene, Okavango, and Zambesi, to see how it could have spread north and east. It must not be forgotten, however, that the Ovambo travelled across Africa from the east, so that the present form of the Ovambo knife may be a local development of the Barotse form, rather than vice versa, or both may have a common ancestor. But it seems fairly evident that in its present form it has travelled eastwards again. Müller (**9**) shows two knives identical with those figured on Plate LXXXI of this volume. They were collected in "Zambesia," but obviously do not belong there, and must have travelled down the Zambesi, after reaching it via the Ovakuangari and the Mambukushu. In Angola the Vakuanyama are only another section of an Ovambo tribe, and it is in their territory that the mines which supplied most of the iron ore are situated. Trade between the various tribes as far as those north of the Kunene has always been brisk (**13,** pp. 84 and 85). The Ovambo tribes also sent expeditions to the Mambukushu (**13,** p. 85), who in their turn traded back along the Okavango River, as far into Ovamboland as the Ondonga. According to Passarge (**10,** p. 299) knives made from raw iron obtained from the Barotse, were among the articles traded to the Ovambo for corn and copper by the Mambukushu. It is quite possible that they adopted the pattern as a better trading proposition, as no other type of knife appears to be used in Ovamboland. The Mambukushu also traded extensively with the Barotse Zambesi tribes on the east (**12,** p. 210), from whom they obtained not only raw iron but finished knives. Culturally the Mambukushu have much in common with both the Ovambo and the Barotse, though they claim to be descended from the latter. Passarge thinks they must have learned smithing while still in Barotseland, before settling in their present district, because iron ore is not found there and they work only in imported iron (**11**). All these tribes too were visited by the Mambari (Portuguese half-caste traders) until the ivory which attracted them was exhausted. There is an interesting mixture of types in the example figured by Passarge, and reproduced on Plate LXXXIII, fig. 1, in which the handle inclines to the Barotse style and the sheath to the Ovambo.

Most unfortunately very few of the specimens in the Museum have been labelled as more than "Ovambo," without any details as to the district or tribe from which they were procured, which, together with the lack of literature on the subject, makes it impossible to correlate style and tribe, if such a relation exists, which is doubtful. The only thing that is apparent from the literature is that the best blades were made by the Uukuanyama (**5**), and the most artistic sheaths by the Ondonga (**13**, p. 59).

The ordinary knives may be classified according to the shape of the scabbard. I have made three main divisions.

I. Made of hard light-coloured wood, rather yellowish in the new and unused specimens, but toned down to a dull brown in the older ones; slender, with narrow opening in the front, and small or medium winged foot; edges branded, with raised portion in the centre, back and front, left unbranded and outlining the shape of the scabbard; handles narrowing and then flanging again to a knob, some shouldered, some not; the blade varies from lancet to **V**-shape, and has a slight thickening on both faces for the midrib.

(*a*) S.A.M., 3133, 3135 (Plate LXXVII, fig. 1), 4846 $_{(4)}$, and two exceptions, 3134 $_{(1 \text{ and } 2)}$ (Plate LXXVII, fig. 3).

The foot is an ellipse both in front view and in horizontal section; in the latter the greatest curve is at the back. The projection is bored horizontally (except 3134 $_{(1)}$, vertical). The raised portion in front is rounded and decorated. S.A.M., 3134 $_{(1 \text{ and } 2)}$ are exceptions to the whole collection in that they have no opening down the front of the sheath. The blade is lancet-shaped, with ordinary midrib and sharpened edges. The handle is unshouldered, with narrow neck and short flanging knob.

(*b*) S.A.M., 4122, 4123 $_{(1)}$ (Plate LXXVII, fig. 2), and 4846 $_{(3)}$.

The foot is similar to (*a*), but more curved along the bottom and less on top. The projection is bored horizontally. The raised portion in front rises to a central ridge, and is decorated. The blade is straight to **V**-shaped (possibly lancet when new) with ordinary midrib, very slight in two specimens, but more definite in 4123 $_{(1)}$, and ogee in parts (probably accidentally). The handle has slight shoulders, a long neck, and square-oval knob, except 4123 $_{(1)}$, which has definite shoulders, a narrow neck (no length), and round-oval knob.

(*c*) S.A.M., 4846 $_{(2)}$ Plate LXXVIII, fig. 3).

Foot straight along the top and very curved at the bottom; it is exceptional in that it has no hole in the base. The projection is bored horizontally. The raised portion in front is flat and decorated. The blade is straight, with ordinary fairly pronounced midrib. The handle is shouldered with medium neck and round knob.

(*d*) S.A.M., 361, 1736 $_{(1 \text{ and } 3)}$ (Plate LXXVIII, figs. 1 and 2), 1736 $_{(2)}$, 4846 $_{(1)}$ (Plate LXXIX, fig. 4), 5058 $_{(2)}$ (Plate LXXIX, fig. 2), and 5058 $_{(1)}$ (Plate LXXIX, fig. 1), which is slightly variant.

The foot has a pronounced curve along the bottom, while the top is straight in three specimens (1736 $_{(2 \text{ and } 3)}$ and 4846 $_{(1)}$), a straight slope in two specimens (5058 $_{(1 \text{ and } 2)}$), and curved like (*a*) in two specimens (361 and 1736 $_{(1)}$). The projection is bored vertically (except 1736 $_{(1)}$ horizontal, and 1736 $_{(3)}$ not at all). The raised portion in front is well raised, rises to a central ridge with slightly concave wings, and is undecorated. The blade is straight to V-shaped in four of the specimens (possibly wear from very slight lancet shape), and lancet in three (4846 $_{(1)}$ and 5058 $_{(1 \text{ and } 2)}$). There is a slight, ordinary midrib, except in 5058 $_{(2)}$, where it is pronounced, and in 5058 $_{(1)}$, which has none at all. The handle is unshouldered with slender neck and flanging knob, round in four specimens, and round-oval in three (361 and 5058 $_{(1 \text{ and } 2)}$).

(*e*) S.A.M., 2101 $_{(4)}$, 2159, 2270 (Plate LXXIX, fig. 3), and 5185 (Plate LXXX, fig. 3).

The horns of the foot are very pointed, the bottom has a pronounced curve, and the top has a straight slant or a slight curve. The projection is bored vertically. The raised portion in front is undecorated and slightly rounded (except 5185, which has a small conical knob on the sheath and lacks the raised ridge round the V-shaped opening). The widest part of the raised portion is at the top of the opening (except 5185), instead of the top of the sheath as in the other specimens. The blade is lancet-shaped in two specimens (5185 and 2101 $_{(4)}$), and V-shaped in the other two. There is an ordinary midrib—slight to medium. The handle is shouldered, with a narrow neck (no length), and a round knob.

S.A.M., 5294 (Plate LXXX, fig. 2) and 5368 (Plate LXXX, fig. 1) belong to the same class but are rather exceptional. In 5294 the blade is **V**-shaped with medium ordinary midrib, and in 5368 tends to lancet shape with very much raised ordinary midrib.

II. Made of hard light-coloured wood toned down to a dull brown; large, with medium opening in the front of the sheath, a large decorated foot, and a handle with a large flat knob. The branding is similar to Class I.

S.A.M., 50 (fig. 4), 2101 $_{(1, 2, \text{and } 3)}$ (Figs. 1, 3, and 5), 3315 (fig. 2), and 5358 (fig. 6)—all on Plate LXXXI.

The plate shows the major differences in the scabbard, which do not appear to be correlated at all. The projection is bored vertically (except 2101 $_{(1)}$, both ways). The blade is lancet-shaped (except 2101$_{(3)}$, which is **V**-shaped with ordinary midrib). S.A.M., 2101$_{(2)}$ (fig. 3) is the best example of the type of blade—very curved lancet-shape, with flat wings, and a raised, almost semicircular midrib on the front surface, and a slightly raised ordinary midrib on the back. This type of midrib is not found on Class I knife blades nor on the arrow blades, but is found on Class III knife blades, and on all the assegai blades in the Museum collection, the majority of the latter having it on both surfaces.

To this class belongs the knife figured by Müller and Snelleman (**9**), collected in "Zambesia."

III. Made of hard red wood capable of a high polish; short, with wide openings in the front of the sheath, a funnel-like knob on the squat handle, and a rather squat triangular foot. They are not branded nor have they a raised portion back and front, but all have a band of leather or tin round the top of the sheath.

S.A.M., 3309 (fig. 3), 3313 (fig. 1), and 3314 $_{(1 \text{ and } 2)}$ (fig. 2)—all on Plate LXXXII.

The projection is bored vertically, and the scabbards are practically identical except for the extra width of 3313. The blade is the same type as Class II, though in 3314 $_{(1 \text{ and } 2)}$ the midrib is so worn as to appear almost ordinary.

The knife figured by Hambly (**7,** Plate xvi, fig. 10), from the Vakuanyama of Angola, is like Class I, *a*; S.A.M., 361, an example from Humpata, Angola, is like Plate LXXVIII, fig. 1, Class I, *d*; and those shown in Baum's photographs of the Humbe natives (**1,** pp. 55 and 79) are like Plate LXXX, fig. 3, Class I, *e*, and Plate LXXXIII, fig. 3.

The copper-covered knives are in two classes: those made expressly for covering with copper, of which there are two types, illustrated on

Plate LXXVI, fig. 1 (S.A.M., 5059), made of soft light-coloured wood, and fig. 2 (S.A.M., $2102_{(1)}$, made of hard light-coloured wood; and secondly, those which appear to have been made as ordinary knives and covered later with copper or brass—Plate LXXVI, figs. 3 and 4 (S.A.M., $3310_{(1 \text{ and } 2)}$, and Plate LXXXIII, fig. 3 (S.A.M., $1735_{(1)}$). It is difficult to say whether these latter belong to the same class as the former, even though all copper is the perquisite of the chief (**11,** p. 293), because he sells it. The blades appear to follow the type of scabbard to which the knives belong.

S.A.M., $1735_{(1)}$ (Plate LXXXIII, fig. 3), has a worn lancet blade like Class I above, which it most resembles in shape of scabbard.

S.A.M., $2102_{(1)}$ (Plate LXXVI, fig. 2), has a worn **V**-shaped blade, with a semicircular midrib on one side, like Class II, to which it belongs in shape of scabbard, but S.A.M., $1735_{(2)}$, which is identical in shape, has a **V**-shaped blade with an ordinary midrib.

S.A.M., 5059 (Plate LXXVI, fig. 1) and $1735_{(3)}$ belong to none of the above-mentioned classes. 5059 has a slight but definite ogee section (the only one in the collection), and $1735_{(3)}$ is almost flat with a scarcely perceptible ordinary midrib.

S.A.M., $3310_{(1)}$ (Plate LXXVI, fig. 3), like Class III, has a lancet-shaped blade and semicircular midrib, but $3310_{(2)}$ (Plate LXXVI, fig. 4) of the same class, has a **V**-shaped blade and ordinary midrib.

The information available shows three types of Mambukushu knife (simenti):—

1. The knives illustrated by Passarge (**10,** p. 297) (Plate LXXXIII, figs. 1 and 2). These are very similar to Ovambo knives in the Museum.
2. S.A.M., 478 (Plate LXXXIII, fig. 4), a specimen from Sesheke, Zambesi (not necessarily made there), which might be called an intermediate type, the shape being Ovambo and the decoration Barotse. There are two knives in one sheath, similar to Class II, Ovambo, with cross-hatched diamond decoration that is not characteristic of Ovambo knives, but does appear on some very modern wooden utensils in the Museum collection.
3. S.A.M., $4861_{(1 \text{ and } 2)}$ (Plate LXXXIV, figs. 1 and 4), two specimens labelled "Mampukushu, Barotseland," similar to but much larger than Class III, Ovambo, with ridged and branded decoration, which, although not characteristic of Ovambo knives, is seen on two modern snuff-boxes (S.A.M., 5435 and 5436).

Two Mambunda knives, S.A.M., 2936 and 4860 (Plate LXXXIV, figs. 2 and 3), though different in shape, show relationship to the Ovambo style in the openings in the sheath, one having them back and front.

The Bushmen tribes which live in scattered groups over most of this area have adopted many articles from the Ovambo, and amongst them knives. Two specimens, S.A.M., 5408, made by the Bushmen of the Sandveld, and a specimen in the University collection (U.C.T., 35–108, kindly lent by Mr. A. J. H. Goodwin), made by the Kung Bushmen in the north-east of S.W. Africa, though roughly made, are so like the Ovambo knives of Class I that it is not necessary to illustrate them. The University specimen differs in that the sides are not branded. It has a band of the tin off the back of a mirror round the neck of the handle. The Museum specimen is identical with the knives in Class I, *a*.

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EXPLANATION OF PLATES.

Plate LXXVI.

1. S.A.M., 5059. Knife with sheath of soft wood, hollowed at the top for the blade, and having a short **V**-shaped opening in the front. The lower edge is covered with copper plating, nailed along the top with copper nails and welded at the corners. The mouth has a narrow band of copper, which covers the pro-

jection at the back and is hooked together in the centre with copper wire. The remainder of the sheath is wound round with spirally twisted flat copper wire, each coil of which fits into a groove made in each edge of the wooden sheath. The base of the handle is covered with copper plating fastened in the same way, and the top of the knob is covered with a thin piece of brass hammered down. The neck is loosely wound with similar wire. The short projection at the back is bored vertically. The short blunt blade has a raised midrib and, contrary to the general rule, is slightly ogee in section.

	Inches.		Inches.
Total length	$7\frac{7}{16}$	Width of handle at base . .	$1\frac{5}{8}$
Width at base . . .	$10\frac{1}{8}$	Width of handle at neck .	$\frac{9}{16}$
Depth of copper plating at base	$\frac{3}{4}$	Diameter of knob . . .	$1\frac{1}{16}$
Width of top of sheath . .	$1\frac{5}{8}$	Length of blade . . .	$3\frac{9}{16}$
Depth of copper plating at top	$\frac{13}{16}$	Greatest width of blade . .	$1\frac{3}{16}$
Length of handle . . .	2		

Ondonga.

2. S.A.M., $2102_{(1)}$. Knife with sheath and handle of hard wood, outstanding for its breadth across the foot, which is separate from the rest of the sheath. It is covered with copper plating, which overlaps and is nailed down on the back. It appears to have had two round discs nailed on the front near the centre. The stem of the sheath is inserted under the copper in front, and cut to fit at the back of the foot, but this has not proved strong enough, and it has had to be bound with fine (European made) brass wire. The upper portion as far as the opening and including the projection at the back (which is bored vertically) is covered with copper, overlapping and nailed down at the back. The remainder is wound with spirally twisted copper wire. The lower part of the handle is covered with copper plating fastened by hooking together with copper wire. The neck and knob are wound with spirally twisted copper wire, leaving the flat top uncovered. The blade is narrow, V-shaped, with raised midrib.

	Inches.		Inches.
Total length	$9\frac{7}{8}$	Width of handle at base . .	$1\frac{3}{8}$
Width across foot . . .	$17\frac{9}{16}$	Width of handle at neck .	$\frac{1}{2}$
Width at bottom of sheath .	$1\frac{1}{16}$	Diameter of knob . . .	1
Width at top of sheath . .	$1\frac{3}{8}$	Length of blade . . .	$6\frac{1}{4}$
Length of handle . . .	$3\frac{1}{8}$	Greatest width of blade . .	$\frac{13}{16}$

No history.

3. S.A.M., $3310_{(1)}$. This specimen appears to have been an ordinary wooden knife, similar to fig. 2, Plate LXXXII, ornamented with copper. The sheath is made of hard reddish wood, very flat-oval in section, and has a wide opening in front, almost the entire length of the sheath. The solid portion at the top is made up of two rectangular pieces of wood hammered in and reinforced by a band of leather. It is difficult to say whether it was made this way, or mended after splitting. The crescentic piece of copper on the foot is seated on grease, each end tapering to a long point which is passed through the foot and bent down at the back. Two similar but straight pieces form bands, one round the mouth over the leather, and the other towards the centre of the sheath. The remainder is wound with flat copper wire. The handle is covered with two pieces of copper, fastened like

figs. 1 and 2. The roughly-made blade is leaf-shaped with raised midrib, which is inclined to be semicircular in section.

	Inches.		Inches.
Total length	$9\frac{3}{8}$	Width of handle at neck .	$\frac{1}{2}$
Width across foot . . .	$3\frac{3}{4}$	Diameter of knob . . .	$\frac{15}{16}$
Width at top (without copper)	$1\frac{7}{16}$	Length of blade . . .	$5\frac{3}{8}$
Length of handle . . .	$3\frac{1}{8}$	Greatest width of blade . .	$1\frac{1}{8}$
Width of handle at base .	$1\frac{5}{8}$		

No history.

4. S.A.M., 3310 (2). Knife similar to fig. 3. The foot, the top of the sheath and the lower portion of the handle are covered with copper plating, nailed at the back of the handle, nailed and hooked on the foot, and lashed with twisted fibre at the top of the sheath. The remainder of the sheath and the neck of the handle are wound with twisted copper wire. The blade is V-shaped with a slight midrib.

	Inches.		Inches.
Total length	$10\frac{7}{8}$	Width of handle at shoulders .	$\frac{9}{16}$
Width across foot . . .	$4\frac{1}{4}$	Diameters of top of knob .	$\frac{15}{16} \times \frac{7}{8}$
Greatest width of sheath .	$1\frac{3}{8}$	Length of blade . . .	$5\frac{1}{4}$
Length of handle . . .	$3\frac{5}{16}$	Greatest width of blade . .	$\frac{15}{16}$
Width of handle at base . .	$1\frac{3}{8}$		

No history.

Plate LXXVII.

1. S.A.M., 3135. Large knife with light-coloured wooden sheath, which terminates in a small winged foot, and has a V-shaped opening down the front. The opening is outlined by a narrow raised ridge, which continues along the base of the foot, and at the top of the sheath becomes a platform, which continues in the same shape on the handle. The back has a similar slightly raised ellipse, both being left their natural colour while the edges are branded. The projection at the back of the sheath is bored horizontally. The blade is lancet-shaped with a definite but very crooked midrib, and sharpened edges.

	Inches.		Inches.
Total length	$25\frac{3}{4}$	Diameters of knob .	$1\frac{9}{16} \times 1\frac{5}{16}$
Width across foot . . .	$2\frac{11}{16}$	Length of blade . . .	$17\frac{7}{8}$
Greatest width of sheath .	$2\frac{1}{4}$	Greatest width of blade . .	$1\frac{3}{8}$
Length of handle . . .	$6\frac{7}{8}$	Length of projection . . .	$4\frac{7}{16}$
Width of handle at neck .	$\frac{5}{8}$		

From Karibib, S.W. Africa.

2. S.A.M., 4123 (1). Knife with wooden sheath and handle, below the knob of which there is a band of tightly-wound fine copper wire. The edges are branded and the raised central portion back and front left natural colour. The cylindrical projection at the back is bored horizontally near the top, and has also a hole in the top, as if the maker had commenced boring vertically. A short thong is passed through and knotted in a loop. The narrow sharply-pointed blade has a distinct midrib.

	Inches.		Inches.
Total length	$17\frac{1}{2}$	Diameters of knob .	$1\frac{3}{4} \times 1\frac{15}{16}$
Width across foot . . .	$2\frac{5}{16}$	Length of projection . .	$2\frac{3}{4}$
Greatest width of sheath .	$1\frac{3}{8}$	Length of blade . . .	$13\frac{3}{16}$
Length of handle . . .	$4\frac{1}{4}$	Greatest width of blade . .	$\frac{15}{16}$
Width of neck . . .	$\frac{3}{8}$		

Uukuanyama, Mafa, Ovamboland.

3. S.A.M., 3134. Knife similar to fig. 1. Unlike all the others, it has no opening in the front of the sheath, and has merely a continuation of the raised ellipse, left unbranded. There is a similar plain raised ellipse on the back, only the edges and the triangular decoration in front being black. The projection at the back is bored vertically. The blade is lancet-shaped, and has a slight midrib.

	Inches.		Inches.
Total length	$8\frac{9}{16}$	Diameters of knob .	$1\frac{5}{16} \times 1\frac{1}{8}$
Width across foot . . .	2	Length of blade . . .	$4\frac{1}{2}$
Greatest width of sheath .	$1\frac{1}{8}$	Greatest width of blade . .	$\frac{11}{16}$
Length of handle . . .	$3\frac{7}{8}$	Length of projection . .	1
Width of handle at neck .	$\frac{1}{2}$		

From Karibib, S.W. Africa.

Plate LXXVIII.

1. S.A.M., 1736 $_{(1)}$. Knife with wooden handle and sheath, having the edges branded and a raised unbranded central portion which outlines the **V**-shaped opening and the lower half of the foot, and rises concavely to a central ridge at the top of the sheath and on the handle. The projection is bored diagonally upwards from the sides near the top, so that the holes meet in the centre, and a conical hole is bored vertically from the top to meet them. The effect, intentional or not, has been to fix the thong loop more or less immovably. The blade is **V**-shaped with raised midrib.

	Inches.		Inches.
Total length	$13\frac{3}{8}$	Diameters of knob .	$1\frac{5}{16} \times 1\frac{1}{4}$
Width across foot . . .	$2\frac{1}{2}$	Length of projection . .	$2\frac{5}{16}$
Greatest width of sheath .	$1\frac{3}{8}$	Length of blade . . .	$4\frac{1}{4}$
Length of handle . . .	$4\frac{5}{16}$	Width of blade at top . .	$\frac{7}{8}$
Width of handle at neck .	$\frac{17}{32}$		

Northern Ovambo.

2. S.A.M., 1736 $_{(3)}$. Knife similar to fig. 1, very long and slender, with more elaborately carved neck and knob. The thin projection at the back is not bored at all. The slender blade is lancet-shaped with a slight midrib.

	Inches.		Inches.
Total length	$26\frac{3}{4}$	Diameter of knob . . .	$1\frac{9}{16}$
Width across foot . . .	$1\frac{7}{8}$	Length of blade . . .	$9\frac{1}{2}$
Greatest width of sheath .	$1\frac{3}{8}$	Greatest width of blade . .	$\frac{15}{16}$
Length of handle . . .	$5\frac{3}{4}$	Length of projection . .	$2\frac{7}{8}$
Width of handle at neck .	$\frac{1}{2}$		

Northern Ovambo.

3. S.A.M., 4846 (2). Knife with light-coloured wooden handle and sheath. In section the lower part of the sheath is oval, but the upper part and the handle have had the edges cut square. The sides of handle and sheath are branded, leaving a raised unbranded central portion back and front. This portion is flat until half-way up the handle, where it rises to a central ridge. The triangular decoration is branded. This is the only knife in the Museum collection with no hole in the foot. The projection at the back of the sheath is bored horizontally near the centre, and has a short thong passed through twice, attaching the knife to a larger thong loop which is fastened by looping one end through a slit in the other. There is a wide band of hoop iron round the sheath below the projection, fastened at the back with brass wire. The blade is lancet-shaped with raised midrib.

	Inches.		Inches.
Total length	$16\frac{7}{8}$	Diameters of knob . .	$1\frac{11}{16} \times 1\frac{5}{8}$
Width across foot . . .	3	Length of projection . .	$1\frac{15}{16}$
Greatest width of sheath .	$1\frac{11}{16}$	Length of blade . . .	$10\frac{1}{4}$
Length of handle . . .	$5\frac{1}{8}$	Greatest width of blade . .	$\frac{13}{16}$
Width of handle at shoulders .	$\frac{3}{4}$		

Uukuanyama.

PLATE LXXIX.

1. S.A.M., 5058 (1). Knife with wooden handle and sheath. At the back of the sheath is a saddle-shaped projection which is bored cylindrically for the passage of a thong. The greater part of the back and front is raised and left natural colour; the sides are blackened by branding. The raised edges outlining the opening are continued as an edging to the top of the handle, and the wood between them rises to a central ridge. The knob of the handle is oval with straight ends. The blade is lancet-shaped and quite flat in section until $\frac{1}{8}$ inch before the sharpened edges.

	Inches.		Inches.
Total length	$15\frac{1}{4}$	Length of handle . . .	$5\frac{3}{8}$
Width across foot . . .	3	Diameters of top . .	$2\frac{1}{16} \times 1\frac{7}{16}$
Greatest width of sheath .	$2\frac{1}{8}$	Length of projection . .	$2\frac{3}{4}$
Greatest width of blade . .	$1\frac{1}{2}$	Length of blade . . .	$8\frac{7}{8}$

Ondonga.

2. S.A.M., 5058 (2). Knife similar to fig. 1, but without the raised edging to the central light-coloured portion. The opening in the front is small. The blade is lancet-shaped with raised midrib.

	Inches.		Inches.
Total length	$8\frac{1}{2}$	Diameters of top . .	$1\frac{1}{4} \times 1\frac{1}{8}$
Width across foot . . .	$2\frac{7}{16}$	Length of projection . .	$1\frac{1}{4}$
Greatest width of sheath .	$1\frac{1}{4}$	Length of blade . . .	$4\frac{1}{8}$
Length of handle . . .	$3\frac{5}{8}$	Greatest width of blade . .	$\frac{15}{16}$

Ondonga.

3. S.A.M., 2270. Knife with wooden handle and sheath. The sides are blackened back and front by branding, leaving an unbranded portion, flat at the

back and raised in front, where it forms an elongated diamond, the centre being at the top of the opening in the sheath. The raised portion is slightly rounded. The handle has very slight shoulders before the flanging, roughly oval knob. The projection at the back is bored vertically, and has a leather thong held by three iron beads where it widens at the base, and by a wedge at the top to a strap. The strap bends over, forming a loop through which the other end of the thong is passed. The blade is V-shaped with a slight midrib.

	Inches.		Inches.
Total length	$12\frac{3}{4}$	Diameters of top . .	$1\frac{1}{2} \times 1\frac{1}{4}$
Width across foot . . .	$3\frac{3}{16}$	Length of projection . .	$2\frac{1}{16}$
Greatest width of sheath .	$1\frac{9}{16}$	Length of blade . . .	$7\frac{15}{16}$
Length of handle . . .	$4\frac{3}{8}$	Greatest width of blade . .	$1\frac{1}{16}$
Width of handle at shoulders .	$\frac{5}{8}$		

No history.

4. S.A.M., 4846 (1). Knife with wooden handle and sheath. Near the base there is a jointless ring of hide to prevent splitting, which has already occurred higher up. The sides are branded and the centre left plain, rising to a central ridge and making an ill-defined rim round the opening. The projection is bored vertically and has a leather strap, split at the top to make a loop and held at the bottom by a cross-piece of leather passed through the end. The blade is lancet-shaped with a raised midrib. This is an old and very worn specimen.

	Inches.		Inches.
Total length	$14\frac{3}{4}$	Diameters of top . .	$1\frac{1}{4} \times 1\frac{1}{8}$
Width across foot . . .	$1\frac{3}{8}$	Length of projection . .	$1\frac{1}{16}$
Greatest width of sheath .	$1\frac{5}{8}$	Length of blade . . .	$9\frac{1}{2}$
Length of handle . . .	$4\frac{9}{16}$	Greatest width of blade . .	1
Width of handle at neck .	$\frac{1}{2}$		

Uukuanyama.

PLATE LXXX.

1. S.A.M., 5368. Knife with handle and sheath, made of reddish wood, long and slender, rounded oval in section, with unbranded portion raised in front but not at the back. The knob flanges widely from a narrow-shouldered neck. There is a binding of thick copper wire near the foot and one of fine copper wire at the base of the handle; both appear to be native-drawn. The saddle-shaped projection at the back is bored horizontally for a thin strip of hide long enough to go round the waist and over one shoulder. The blade is lancet-shaped with raised midrib.

	Inches.		Inches.
Total length	22	Diameters of top . .	$1\frac{5}{8} \times 1\frac{1}{2}$
Width across foot . . .	2	Length of projection . .	$5\frac{5}{16}$
Greatest width of sheath .	$\frac{15}{16}$	Length of blade . . .	$16\frac{1}{4}$
Length of handle . . .	$5\frac{1}{4}$	Greatest width of blade . .	$\frac{11}{16}$
Width at neck	$\frac{5}{16}$		

No history.

2. S.A.M., 5294. Knife with wooden handle and sheath. On either side of the opening the wood is quite flat, the back of the sheath and handle being rounded. The edges, knob, and back of the scabbard are branded black and the remainder

left natural colour. The unbranded part above the opening and on the handle is not raised, but is separated from the black edges by a deep semicircular groove on each side. The handle is shouldered and has a thin round neck, which is bound with fine brass wire and supports a shallow knob. There is a $3\frac{1}{4}$-inch binding of fine brass wire at the bottom of the sheath, and four narrow bands of brass, two on the handle and two on the sheath. There are three bands of hoop iron on the sheath, two close together at the top and one lower down. The blade is lancet-shaped with a distinct midrib and a very sharp edge. The projection is bored horizontally near the top.

	Inches.		Inches.
Total length	$26\frac{3}{4}$	Diameters of knob .	$1\frac{5}{8} \times 1\frac{1}{2}$
Width across foot . . .	$4\frac{1}{2}$	Length of projection . .	$2\frac{7}{8}$
Greatest width of sheath .	$1\frac{7}{8}$	Length of blade . . .	$20\frac{1}{4}$
Length of handle . . .	$5\frac{5}{8}$	Greatest width of blade . .	$1\frac{3}{8}$
Width of handle at shoulders .	$\frac{5}{8}$		

No history.

3. S.A.M., 5185. Knife with wooden sheath and handle, the handle being shouldered below the flanging knob. The edges of the front of the sheath and the top of the foot are branded, leaving unbranded a narrow flat piece in the centre below the opening, and a raised portion which has a conical point in the centre above the opening, the back, and the remainder of the foot. The edges of the handle are branded, leaving a plain raised central portion back and front. The projection at the back is saddle-shaped and bored cylindrically for a loop of thin twisted sinew. The blade is lancet-shaped with raised midrib.

	Inches.		Inches.
Total length	$10\frac{5}{8}$	Diameters of knob .	$1\frac{7}{8} \times 1\frac{5}{16}$
Width across foot . . .	$3\frac{5}{16}$	Length of projection . .	$1\frac{7}{16}$
Greatest width of sheath .	$1\frac{3}{8}$	Length of blade . . .	$6\frac{1}{4}$
Length of handle . . .	4	Greatest width of blade . .	$1\frac{1}{8}$
Width of handle at shoulders .	$\frac{1}{2}$		

No history.

Plate LXXXI.

1. S.A.M., 2101 (1). Knife with wooden handle and sheath. The handle is shouldered half-way and surmounted by a funnel-shaped knob, the flat top of which is covered with small round depressions. The foot is straight along the bottom, with the points curving forward. In section both handle and sheath are flat oval. The cylindrical projection at the back of the sheath is bored vertically and twice horizontally. The base of the handle, the top of the sheath, and the decoration on the foot have been left natural colour and the rest branded. The blade is lancet-shaped and has a very definite, almost semicircular midrib.

	Inches.		Inches.
Total length	$14\frac{7}{8}$	Length of handle . . .	4
Width across foot . . .	$4\frac{7}{8}$	Diameters of knob .	$1\frac{3}{4} \times 1\frac{1}{2}$
Width at shoulders . .	$\frac{7}{8}$	Length of blade . . .	$10\frac{1}{4}$
Length of projection . .	$2\frac{7}{8}$	Greatest width of blade . .	$1\frac{1}{8}$
Greatest width of sheath .	$1\frac{1}{2}$		

No history.

2. S.A.M., 3315. Foot of sheath of knife similar to fig. 1, but more slender, and rounder in section. The foot is smaller and the points do not curve forward. The raised portion is left natural colour, and the remainder branded. There is a narrow band of tin at the base of the sheath.

	Inches.		Inches.
Depth of foot . . .	$1\frac{1}{8}$	Width across foot . . .	$3\frac{5}{16}$

No history.

3. S.A.M., 2101 (2). Knife with wooden handle, deeply shouldered half-way for a funnel-shaped knob, which is rounded on top and has a brass furniture tack in the centre. The raised portion in front is unbranded. The blade is lancet-shaped, with a raised midrib, semicircular in section, and is very finely made.

	Inches.		Inches.
Length of handle . . .	$5\frac{3}{8}$	Diameter of knob . . .	2
Width of handle at base .	$1\frac{15}{16}$	Length of blade . . .	$13\frac{1}{8}$
Width of handle at shoulders .	1	Greatest width of blade . .	$1\frac{9}{16}$

No history.

3*a*. Foot of sheath belonging to fig. 3, similar to fig. 1, but rounded along the bottom, and not set straight on the sheath. The raised portion is unbranded.

	Inches.		Inches.
Depth of foot . . .	$1\frac{3}{8}$	Width across foot . . .	$4\frac{1}{4}$

4. S.A.M., 50. Foot of sheath of same type as fig. 1, but the ends are inclined to curve backward. A raised portion back and front is left unbranded, as is the entire back of the sheath. There is a band of hoop iron at the base of the sheath.

	Inches.		Inches.
Depth of foot . . .	$1\frac{5}{8}$	Width across foot . . .	5

No history.

5. S.A.M., 2101 (3). Foot of sheath of the same type as fig. 1, but that the front is entirely branded, except for the raised portion of the foot. The centre of the back and the projection are also unbranded. The foot is not set straight on the sheath.

	Inches.		Inches.
Depth of foot . . .	$1\frac{5}{8}$	Width across foot . . .	5

No history.

6. S.A.M., 5358. Knife with wooden handle and sheath, similar in type to the foregoing, but larger and heavier, with an oval knob. The section of the foot is the segment of a circle, straight along the front edge and curved at the back. The edges of the scabbard and of the foot, back and front, are blackened by branding, and the remainder is left natural colour. The projection at the back is bored vertically. The blade is lancet-shaped with slightly raised, semicircular midrib.

	Inches.		Inches.
Total length	$21\frac{3}{4}$	Width of handle at shoulders .	$1\frac{1}{16}$
Width across foot . . .	$3\frac{13}{16}$	Diameters of knob .	$2\frac{1}{16} \times 1\frac{1}{2}$
Greatest width of sheath .	$2\frac{1}{8}$	Length of blade . . .	$10\frac{1}{4}$
Length of projection . .	3	Greatest width of blade . .	$1\frac{1}{8}$
Length of handle . . .	$5\frac{9}{16}$		

No history.

PLATE LXXXII.

1. S.A.M., 3313. Knife with wooden handle and sheath, having a comparatively small winged foot, and open down the front, about 1 inch from the top of the sheath, so widely that the edges are only about $\frac{1}{8}$-inch wide, and the opening is wider than the blade. There is a band of hoop iron round the closed part at the top, fastened at the back, over a cylindrical projection, by a wire hooked through holes in each edge. The projection is bored vertically and a double thong is inserted, making a short loop at the bottom, and cut off short and wedged with two splints of wood at the top. The handle is shouldered and flanges from the neck to an oval knob, which is flat on top. The horizontal section of the whole is a very flat oval. The blade is lancet-shaped, with a raised midrib.

	Inches.		Inches.
Total length	$13\frac{7}{16}$	Width of handle at shoulders .	$\frac{5}{8}$
Width across foot . . .	$2\frac{3}{4}$	Diameters of knob .	$1\frac{3}{16} \times 1$
Greatest width of sheath .	$2\frac{1}{4}$	Length of blade . . .	$8\frac{5}{8}$
Length of projection . .	$\frac{7}{8}$	Greatest width of blade . .	$1\frac{5}{8}$
Length of handle . . .	$4\frac{1}{4}$		

Ovamboland, West Coast.

2. S.A.M., 3314. Wooden sheath of the same type as fig. 1, fitted with a knife like fig. 3, which is too long for it. The bands of hoop iron above the foot and round the top are fastened at the back with an iron pin, hooked through each side. The projection is bored vertically and has a looped thong, with the loop at the top and a knot below the projection.

	Inches.		Inches.
Length	$6\frac{3}{8}$	Width across foot . . .	$2\frac{5}{16}$
Greatest width at top . .	$1\frac{7}{8}$		

No history.

3. S.A.M., 3309. Knife with handle and sheath of the same type as figs. 1 and 2, but narrower and with narrower opening. The blade is lancet-shaped, with raised midrib. A short thong is looped and knotted through the vertical bore of the projection. The horizontal section of the foot is diamond-shaped.

	Inches.		Inches.
Total length	$12\frac{5}{8}$	Width of handle at shoulders .	$\frac{5}{8}$
Width across foot . . .	$2\frac{9}{16}$	Diameter of knob . . .	$\frac{15}{16}$
Greatest width of sheath .	$1\frac{9}{16}$	Length of blade . . .	$8\frac{5}{16}$
Length of projection . .	$1\frac{1}{4}$	Width of blade . . .	1
Length of handle . . .	$3\frac{3}{4}$		

Ovamboland.

Plate LXXXIII.

1. Knife figured by Passarge (Globus, 87, 1905, p. 297, fig. 20), with wooden handle and sheath, having a crescentic foot, and a **V**-shaped opening in front. The edges appear to be branded and the raised portion in front left plain. The projection is bored vertically. No description or measurements are given.

Mambukushu.

2. Knife figured by Passarge (*loc. cit.*, fig. 19), similar to fig. 1, but covered with copper plating, which overlaps and is nailed at the back. No description or measurements given.

Mambukushu.

3. S.A.M., 1735. Knife with wooden handle and sheath. There is a raised ridge outlining the opening and left unbranded, as is the centre of the back. Thin bands of brass and hoop iron, arranged more or less alternately, are nailed on with copper nails, so as to cover the front entirely, but leaving a space down the back. (Two bands are missing.) The band of tin at the mouth of the sheath goes right round, covering the cylindrical projection, which is bored vertically. The front of the foot is covered with thin brass discs of various sizes, nailed on with copper nails. The blade is lancet-shaped with a raised midrib.

	Inches.		Inches.
Total length	13	Width of handle at neck .	$\frac{5}{8}$
Width across foot . . .	10	Diameters of knob .	$1\frac{5}{16} \times 1\frac{3}{16}$
Greatest width of sheath .	$1\frac{1}{2}$	Length of blade . . .	$8\frac{7}{16}$
Length of projection . .	$2\frac{1}{4}$	Greatest width of blade . .	1
Length of handle . . .	$4\frac{5}{16}$		

Northern Ovambo.

4. S.A.M., 478. Two knives with wooden handles in one wooden sheath. The sheath is half an ellipse, terminating in a winged foot, and having two **V**-shaped openings in front. The handles of the knives continue the line of the ellipse with their outer edges, and the blades are set in the sheath convergently. The handles are shouldered, and have narrow-necked flat-topped knobs. At the back of the sheath is a single short projection, bored vertically for a thong. The blades are **V**-shaped with distinct midribs. The sheath and handles are blackened by branding all over, with the exception of a panel down the front of each handle and a diamond pattern on the sheath, both cross-hatched.

	Inches.		Inches.
Total length	$8\frac{1}{2}$	Greatest width of handles .	$1\frac{1}{8}$
Width across foot . . .	4	Width at shoulders . .	$\frac{9}{16}$
Greatest width of sheath .	$2\frac{5}{16}$	Diameter of knobs	right $1\frac{3}{16}$, left $1\frac{1}{8}$
Length of projection . .	1	Length of blades .	right $4\frac{3}{8}$, left $4\frac{5}{8}$
Length of handles .	right $3\frac{7}{16}$, left $3\frac{1}{2}$	Greatest width of blades .	$\frac{7}{8}$

From Sesheke, Barotseland.

Plate LXXXIV.

1. S.A.M., $4861_{(1)}$. Knife with wooden handle and sheath. The handle is shouldered half-way, and topped with a slightly flanging peg. The diamond-shaped foot is flat and rectangular in section. There is a long cylindrical pro-

jection at the back of the sheath, bored twice horizontally. The entire handle and sheath are blackened by branding, and decorated in front on either side of the opening by a series of triangles, enhanced with diagonal grooves, and on the remainder of the front as well as on the back of the handle by bands of diagonal ridges in alternate directions separated by single horizontal grooves. The rest is plain but for a ring of half-moons cut out round the top of the handle. The blade is lancet-shaped with a single continuous chevron incised down the midrib back and front.

	Inches.		Inches.
Total length	$20\frac{13}{16}$	Width of handle at shoulders .	$1\frac{5}{8}$
Width across foot . . .	$3\frac{5}{8}$	Diameters of top . .	$1\frac{1}{8} \times 1\frac{7}{16}$
Greatest width of sheath .	$2\frac{11}{16}$	Length of blade . . .	$11\frac{3}{8}$
Length of projection . .	$4\frac{5}{16}$	Greatest width of blade . .	$1\frac{3}{4}$
Length of handle . . .	$5\frac{13}{16}$		

Mampukushu, Barotseland.

2. S.A.M., 2936. Knife with wooden handle and sheath, having a short V-shaped opening in front. The handle is round in section for two-thirds of its length, and then flanges to a flat oval for the insertion of the blade. The sheath is rectangular in section. The entire handle and sheath are blackened by branding. The sheath, plain on the back and edges, has a series of triangles on each side of the front, enhanced with diagonal grooves, and a raised and grooved band outlining the opening and continuing down the centre. The lower part of the handle has similar decoration back and front. There is a short projection at the back, bored twice horizontally. The blade is V-shaped and slightly ogee in section, with an incised continuous chevron down the midrib, back and front.

	Inches.		Inches.
Total length	$8\frac{11}{16}$	Length of handle . . .	$4\frac{1}{8}$
Greatest width of sheath .	$2\frac{1}{4}$	Width of handle at base .	$1\frac{7}{8}$
Width of sheath at waist .	$1\frac{1}{16}$	Diameter of neck . . .	$\frac{11}{16}$
Width of sheath at mouth .	$1\frac{3}{4}$	Length of blade . . .	$4\frac{5}{16}$
Length of projection . .	$\frac{7}{8}$	Greatest width of blade . .	$1\frac{3}{8}$

Barotseland.

3. S.A.M., 4860. Knife similar to fig. 2, but there is a V-shaped opening in the back of the sheath corresponding to the opening in the front. The edges are grooved and the decoration on the front of the sheath and on both sides of the handle consists of horizontal grooves, which outline bands of diagonal grooves arranged in alternate directions. The projection at the back is bored horizontally.

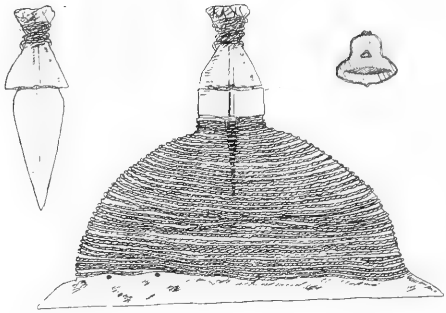
	Inches.		Inches.
Total length	$9\frac{1}{2}$	Greatest width of handle .	$1\frac{3}{4}$
Width across foot . . .	$2\frac{1}{8}$	Width of handle at neck .	$\frac{3}{4}$
Greatest width of sheath .	$2\frac{3}{16}$	Diameters of top . .	$1 \times \frac{3}{4}$
Length of projection . .	1	Length of blade . . .	$4\frac{7}{8}$
Length of handle . . .	$4\frac{3}{16}$	Greatest width of blade . .	$1\frac{3}{8}$

Mambunda, Barotseland.

4. S.A.M., $4861_{(2)}$. Knife similar to fig. 1, but with rounded foot to the sheath. The back of the sheath is plain and branded black and the front is decorated with alternate interlocking triangles of plain light-coloured, and grooved black. The sides have ridges corresponding with the apices of the plain triangles. The projection at the back is somewhat below the top of the sheath, and is bored twice horizontally. In section the sheath is a flat oval with the ends cut off straight.

	Inches.		Inches.
Total length	$20\frac{1}{2}$	Diameter of neck	$1\frac{1}{8}$
Width across foot	$3\frac{5}{8}$	Diameter of top	$\frac{3}{4}$
Greatest width of sheath	$2\frac{9}{16}$	Length of projection	$4\frac{7}{8}$
Length of handle	$6\frac{3}{8}$	Length of blade	$12\frac{1}{8}$
Width of handle at shoulders	$1\frac{5}{8}$	Greatest width of blade	$1\frac{3}{4}$

Mampukushu, Barotseland.



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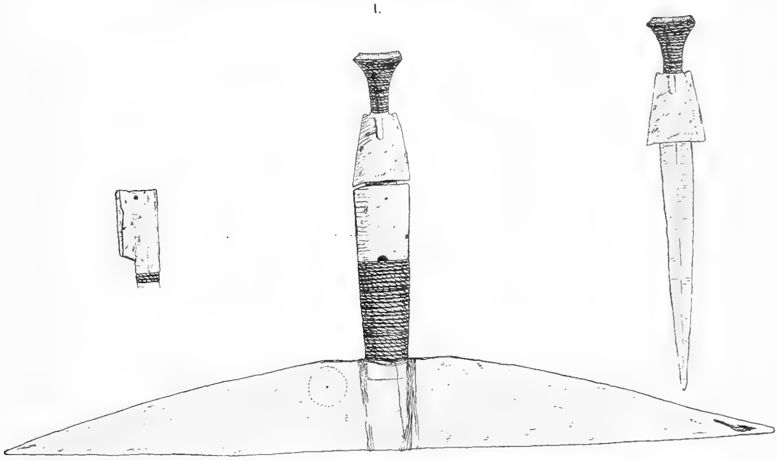

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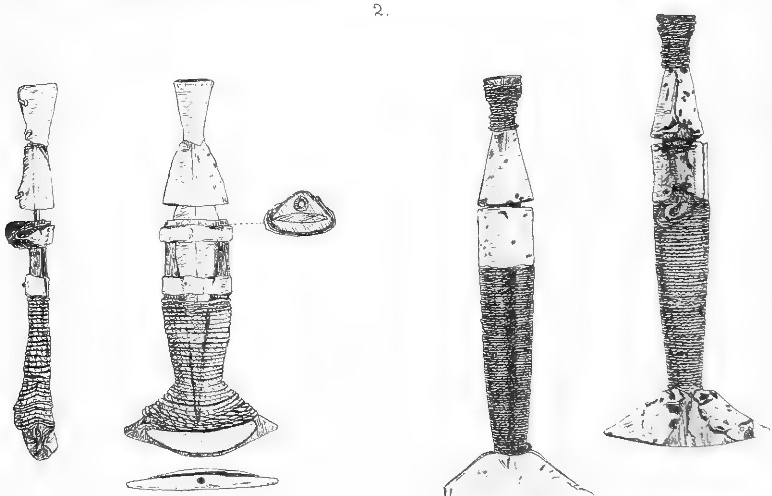

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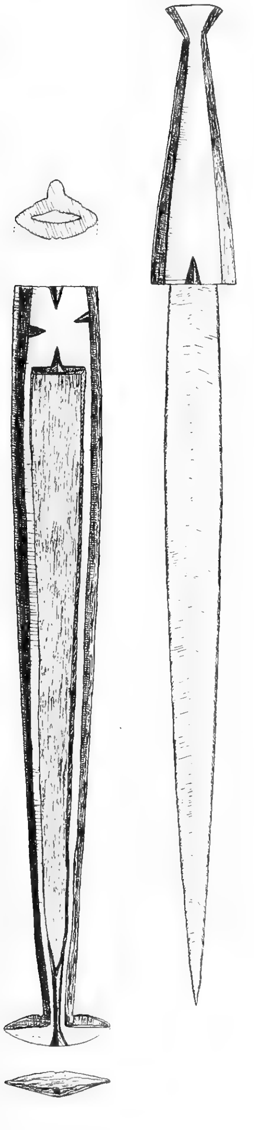

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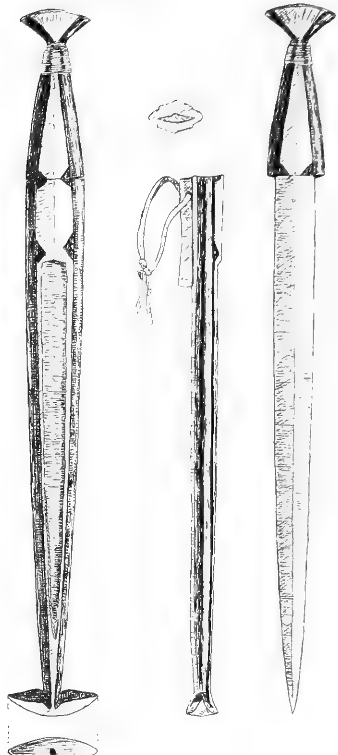

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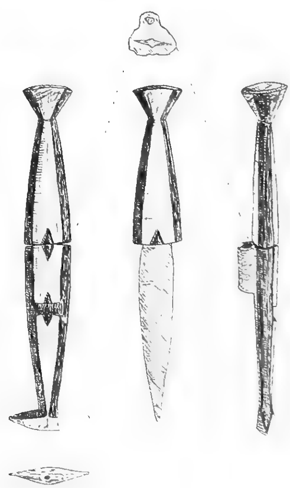

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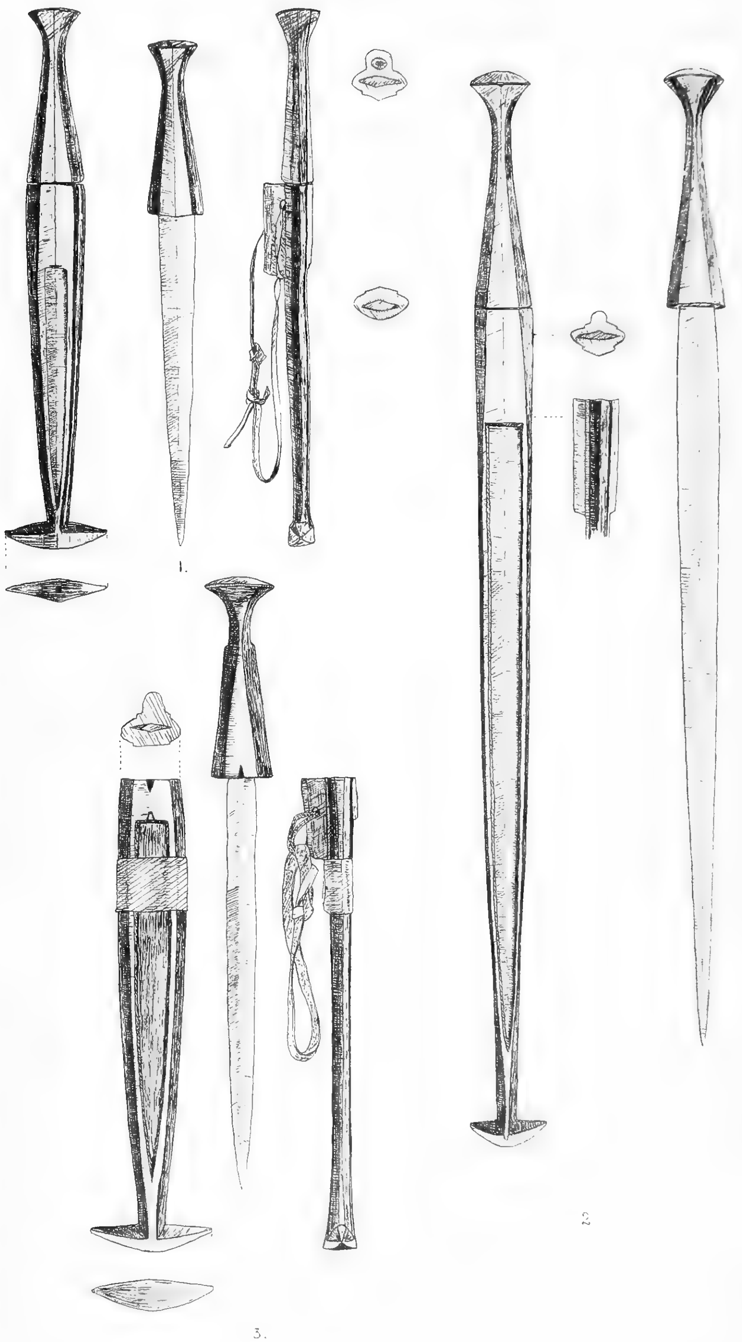

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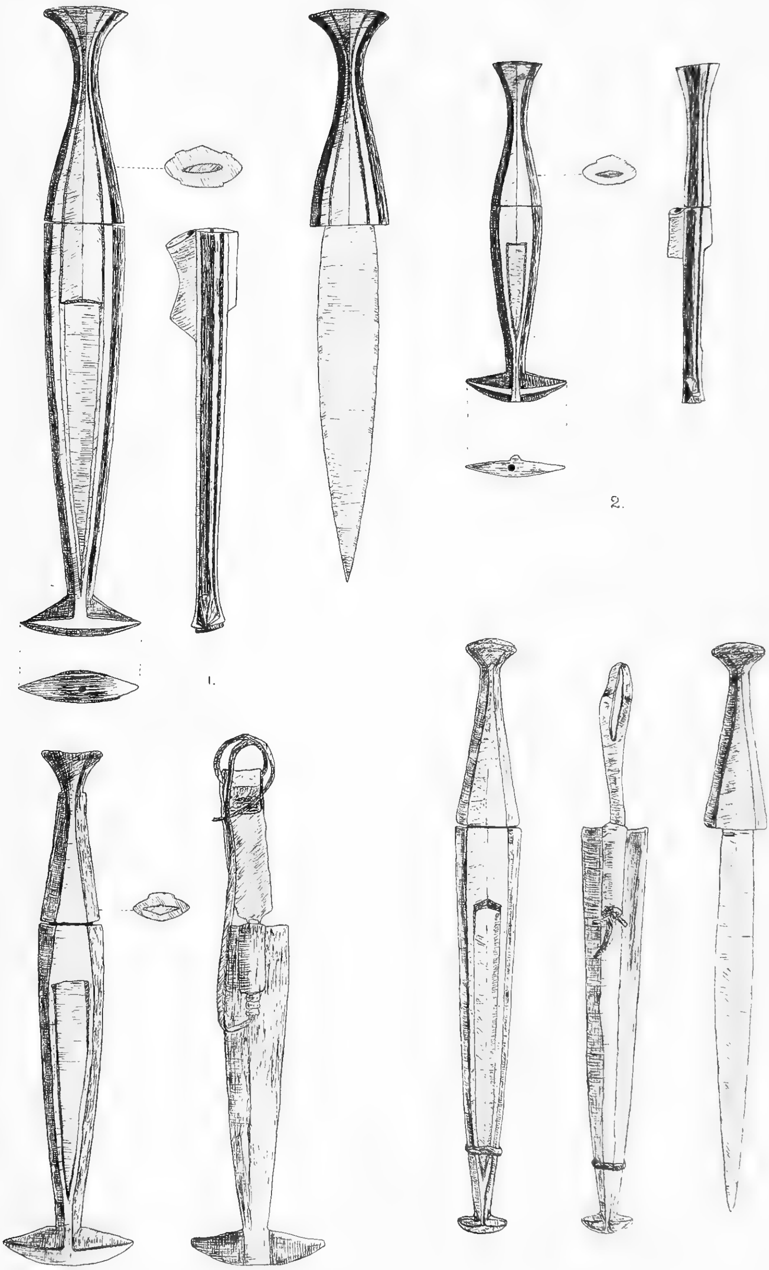

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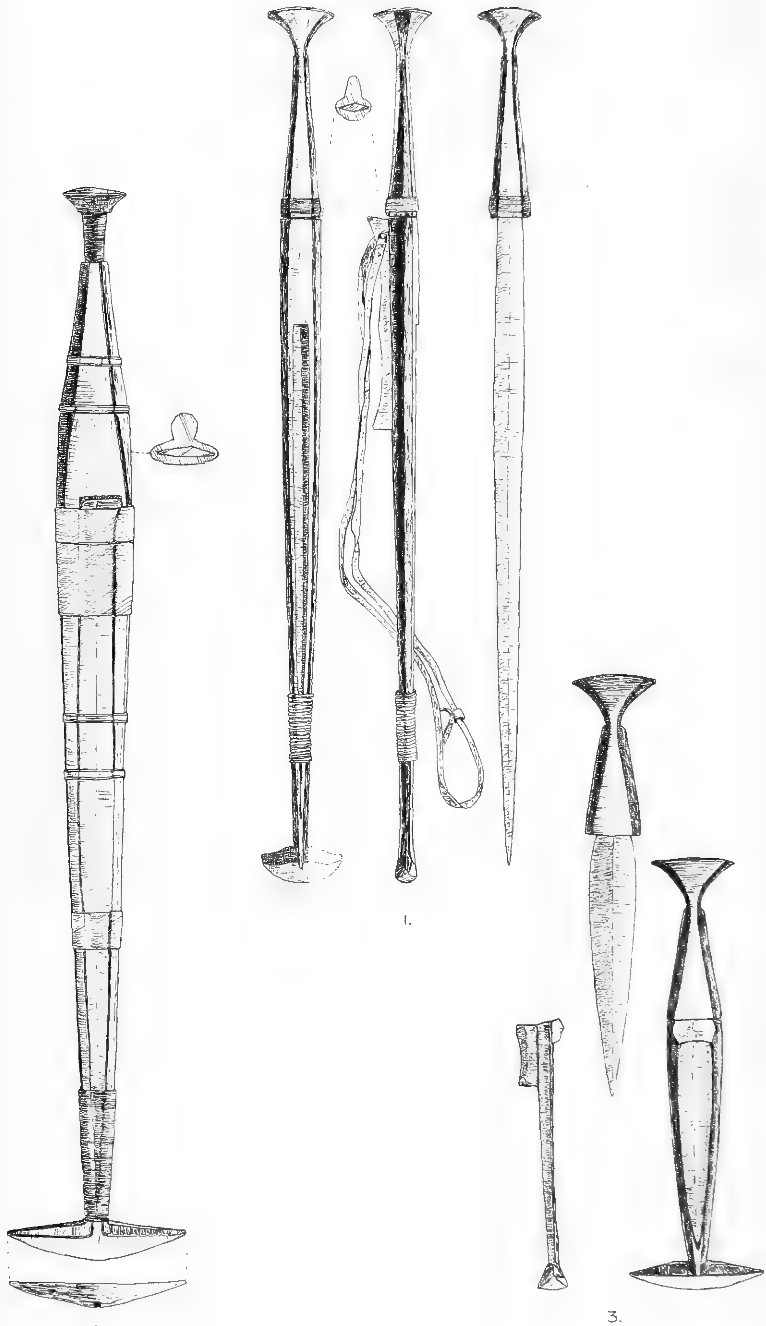

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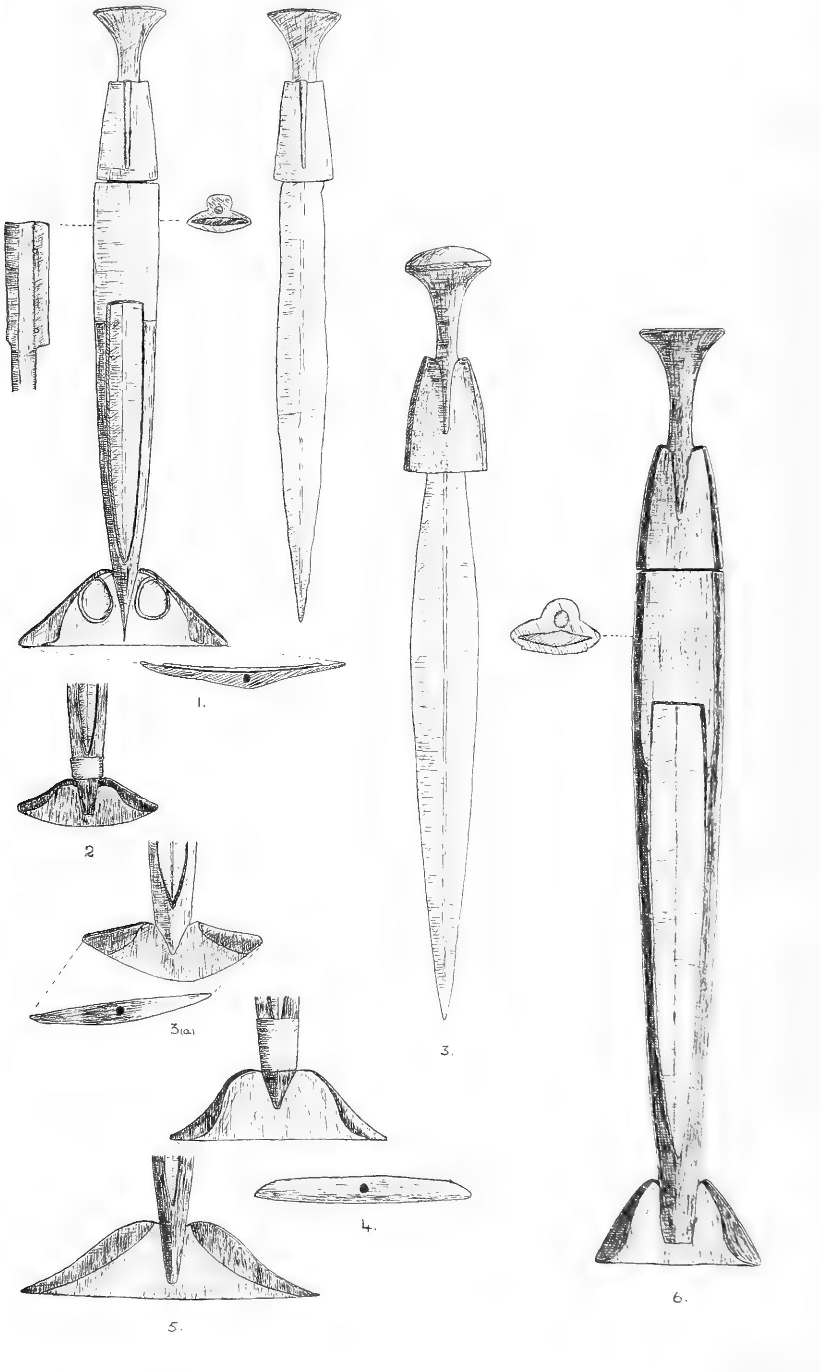

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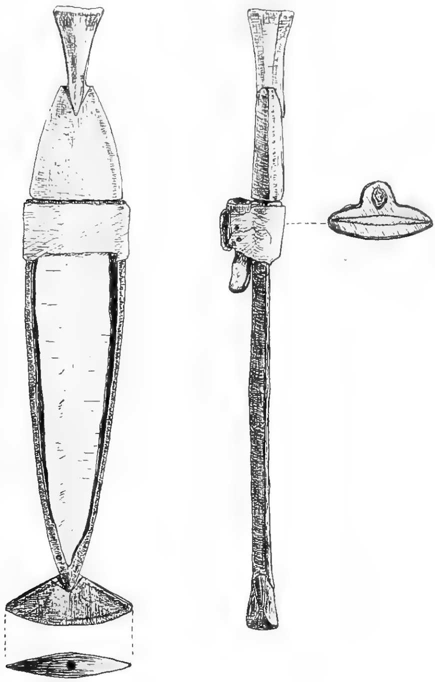

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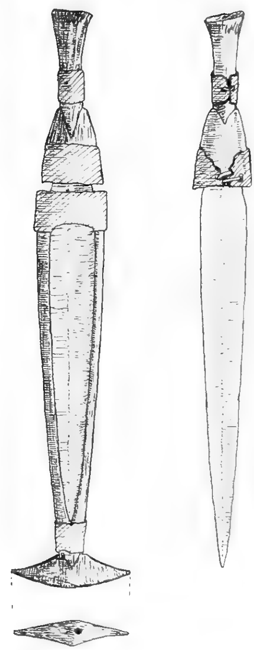

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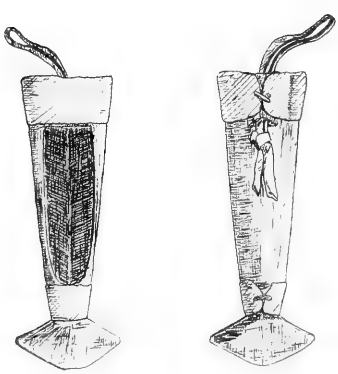

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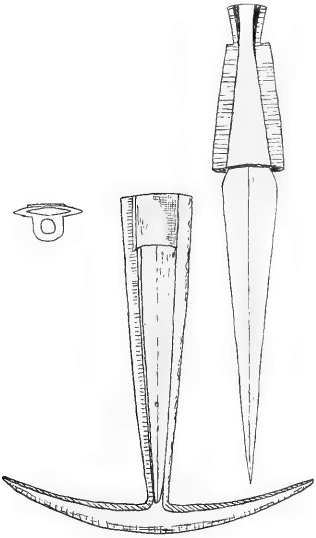

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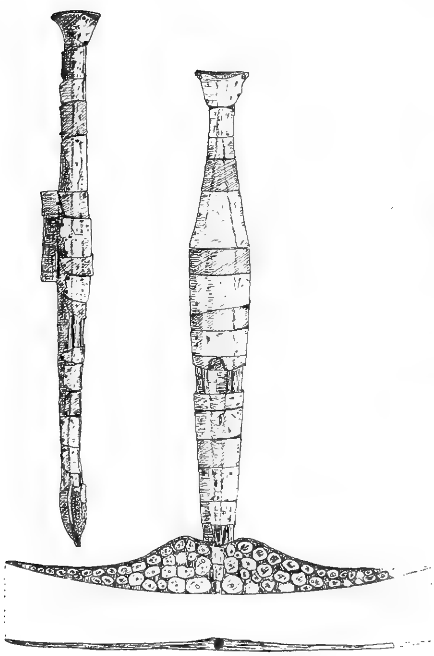

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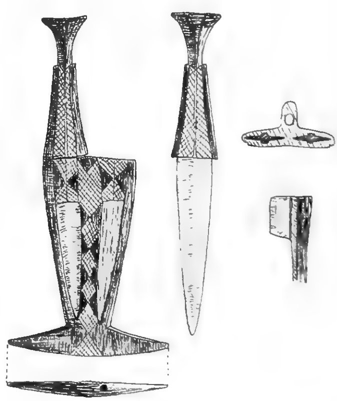

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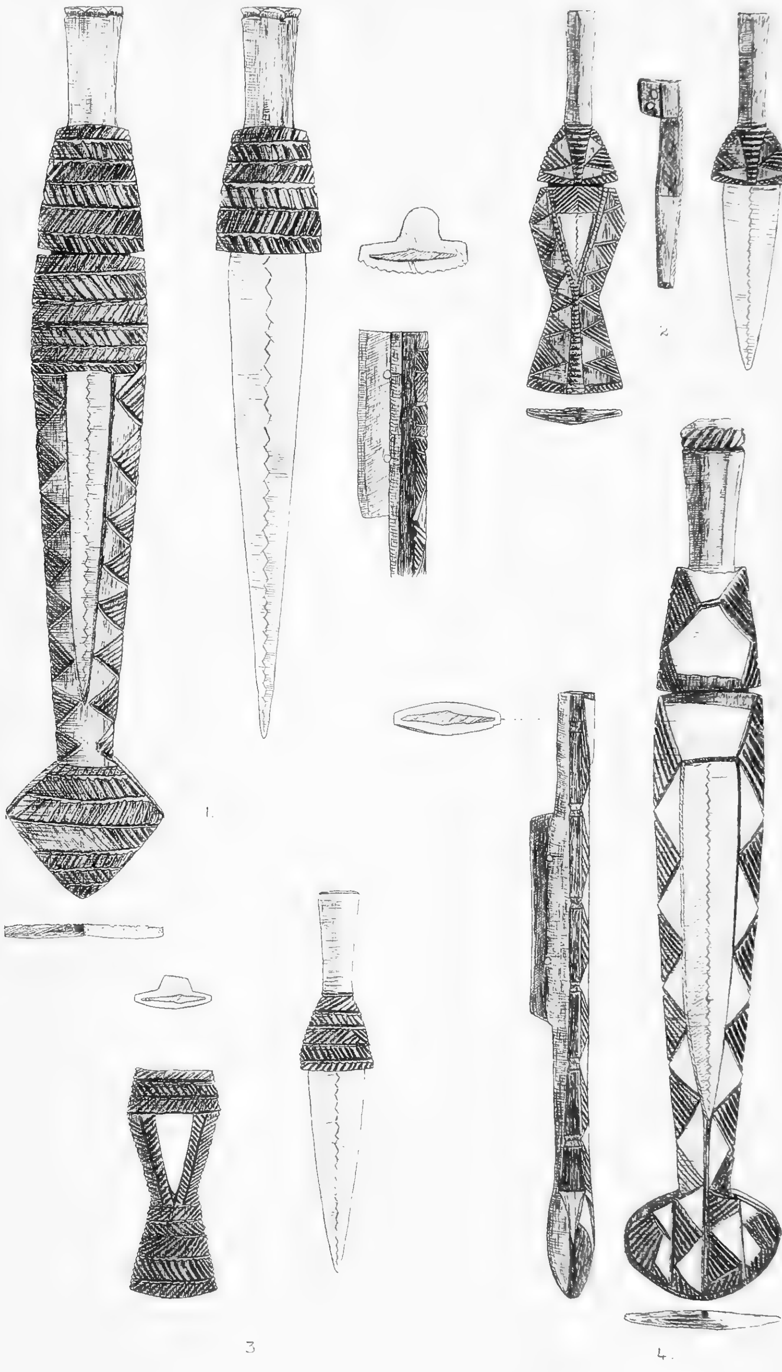
M. Shaw. *Neill & Co., Ltd.*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12.—*Native Pipes and Smoking in South Africa.*—By

Miss M. Shaw, B.A., Assistant in Ethnology.

(With Plates LXXXV–XCIX, and 2 Text-figures.)

The use of the two narcotics, tobacco and hemp (dagga), seems to have been well established amongst the native tribes in South Africa by the time of the first European settlement at the Cape. Neither plant is indigenous to the country, the former having come from America, the latter from Asia, and it is supposed that hemp was introduced on the east coast by the Arabs, and tobacco on the west and east coasts by the Portuguese. Tobacco must in that case have been introduced in the fifteenth and sixteenth centuries, and it is probable that hemp came in earlier. Dos Santos (**1**), writing in the sixteenth century, discusses the cultivation and use of hemp by the people of eastern Mashonaland, but makes no mention at all of tobacco. Certainly hemp had spread as far as the Cape Peninsula by the time of van Riebeeck's arrival. It is doubtful whether tobacco had got as far, but the Hottentots soon became very fond of it. Those people who did not cultivate their own narcotics obtained them by barter from neighbouring people. Tobacco even more than hemp seems to have been a trade article of the greatest importance, which reached at times almost to a currency. Its value in this direction was soon realised by European settlers and travellers, who found it the most popular article of exchange and generally preferred by the natives to their own variety.

It seems fairly certain that at first tobacco was used almost exclusively for snuff, and hemp for smoking, and even to-day when the Government ban on hemp has given tobacco first place in most parts of the country for smoking as well as snuff, there are still some places where it is used mostly as snuff. Hemp is occasionally used for snuff, while some people are such slaves to their pipes that when tobacco or hemp are lacking, they will put in them a live coal, a piece of dry dung, or some other substitute.

Dagga was the name given to hemp by the Cape Hottentots, and it has become a common name in the country, though each native people has its own name for it. The true hemp is *Cannabis sativa.* It has frequently been confused with an indigenous plant of an entirely different family, *Leonotis leonurus*, of which the leaves are very similar and might easily be confused although the flowers are entirely different, those of the hemp being cream and insignificant, and those of *Leonotis* large and brilliant red. The *Leonotis* is often referred to as wild dagga, but how much it is smoked is difficult to say. It is probably one of a number of aromatic herbs which are used as substitutes for tobacco or dagga, and have some narcotic effect from the natural oils contained in them. *Cannabis sativa* is reported to have grown wild in various parts of the country since its importation, but was also cultivated.

Among the Bushmen the Namib are the only tribe that have cultivated dagga to any extent and for a considerable length of time (**2**). A few men among the Auen and Naron copied their Bantu neighbours and grew a little (**3**), but on the whole any dagga they have is obtained by gift or barter.

There is some discussion as to whether the early Cape Hottentots cultivated dagga or not. At least six of the tribes are reported to have done so, but Maingard (**4**), after considering the evidence in the early records, concludes that the information is not reliable, and that actually the western tribes had it by barter from the eastern, who are known definitely to have obtained their dagga at a big annual bartering between themselves and the Xosa. The dagga was made up into little balls for use (**5**). The Nama Hottentots, however, did grow their own. It was the only other plant besides tobacco that they cultivated (**6**).

The Bergdama of S.W. Africa grew a fair quantity of dagga at one time, but latterly, under missionary influence, it has practically disappeared (**7**).

The majority of the Bantu tribes must at one time have cultivated dagga. With them it spread south and west until it reached the Bushmen and Hottentots as well. There is definite record of the fact that the Xosa, the southernmost branch, traded it to the Cape Hottentots, and it was probably in that way that it spread west and north to Namaqualand, and from the Nama to the Herero who did not cultivate it. It would seem that dagga had not made its appearance before the western branch of the Southern Bantu started on their journey from the Eastern Highlands, as it was reported unknown among the Ovambo as late as 1887 (**8**), and when they did take to it, which was in comparatively few cases, they obtained it from their Bushmen neighbours (**9**). The south-eastern and central tribes cultivated it quite extensively; generally small gardens were made at the back of the huts or in an old deserted cattle kraal. Certainly in the beginning it must have been less plentiful than latterly, as the earthenware pipe-bowls that have been excavated in many parts of the eastern side of the country are quite small compared with the really capacious bowls of modern times (Plate LXXXVII). The Arabs, if it be they who introduced dagga, also introduced their own method of smoking it, that is through water, in order to cool the smoke somewhat. The fumes of dagga are highly intoxicating and irritating to both lungs and throat. Taken in moderation it does not seem to have any ill effects, but the majority of those who smoke it inhale it very deeply into the lungs, and consider coughing and choking and running at the eyes necessary for a proper enjoyment, even to the point of becoming unconscious. When thus smoked to excess it is considered to have very serious effects on the health and brain. For this reason and on account of the irresponsible behaviour of individuals under its influence, its growth and sale have been prohibited by the Government, but there is a considerable illicit traffic, by Europeans as well as native and coloured.

Although tobacco since its introduction has always been greatly sought after by all the peoples of South Africa, its use is not nearly as old nor as widespread for smoking as for snuffing. The Bushmen, Hottentots, and South-Eastern Bantu, particularly the Transkeien tribes, seem to have become the most inveterate smokers of tobacco, a fact which reflects the routes of the early European penetration of the country. Smoking of tobacco is practised, however, by all if to a lesser extent by some, and is gaining ground with the suppression of dagga. Nowadays, although the European-grown article has been introduced everywhere, there are few tribes who do not grow their own tobacco as well, although several of them when first visited by Europeans were dependent on barter for their supply. Generally each household has its own tobacco garden in or near the village and apart from the other gardens. The leaves when dried are made up in a variety of forms, generally some sort of roll in the south and east, and some sort of ball or block in the north and west, and these are the standard quantities when tobacco is used for trade.

With the exception of the Namib, who have cultivated it for quite a long time, and a few isolated men among the Auen and Naron, the Bushmen neither did, nor do they now, grow tobacco, but obtained it by barter from their Bantu neighbours (**10**). It was the first thing for which they begged European travellers among them, and they still prefer it to any other payment for services rendered (**11**).

The Hottentots did not cultivate tobacco either in the early days, but got it by trade, labour, and begging from Europeans (**12**). In 1661 it was reported that the Nama visited by van Riebeeck's expedition had not seen it smoked, but all learned in a short time, and within recent years they have cultivated it themselves (**13**).

The Bergdama have also cultivated tobacco for a long time, and according to tradition had it from the south, where one of the ancestors bartered a goat for it, long before the arrival of the first Europeans among them (**14**). Comparatively few men cultivate it and trade it to others, and in particular to the Herero, who also obtained a good deal of theirs from the Ovambo in the early days, but did not cultivate it on their own until the middle of the last century, when someone started to do so and made his fortune out of it (**15**). Even in Ovamboland the southern tribes hardly cultivate tobacco at all. Those in the north grow quite a lot (**16**), but the majority and the best comes from north of the Cunene River, whence it is imported in round balls (**17**). Those who do grow tobacco have to give a certain proportion of their crops to the chief (**18**). Tobacco is the most important trade medium in Ovamboland (**19**), and is mostly used as snuff, as on account of its high price only the well-to-do can afford to smoke it (**20**).

Among the central tribes tobacco obtained a strong footing somewhat earlier, but certain of them until comparatively recently did not grow their own. Among the Tswana, the Batlapin when Burchell first visited them obtained a very inferior brand from the Bahurutshe (**21**), and only started to grow their own about 1830 (**22**). The northern Tswana have grown tobacco for a considerable time, and do it up in cone-shaped lumps which they trade to the neighbouring peoples, particularly the Bushmen (**23**). The Basuto have cultivated tobacco since long before the appearance of Europeans among them (**24**). They do it up in large rolls which are kept rolled up in roughly made mats. The Venda, too, have grown tobacco for a very long time, but until quite recently used it only for snuff (**25**). After a preliminary grinding they mix it to a paste which they press into oval pitted moulds, and when set the blocks can be traded or stored until needed. The Mashona, too, cultivated tobacco almost entirely for snuff. The Bashankwe tribe, west of Salisbury, grow and export a great deal of tobacco to their neighbours, who prefer it to any other (**26**). The Makaranga peoples pound their tobacco up and mix it with wild honey before pressing it into conical moulds to dry (**27**).

It is, however, the south-eastern tribes who are the greatest smokers of tobacco. Almost every household or village has its own tobacco garden, at the back of the huts or in an old deserted cattle kraal. The cultivation is done by men, particularly the older men, and occasionally old women, never by young women. The leaves are carefully prepared, stalked, and dried, and are then rolled up into long cigar-shaped rolls, which are wrapped in roughly made grass mats for storing, and are often used for barter (**28**).

Presuming, as we may, that dagga came into the country before tobacco, we may take the water pipe to be the earliest form of pipe in the country. Archæological finds have included very many earthenware and stone pipe-bowls of the type used with a water pipe but considerably smaller than the modern examples (Plate LXXXVII, figs. 1–6). These pipe-bowls have been found over a large area from Zimbabwe to the Natal coast. It is interesting to compare with them a modern Indian pipe-bowl obtained in the Indian Market, at Durban (Plate LXXXVII, fig. 15).

The modern water pipe (Plate LXXXVIII) consists most commonly of the horn of an ox or one of the larger antelopes, into the side of which is inserted a length of bamboo reed, or sometimes a hollow wooden tube, which has fixed on its top end a bowl, which varies in size, and is made of baked clay, carved stone, or even wood. Sometimes at the junction of reed and horn gum or wax is used to make the joint water-tight. In making the stone bowls, after the cylinder has been roughly shaped, the bore is commenced from each end alternately, until two rounded or cone-shaped hollows have been drilled and scooped out, and meet at a point, the distance of which from the centre varies. In Mashonaland **Y**-shaped soapstone bowls are made with two containers forming the fork of the **Y** (**29**). A bowl of this type was found in Zimbabwe. The baked-clay bowls can be moulded by hand. The narcotic is placed in the bowl and ignited with a live coal; individuals in some tribes have small neat metal tongs for handling the coal. The horn is half-filled with water, just past the point where the reed enters its side. The mouth is applied to the large open end of the horn, and the smoke is drawn through the water, which cools it. If the open end of the horn is too large for the mouth to go round, it is placed in such a way that half the rim rests against one cheek and the other half is covered by the mouth (**30**). This type of water pipe was used throughout the country, excepting by some Bush tribes (Naron, O'Kung of Angola, Heikum and Kung of S.W. Africa) and the Nama and Korana Hottentots, but there are several local variations in detail. For instance, the most common way of inserting the reed stem in the side of the horn is diagonally, at an angle (Plate LXXXIII, figs. 1–4 and 7) (Xosa and Transkeien tribes generally, Zulu, Basuto, Tswana, Mampukushu, and Herero), but certain of the Cape Bushmen inserted it vertically, and some Bantu tribes (Bomvana, Swazi, Thonga, Venda) use a much longer reed and put its lower end right down into the horn through the large open end, instead of inserting it in the side (Plate LXXXVIII, fig. 5). In this latter type the smoker places his hands round the top of the horn including the reed, and makes a small opening between them through which to inhale (**31**). Certain Bush tribes, the Cape Hottentots, and the Herero dispensed with a reed altogether, and placed the bowl directly in the horn, which the Bushmen and Hottentots covered with skin at its larger end and cut off at the point to form a smaller mouth (Plate LXXXIX, fig. 5), while the Herero inserted the bowl towards the small end and left the big end open. Sometimes the large opening of the horn is filled in with wood or horn and a smaller one is made in the side higher up, with the reed still inserted diagonally (Plate LXXXVIII, fig. 4), or the small end of the horn is used (fig. 2).

In another variety of water pipe which is found mainly in the north, the horn water-vessel is replaced by a long-necked calabash into the side of the bowl of which the pipe-bowl is inserted, either directly or on a reed stem, and either the end of the neck of the calabash is cut off or a hole is made in the side of the neck to form the aperture for the mouth (Plate LXXXIX, figs. 1, 2, and 4) (Bushmen of Angola, Kung and Heikum of S.W. Africa (who use no water in it), Mampukushu, and Makaranga tribes). Sometimes a wooden ring is fastened to the bottom of the calabash to act as a stand (**32**). The Mashona and the tribes near the Zambesi mouth use a plain narrow oval gourd, narrower at the top end, where is inserted a reed which goes right down to the bottom of the gourd and has a bowl fixed at its top. The smoker inhales through a square hole cut in the side of the gourd (**33**).

Failing any of the above types, makeshift water pipes are made out of clay by the poorer members of most communities. In some cases a water-vessel is properly made and baked in the shape of a brick (Plate XC, fig. 3). In one ingenious example half an actual brick has been used, and passages bored, one right through the centre and corked at each end, in which water is placed, and two others joining it from the top, one for the bowl and the other for the mouthpiece (Plate XC, fig. 4). A still simpler device is used a great deal by youths and poor people particularly in the Transkei (**34**), Bechuanaland (**35**), and Matabeleland (**36**). A water pipe is made in wet sand and the smoker lies down to smoke it. The Tswana and Transkeien method is to damp the soil and then make a little raised mound with a depression at one end to hold the narcotic. At the other end a reed mouthpiece is inserted to connect with the bowl. A mouthful of water is taken and the smoke is inhaled through the water, and expelled either through the nose or with the water from the mouth. The reed may be dispensed with and the mouth applied direct to the aperture. The Matabele ground pipe has a water-vessel dug in the soil. Two channels run from it, one at each side, making an acute angle with each other. Where they reach the surface a pipe-bowl is inserted in one and a reed in the other. The Heichware Bushmen carry a pipe-stick with them and make a small hollow in the ground for the narcotic with a small tunnel leading from it into which they insert the stick and smoke through that (**37**).

Le Vaillant (**38**) describes a dagga pipe of the Gonaqua in the Eastern Province . . . ". . . they employ the bamboo reed and baked earth or soft stone which they cut and scoop out to a considerable depth without breaking it. They generally make them very large—I have seen some the shanks of which had an orifice more than an inch in diameter." The description sounds like two parts of a water pipe but that he adds that "they prefer these to the European article because the latter is not big enough."

The water pipe was originally designed for smoking dagga, but when tobacco first came to be smoked (as well as being used for snuff) the water pipe was used for it in most parts, notably in the Transkei, Natal, Basutoland, and Vendaland, until the European style of tobacco-pipe was copied. In most parts of the country dagga smoking is generally a social activity at which two or more people share a pipe and pass it from one to another. Amongst Bushmen and Hottentots both men and women smoke it (**39**), but among the Bantu generally men only. An amusing description of the effects of dagga is given by Schulz (**40**) . . . [Each takes] "two or three mighty draws between which the smoker exhales the smoke each time, until he takes the last draw which he retains in the lung while he passes the pipe to his neighbour . . . [it] seems to produce intense transient excitement of the brain, causing the smoker to burst out into vaunting speech, rapidly uttered and interspersed with long-drawn yells of a most blood-curdling nature. . . . This period over, the native grasps a thin long reed, through which he ejects the fluid still contained in his mouth, now of a dull blue colour from contact with the smoke, in a succession of little pearl-like bubbles, which he turns into circular shapes on the floor. All this time the pipe is circulating from one to another of the company, and it is no unusual occurrence for a smoker, fired into almost madness by the fumes, to spring up, shouting like a demon, and go through the evolutions of a war dance, accompanied by the loud acclamations of his companions who in their turn perform some equally excitable freak. From this pipe they gather inspiration in extreme moments, the warrior before battle, the hunter before going after dangerous game, and the witch-doctor for the execution of the intricacies of his profession." A similar idea was found among the Bergdama—the dagga pipe was passed round among the company before a collective hunt, as it was believed to give the body greater power for the struggle; ordinarily only the older men were allowed to smoke it because of its intoxicating qualities (**41**).

The Cape Hottentots were very great dagga smokers. According to Kolb it was a frequent accompaniment to some of their ceremonies (**42**). Otherwise among Bushmen and Hottentots and many Bantu dagga is smoked purely for its own sake, or for conviviality, but among the South-Eastern Bantu it is frequently accompanied by a spitting game which has its local variations but of which the Zulu form is a good example. On dark evenings particularly, the pipe is passed from one to another, and the strong flow of saliva caused by the smoke forms the chief requisite for this very favourite game that is played between two people or two sides. To the light of torches held by small boys, each in turn after a good draw at the pipe, inhaled well into the lungs and held as long as possible, spits the saliva on to the floor or ground through a reed or wooden tube (Izintshumo) about nine inches long, which is kept specially for the purpose (Plate LXXXIX, figs. 6 and 7). Each starting from a given position spits the saliva out in a string of closely-joined bubbles, which if properly done should stand without bursting for four or five minutes. The bubbles might represent cattle and a cattle kraal, or an army, and the object of the game is to surround the opponent's bubbles with a closed ring so that he cannot get out. If the ring breaks, the opponent has a chance of breaking through and trying to surround in his turn (**43**).

The smoking of dagga is by no means confined to the tribal areas, but is also practised by native and coloured in the towns, where it is the object of vigorous police campaigns. Two specimens that were taken in a police raid in a slum area of Cape Town are figured on Plate XC (figs. 1 and 2). One is made of a pickle jar and the other of a coconut shell. Another specimen that featured in a court case in East London and is now in East London Museum has been described to me by Miss Courtenay Latimer. The water-vessel consists of a round enamel basin about sixteen inches in diameter, built up on top with clay into a cone, in the centre of which is a large depression for the dagga. The reed stem is inserted in the side of the cone. It appears that the owner of this magnificent specimen made a good thing out of it by charging threepence a smoke to a large clientèle.

The simplest type of pipe found in South Africa and possibly the earliest tobacco-pipe (though dagga is sometimes smoked in them too) is a short piece of the shin-bone of some animal. In one end of it the tobacco is stuffed and in the other end dry grass to keep the ashes from coming into the mouth (Plate LXXXV, figs. 1–4). One specimen (fig. 3) has a round disc of ostrich egg-shell, bored in the centre, to serve the same purpose. Occasionally they are ornamented with incised lines. These pipes are still common, particularly among the Bushmen, Hottentots, Bergdama, and Herero of South West Africa, all of whom use them for either tobacco or dagga. The Tswana used them in the early days and in isolated districts do so still, as anyone might do who had no better pipe. The grass in the end serves a double purpose—not only does it prevent the tobacco from coming into the mouth, but also it absorbs the nicotine and is carefully removed and kept to be smoked itself in time of need.

These bone pipes were copied in stone; the shape, however, was modified to that of a European cigar- or cigarette-holder. A number of different soft stones have been used for pipes and pipe-bowls, but the majority are some kind of serpentine. They may be cut and hollowed out with an iron spear-point, a knife, or a small stone or iron drill, after they have been roughly shaped by rubbing on a stone. A knife or an iron point is used to make the simple line ornamentation (**44**). Pipes of this sort were and are still used by Bushmen, Hottentots, Herero and Tswana. Among the Korana Hottentots there is a distinction between men's and women's pipes, women using the cigar shape (Plate LXXXV, fig. 6), and men the clay-pipe shape (Plate LXXXV, figs. 10 or 15) described below (**45**). To this type of pipe belong the joints of bamboo and tubes of wood described by Stow (**46**) as being used by the Cape Bushmen, and the latest variety is empty cartridge-cases, which are used alone or mounted in bone (Plate LXXXV, fig. 5). Like the water pipe, this type of pipe may be smoked in private or passed round in company, with a finger put over the mouthpiece to prevent the escape of the precious smoke (**47**).

Wooden pipes of an indigenous pattern do not appear to have been made in the South and East at all, but only in the North-west, among the Mampukushu and some of the Ovambo tribes, whose connection with the peoples north of the Zambesi is still comparatively recent. A pipe from Ovamboland figured on Plate XCIX, fig. 3, is identical with those used by the southern Angolan tribes and probably came from there. They consist of a carved wooden bowl and a long iron or wooden stem. The tobacco-pipes of the Mampukushu are quite outstanding (Plate XCIX, fig. 5), and they attach great importance and value to them (**48**). The stem of the pipe is carved out of wood, about an inch in diameter and of varying length (quoted from one metre to four feet, but our specimens are very much shorter). The mouth of the stem is flanged, but there is no record of a separable mouthpiece, and the fore-end is carved to represent a man's head, conventionalised, and looking rather like the figure-head of a boat, but that it faces aft instead of fore. In a simpler and less ornamental type the stem is made of a length of bamboo about an inch in diameter, with the fore-end closed. The bowl, which is generally of clay, is inserted a little distance from the fore-end. In the two specimens of the wooden variety in the South African Museum the bowl is of iron. Green says "the stem varies in length, some being at least four feet, and usually composed of a portion of a gun-barrel, with an additional iron tube of their own manufacture." (**49**).

The type of European tobacco-pipe that was copied in the first instance was the old-fashioned clay pipe, small and with a little spur at the base of the bowl (Plate LXXXVI, figs. 9 and 10). It was copied all over the country almost exactly in stone, and in a modified form and generally somewhat larger in wood. Its influence can still be seen to-day, as many of the modern pipes still have the spur. The influence of later styles of European pipes is to be seen too, both in wood and stone, though the mouthpiece is seldom copied, as the natives prefer a widely flanging end into which they insert a separable mouthpiece of a short length of reed, wood, or bone. With this the owner does not willingly part, because, coming as it does in direct contact with his mouth, it is thought to contain something of his spiritual essence, and would therefore be dangerous if it fell into the hands of an enemy.

The greatest number and variety of wooden pipes are found in the south-east, particularly in the Transkei, where their carving and decoration have provided a means of artistic expression that is found in few other things (Plates XCI to XCVIII). The pipes are well made,

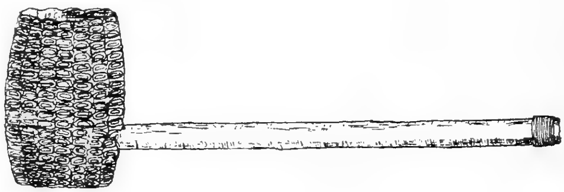
TEXT-FIG. 1.—S.A.M., 5513. Pondomisi wooden pipe, covered with dark blue, light blue, and white beads. Has spare mouthpiece.

and hard woods that are capable of a high polish are generally chosen. Not only is the wood carved—originally with an assegai blade as tool—out of one piece into a variety of shapes, but the pipes are further ornamented by inlaying the bowl with lead, brass, copper, and even bone. The method of inlaying lead is to carve the desired pattern into the surface of the bowl, place it in the sand, and pour molten lead into the grooves thus made (**50**). The overlapping lead is cut away and smoothed down with a spear blade, and the bowl is polished well by greasing and rubbing on the hand and blanket. (In the Transvaal Museum there is a small piece of lambskin, well greased and rolled up, with which the former owner polished his pipe from time to time.) Brass, copper, and bone inlays are generally cut to shape first and then tacked into position on the bowl. Among the Pondomisi beadwork is a favourite decoration (text-fig. 1). The inside of the bowl is lined with tin to protect the wood. Nowadays pipes are usually made by men specialists, and a great number are imported by traders.

Soapstone pipes of this type also show a great variety in styles of carving, particularly in Griqualand West and the Transkei, and even they are frequently inlaid, though generally not as elaborately, plain bands being the most common (Plate LXXXVI, figs. 3 to 7).

Both wood and soapstone pipes frequently have fitted on to the stem a carved end of another substance, horn, bone, or lead, into which the mouthpiece is inserted (Plate XCVIII, figs. 5, *a* and 6, *a*).

In Basutoland there was common until quite recently a true corn-cob pipe, for which a portion of a dry mealie cob was rubbed down and hollowed out for the bowl, and a thin reed stuck in the side near the



TEXT-FIG. 2.—T.M., 35: 123. Basuto corn-cob pipe.

bottom for the stem. It would be interesting to know how the the inspiration came (text-fig. 2).

Another type of tobacco-pipe which really belongs north of the Zambesi, but overlaps slightly, is one with a large black earthenware bowl, to which is fitted a very long bamboo stem. South of the Zambesi it is found among the Batonga in the north-west of Southern Rhodesia (Plate XCIX, figs. 1 and 2).

The Mampukushu have a pipe which consists of an earthen bowl which may be smoked with or without a bamboo stem (Plate XCIX, fig. 4), and it is reported that the Matabele and those of the Bathonga just in the vicinity of Lourenço Marques used a similar pipe, which among the latter was smoked only by old women and dandified young men.

The Ovambo use a fairly elaborate type of black earthenware pipe-bowl similar to those figured on Plate XCIX, figs. 6 and 7. They are fitted with a wooden or iron stem, twelve to fourteen inches long. The examples figured are attributed to the Herero, and though I can find no reference to them in the literature, the Herero are known to have obtained pipes from the Ovambo.

All adults and even small children smoke tobacco when they can get it. The Bushmen prefer it to any other narcotic. The Hottentots, particularly the Nama, having once been introduced to tobacco, reached a stage where it was "almost a necessity to them." A meeting without a pipe is quite unthinkable, and failing tobacco or dagga, they will smoke the dried excrement of small animals, or for preference, in the early days, of an elephant (**51**).

Both water pipes and the ordinary type seem to have existed side by side in most parts of the country, excepting among some Bush and Hottentot tribes as previously mentioned, but nowadays the water pipe for dagga is disappearing, and ordinary European-made wooden tobacco-pipes are common throughout the country, and will probably soon have taken the place of all native-made articles.

ABBREVIATIONS IN DESCRIPTION OF PLATES.

C.C. . .	Camp Collection.
D-C.C. .	Duggan-Cronin Collection.
K.M. . .	Kimberley Museum.
T.M. . .	Transvaal Museum.
S.C. . .	Schofield Collection.
S.A.M. .	South African Museum.
S.A.M.M.L.C.	Malleson Loan Collection, at the S.A. Museum.

DESCRIPTION OF PLATES.

Plate LXXXV.

Fig. 1.—S.A.M., 5278. Bushman, N.E. Kalahari. Section of shin-bone of small animal. Decorated at centre with incised lines rubbed with dark brown substance. Small end stuffed with grass, which acts as a filter.

Fig. 2.—C.C. Nama Hottentot, Namaqualand. Section of shin-bone of small animal. Undecorated.

Fig. 3.—C.C. Nama Hottentot, Namaqualand. Section of shin-bone of small animal. Large end decorated with incised lines rubbed with soot. At small end is fitted an ostrich egg-shell disc, bored through the centre, to prevent bits of leaf from coming into the mouth.

Fig. 3, *a.*—View of end of same pipe showing bored disc.

Fig. 4.—S.A.M., 5060. Bergdama, Zesfontein, S.W. Africa. Section of shin-bone of small animal, covered, except for a band near the top, with a section of a small stem of *Cotyledon paniculata* (Botterboom).

Fig. 5.—S.A.M., 3169. ? Bushman, no history. A brass cartridge-case, into the narrow end of which a small and short section of bone has been inserted to serve as a mouthpiece.

Fig. 6.—C.C. Hottentot, Griquatown, C.P. Cylindrical pipe of polished greeny fawn serpentine with fawn flecks. The mouthpiece is of lead, fused on. The bowl is octagonal in section.

Fig. 7.—C.C. Nama Hottentot, Warmbad, S.W. Africa. Cylindrical pipe of polished brownish-green serpentine with fawn flecks. Simple incised lines round mouth. Butt-end is small and has small opening as shown alongside.

Fig. 8.—C.C. Hottentot, from Prieska, C.P. Polished grey serpentine bowl with patches of dark brown, green, and black. Has a short lead stem fused on, and vestige of spur at base of bowl.

Fig. 9.—S.A.M., 5808. ? Bushman. Found in mountains of Moordenaar's Karoo, north of Laingsburg, C.P. Small bowl of polished light green serpentine. Mouth decorated with rough incised cross-hatching. Round the base four small holes to give a grip to the lead which is poured through the base of the bowl to form a short stem, and visible half-way up the bowl inside.

Fig. 10.—S.A.M., 5444. Hottentot, Griqualand West. Pipe of polished dark green serpentine with darker streaks. Very short stem and spur at base of bowl. Undecorated.

Fig. 11.—C.C. Hottentot, Warmbad, S.W. Africa. Cylindrical pipe of polished fawn-coloured serpentine. Two bands of incised cross-hatching between horizontal lines round mouth.

Fig. 12.—C.C. Hottentot, Griquatown, C.P. Cylindrical pipe of khaki-coloured unpolished clayey stone, with considerable amount of incised decoration.

Fig. 13.—S.A.M. No history. Cylindrical pipe of polished brown serpentine with light flecks, darkened with smoke. Slight cross-hatched incised decoration round mouth. Mouthpiece of lead, inlaid in horizontal and vertical bands for strength at intersection.

Fig. 14.—C.C. Nama Hottentot, Warmbad, S.W. Africa. Polished olive-green serpentine with red streak. Style of European clay pipe with spur at base of bowl. Band of roughly incised diagonal lines round mouth of bowl.

Fig. 15.—C.C. Hottentot, Griquatown. Pipe of polished yellowish-brown serpentine with fine lighter flecks. Style of European clay pipe. Band of incised diagonal lines round mouth of bowl.

Fig. 16.—C.C. Nama Hottentot, Warmbad. Pipe in style of European clay pipe with no spur at base of bowl. Polished greeny-brown serpentine. Decorated with four bands round top of bowl, one plain, three incised with diagonal lines in alternate directions.

Fig. 17.—C.C. Hottentot, O'Okiep, Little Namaqualand. Pipe of olive-green polished serpentine with black flecks and red patches. The base of the bowl is carved as a conventional jackal face. Different from clay-pipe style.

Fig. 18.—C.C. Hottentot, Namaqualand. Bowl only of khaki-coloured polished soapstone. The bore is plugged at the back with a slightly carved wooden stopper. Copied from a different style of European pipe-bowl.

Fig. 19.—C.C. Hottentot, Warmbad, S.W. Africa. Greyish fawn serpentine. Made with three bowls, each connected with the others by the bore which passes right through the stem and the base of the bowls. The hole is plugged with wood where the arrow indicates. The two outer bowls have rough incised cross-hatching round the mouth. I have seen specimens with as many as seven bowls in two rows. The idea of two bowls to one pipe may have been of native origin, but I am quite sure that a greater number than that has only been conceived under European influence and for the tourist trade. None of the pipes of this type that I have seen bear any sign of having been smoked.

Fig. 20.—C.C. Hottentot, Brakkies, C.P. Pipe with bowl and short stem

of polished greeny-brown banded shale, with ridge projecting forward and terminating at peg at base of bowl. At the end of the stone stem is a brass pipe ring, and in it is inserted an unpolished wooden stem or long mouthpiece.

Plate LXXXVI.

Fig. 1.—S.A.M., 1790. Tswana, Bechuanaland Protectorate. Pipe of polished greenish-brown banded serpentine. Bowl and stem made in one with a band of tin at the top of the stem. The base of the bowl and top of the stem are inlaid with lead. There is a narrow brass band at the end of the stem.

Fig. 2.—C.C. Batlaro, Kuruman, C.P. Polished yellowish-brown banded serpentine, with red flecks. Large projection at base of bowl. Two bands of fine incised cross-hatching round mouth.

Fig. 3.—C.C. Hottentot, Griquatown, C.P. Chrome-yellow highly polished serpentine, with quartz flecks. Over the end of the stone stem is fixed a zinc band into which a wooden stem is inserted. The zigzag decoration round the mouth and wing is incised.

Fig. 4.—C.C. Hottentot, Namaqualand. Polished golden brown serpentine with dark and quartz flecks. The two bowls are connected only at the base, below which is a carved projection. Into a brass band round the end of the short stone stem a longer wooden stem is inserted. The bore passes right through the base of the two bowls, and is plugged at the front of the foremost bowl with a small grooved bone peg.

Fig. 4, *a*.—Underside of bowls of above, to show carving.

Fig. 5.—C.C. Hottentot, O'Okiep, Little Namaqualand. Polished light brownish-yellow serpentine, with spur at base, and very short stem joined by a flanging brass pipe-ring to long carved black horn stem. The mouth of the bowl is decorated with two bands of incised diagonal lines, and is fitted with a brass pipe-cover of European pattern and, probably, manufacture.

Fig. 6.—C.C. Griqua, Griquatown, C.P. Elaborately carved and polished chrome-yellow clayey stone. A square brass fitting covers the junction of the brown wooden stem and the short vertical stone stem. The bore is plugged in three places as shown by arrows, in two flush with the surface and the third with a large wooden peg. At one place the bore has broken through the stone, and a wooden lining has been put in. Round the mouth of the bowl is a band of open cross-hatching.

Fig. 7.—C.C. Griqua, Griquatown, C.P. Polished chrome-coloured clayey stone, very fine grained. Two bowls joined by a short stem, both decorated with roughly incised lines round mouth; one has a rim. There is a brass band at the end of the stone stem, where a rough wooden stem is inserted.

Fig. 8.—C.C. Griqua, Griquatown, C.P. Bowl carved out of banded shale, reddish chocolate in colour, with bands of chrome. A band round the mouth and another round the middle are inlaid with lead. The bowl is set on a base, one end of which is inserted in a carved and elbowed wooden stem, the insertion end of which is inlaid with lead. The bore is plugged in three places, one flush with the surface and two fitted with carved horn pegs. A light wooden mouthpiece is fitted to the flanging end of the stem.

Fig. 9.—S.A.M., 1420. White clay pipe of European manufacture. Bowl cast to represent the head of a bearded man. The pipe was found in Cape Town,

22 feet below surface, during excavations for the present railway station, at a spot where the step of an old landing-stage and some post office stones were also found. (These stones were used prior to the first settlement at the Cape in 1652.) Compare figs. 8, 9, and 10, Plate LXXXV.

Fig. 10.—S.A.M., 932. White clay pipe of European manufacture of the time of Charles II. Note the angle of the bowl and the spur at its base. Compare with stone pipes, Plate LXXXV, figs. 14 and 15, and Plate LXXXVI, figs. 1 and 2.

Plate LXXXVII.

Bowls for Water Pipes, Ancient and Modern.

(Unless otherwise stated, all are round in cross-section.)

Fig. 1.—S.A.M., 520. Old bowl, excavated East London district. Dark grey baked clay. Very small capacity.

Fig. 2.—S.C. Old bowl, excavated at Beacon site near Durban. Carved out of black stone. Very small capacity.

Fig. 3.—S.A.M. Old bowl, excavated at Durban in 1882. Reddish-brown baked clay. Rather larger capacity.

Fig. 4.—S.C. Old bowl, excavated at University site, Durban. Yellowish clayey stone, oval in cross-section.

Fig. 5.—S.A.M., 5857. Old bowl, excavated at the Beacon site, near Durban. Red baked clay. Very small capacity.

Fig. 6.—S.C. Old bowl, excavated at Tinley Manor site. Rough red baked clay.

Fig. 7.—S.A.M. No history. Black baked clay, slightly burnished on outside. Decorated in triangle design of deep incisions.

Fig. 8.—S.A.M. No history. Black baked clay, slightly burnished outside. Undecorated.

Fig. 9.—S.A.M., 5869. Found in grave in Umhloti Dune, Durban. A stone ink-bottle with a hole knocked in the bottom and used upside down. (A similar bowl was reported as seen in use in Constantia, Cape, within recent years.)

Fig. 10.—C.C. Modern bowl from Transkei. Carved out of grey-brown soapstone and polished. Bowl decorated back and front with two bands of diagonal **V**-shaped grooves.

Fig. 11.—C.C. Modern bowl from Transkei. Carved out of dark grey stone, unpolished. Bowl decorated with two horizontal bands of short diagonal **V**-shaped grooves.

Fig. 12.—S.A.M., 4769. Modern bowl from Ovamboland, S.W. Africa. Black baked clay slightly burnished.

Fig. 13.—S.A.M., 796. Found at Smithfield, O.F.S. Greyish stone, very heavy in weight. Quite undecorated. Very thick walls. (Compare Plate LXXXIX, fig. 3.)

Fig. 14.—S.A.M., 3336. Modern bowl from the Herero, S.W. Africa. Polished greeny-grey serpentine with heavily carved base, carving of horizontal and vertical **V**-shaped grooves and flat ridges.

Fig. 15.—S.A.M., 5859. Modern Indian pipe-bowl from Indian Market, Durban. Bright red lightly baked clay. Very fragile.

Fig. 16.—S.A.M., 3000. No history. Carved out of light pinky-grey stone. Undecorated except for raised rings at the centre. (Compare with fig. 15.)

Fig. 17.—S.A.M., 2544. No history. Made of almost white sandstone.

Fig. 18.—C.C. Modern bowl from Transkei. Smooth yellowish-brown serpentine. Plain bowl, base decorated with diagonal V-grooves, and flat ridges.

Fig. 19.—S.A.M., 5888. ? Bushman. Dug up at Graaff Reinet, C.P. Carved out of chalky stone, dull fawn in colour. Decorated with vertical bands of short diagonal grooves (semicircular in cross-section), with a vertical band of raised dots, on two opposite sides.

Fig. 20.—S.A.M., 3333. Zulu, Utrecht, Natal. Polished green soapstone bowl on long cylindrical base with ring attached by four spokes just below base of bowl.

Plate LXXXVIII.

Water Pipes, for Smoking Dagga.

Fig. 1.—C.C. Transkei. A light-coloured polished ox-horn water-vessel, with large end left open for mouth and bound with light-coloured hide, which is secured at the lower edge by four wooden pegs. A piece of strong reed, strengthened in the centre with bindings of sinew, is inserted diagonally in the side of the horn and held in place with thick black wax. On top of the stem is placed a blackened and polished stone bowl, plain but for a ridge with a diamond cut-out pattern round the neck. The bowl is round in cross-section.

Fig. 2.—C.C. Hottentot, Namaqualand. Black polished ox-horn water-vessel, the large end of which is filled in with a round of wood, held in with wooden pegs. Pointed end cut to nozzle shape, with small opening for the mouth. (This shape and the ring at the base make it appear that this is a converted snuff-box or powder-horn.) Just below the nozzle is a small hole. The plain reed stem is inserted diagonally near the mouth, and held in place with a binding of cloth over which some waxy substance has been smeared. A similar binding is found at the top of the stem where it enters the base of the carved and polished red serpentine bowl, decorated with four vertical bands of diagonal V-grooves and flat ridges, separated by two V-grooves and a sharp ridge. The bowl is oval in section.

Fig. 3.—S.A.M., 5678. Mampukushu, Okavango River, S.W. Africa. Black unpolished kudu horn water-vessel, with large end left open for mouth. Wooden stem shouldered at each end. The lower end is fitted almost at right angles into a small hole in the horn near the point, with a strip of bark put in to make the fit tighter. The other end is inserted in the base of a wooden bowl, round in cross-section, branded black on the outside and unpolished.

Fig. 4.—S.A.M., 2879. Said to be Basuto. Black polished horn water-vessel, ornamented with round brass furniture tacks. The large end is filled in with wood, held in by the tacks. The point is left intact, and an oval opening is made in the side near the point for the mouth. A short length of smooth reed is inserted diagonally in the side of the horn, and at its other end into a pinkish-mauve soapstone bowl, round in cross-section, and elaborately carved on bowl and neck with vertical and horizontal bands of V-shaped grooves and sharp ridges.

Fig. 5.—S.A.M.M.L.C., 17. Swazi, Eastern Transvaal. Long, dark grey, unpolished eland horn water-vessel, with large end open for mouth. Near the top there are two bands and a loop of raw hide, made by slitting two ends of a straight

piece of hide, and slipping them both over the end of the horn, leaving the centre piece to form the loop. A small black clay bowl, round in cross-section, with a raised ring round the neck and a hide strap put on in the same way as that on the horn, is placed on the top of a long stout reed, which when the pipe is in use is placed right down into the horn through the mouth. When not in use the reed can be put through the loops on bowl and horn for ease in carrying and storing.

Fig. 6.—C.C. No history. Probably Transkei. Light-coloured polished ox-horn, with large end open for mouth. A short, thick, polished, light wooden stem is inserted at right angles to the horn just near the mouth, and at the point of insertion the horn is bound with a wide band of hide, which is drawn on while wet and allowed to set, therefore showing no join. On top of the stem is a heavy sandstone bowl, covered with thin skin, drawn over while wet. Before drawing on the skin the bowl has been bound with sacking. The bowl is round in section.

Fig. 7.—C.C. Xosa, Komgha, Eastern Province. Large, light-coloured, highly polished ox-horn water-vessel, with large end left open for mouth. Polished wooden stem inserted diagonally in the side of the horn about centre, and fixed in with thick plaster of black wax. On top of the stem is a heavy bowl of polished red jasper, with raised knobs on it. The bowl is square in section, with rounded corners.

Plate LXXXIX.

Water Pipes for Smoking Dagga.

Fig. 1.—S.A.M., 5677. Mampukushu, Okavango River, S.W. Africa. Long-necked gourd water-vessel, in which the neck of the gourd serves as the stem and the bowl as the actual water container. A wooden bowl is set in the side of the bowl of the gourd and secured with a plaiting of fibre cords over bark.

Fig. 2.—C.C. ? Matebele, from Bulawayo, S. Rhodesia. Light brown polished narrow gourd water-vessel, with opening for mouth at narrowest end, and short reed stem, bound at base to secure fit, and stuck at right angles into fattest part of gourd. On top of stem is a dark soapstone bowl, the upper part of which is carved in long V-grooves and ridges. The bowl is secured to the gourd with a short piece of bark fibre cord.

Fig. 3.—K.M. 1900. Bushman, Blauwater, Graaff Reinet, C.P. Small black horn water-vessel with large end filled in with wood or horn, and the point cut off to form a mouth. The wooden stem is inserted in the side of the horn diagonally, and at its other end into the base of a plain greyish sandstone bowl.

Fig. 4.—K.M. 2288. Bushman, Ovamboland. The water-vessel is a calabash with a long curved neck, in a forward bend of which a hole has been made for the mouth. The pipe-bowl is set in the side of the bowl of the calabash, and is made of wood.

Fig. 5.—T.M. 6635. Bushman. Short black horn water-vessel open at its smaller end for mouth, and closed at the larger end with a cap of hide put on wet and bound with string until dry, when it had set quite fast. Near this end is inserted at right angles with the horn a small black clay bowl, decorated with vertical chevron grooves.

Fig. 6.—D-C.C. Zulu. Spitting-tube. The narrower stick on the right hand

of the sketch is bored down its length for the tube. The other is solid and is merely a handle. The two are bound together with fibre string.

Fig. 7.—D-C.C. Zulu. Same spitting-tube as fig. 6 rolled up in the little grass mat in which spitting-tubes are kept when not in use.

Plate XC.

Dagga Pipes from Towns.

Fig. 1.—S.A.M., 4276. District Six, Cape Town. A pickle jar is used as a water-vessel. The bowl is of wood, and the wooden stem of the bowl and the reed stem through which the smoke is inhaled are bound together with rags, which form the large stopper for the jar. Both stems are visible within the jar.

Fig. 2.—S.A.M., 4274. District Six, Cape Town. A coconut shell is used as a water-vessel, and in the top of it are inserted at different points the reed smoking stem and the stem of the wooden bowl. There is a small hole between these two insertions. Both insertion points are built up with wax. (Figs. 1 and 2 were captured in a police raid.)

Fig. 3.—S.A.M., 2426. No history. A water-vessel of baked red clay, roughly shaped like a brick with a depression in one end for the leaves of the narcotic, and a passage leading from it to the other end, where the top of the neck of a glass bottle serves as a mouthpiece.

Fig. 4.—K.M. 1378. From Kampfersdam, near Pretoria. Half of a hard whitish-grey brick has a channel bored right through the centre horizontally, and plugged at each end with cork. From the top of the brick are bored two other channels to meet the horizontal one. One is enlarged at the top to serve as a bowl for the dagga, and in the other is inserted a copper fitting for a mouthpiece.

Plate XCI.

Plain Wooden Tobacco-Pipes.

These pipes are for the most part copied from a later and larger style of European pipe, though the majority retain the spur at the base of the bowl like the old clay pipes. In every case the bowl of the pipe is lined with tin. In many cases these tin linings give the appearance of having been European-inspired if not European-made, particularly in the vandyke cut-out along the lower edge to make the lining fit the narrowing of the bowl. Possibly they are obtainable in the stores. In the majority of cases the bore of the stem emerges on the surface of the bowl for ease in making, and is plugged with a small round of wood, often so well matched as to be hardly distinguishable. In every case on this and succeeding plates the plug is indicated with an arrow.

Fig. 1.—C.C. Transkei. Dark brown wood, with fair polish, very much after European style. Wooden mouthpiece.

Fig. 2.—C.C. Transkei. Dark brown highly polished wood, with carved horn end to stem. (The wooden stem is cut down to a thin column over which the horn piece fits so well that when the wood has a high polish it is frequently hard to see the join.) The mouthpiece is a short length of the bone of a bird.

Fig. 3.—C.C. Xosa, Transkei. Dark unpolished wood. Only the top portion of the bowl is lined with tin. The horn end to the stem is inlaid with a band of bone in the centre. Wooden mouthpiece.

Fig. 4.—C.C. Transkei. Plain brown wood, with fair polish. Wooden mouthpiece.

Fig. 4, *a*.—Front view of bowl to show tapering.

Fig. 5.—C.C. Transkei. Dark red wood of the karreeboom (a species of *Rhus*), with fair polish. Bone mouthpiece.

Fig. 6.—C.C. Transkei. Woman's pipe. Light-coloured highly polished wood. The whole of the base of the bowl is inlaid with lead. Wooden mouthpiece.

Fig. 7.—C.C. Transkei. Polished brown wood; bowl and stem all in same plane. Wooden mouthpiece.

Fig. 8.—C.C. Griquatown (Transkeien type). Dark brown prettily grained wood, with two bowls set across end of stem. Horn end to stem, similar to fig. 2, and band of thin brass round fore-end of stem. Wooden mouthpiece.

Fig. 9.—C.C. Transkei. Dull brown coarse-grained wood. Flanged end of stem finished with lead, put on like the horn. Wooden mouthpiece.

Fig. 10.—T.M. Transkei. The bowl is the oil-cap of some machine, inscribed Justrite Mfg. Co., Chicago, U.S. Originally black enamel paint on iron, but the paint has worn off. With the mouthpiece of an ordinary European pipe, it makes a small but efficient smoking outfit.

Plate XCII.

Plain Tobacco-Pipes, all from the Transkei.

Fig. 1.—C.C. Dark brown wood, highly polished. Wooden mouthpiece.

Fig. 2.—C.C. Light brown wood, with fair polish. Bore passes right through base of all three bowls. Short reed mouthpiece. Plain but for band of lead inlaid at junction of stem and last bowl, probably for strength.

Fig. 3.—C.C. Plain light brown wood with dark grain. Wooden mouthpiece.

Fig. 4.—C.C. Plain brown highly polished wood, with wooden mouthpiece. Tin lining of bowl incised where it turns over rim of mouth.

Fig. 5.—C.C. Xosa. Hard brown wood, well polished. Carved bone end to stem, and wooden mouthpiece secured to stem by a thin thong.

Fig. 6.—C.C. Light coarse-grained unpolished wood, with patch of dark heartwood on one side of bowl. Bowl has double lining. Wooden mouthpiece.

Fig. 7.—C.C. Rich brown coarse-grained wood, with fair polish. Mouthpiece is section of bird-bone.

Fig. 8.—K.M., 1924. Tembu. Plain pipe, carved out of one piece of bone.

Plate XCIII.

Carved Wooden Tobacco-Pipes.

Fig. 1.—C.C. Xosa, Transkei. Dark brown wood, with carving of fretwork type on stem. End of stem is carved dark coloured horn. Wooden mouthpiece. There is a lead inlay to mend part of the carving where it has cracked.

Fig. 2.—C.C. Transkei. Brown wood, with good polish. Stem decorated with fretwork type of carving. A band of lead is inlaid round the end of the stem. Wooden mouthpiece.

Fig. 3.—C.C. Tambuki, Cala District, Transkei. Dark brown, highly polished, coarse-grained wood. The tin cover off a European pipe is fixed on with a brass hinge, and a cylinder of tin is inserted through the base of the bowl. The bore is plugged at the back with a wooden peg. There is a wooden mouthpiece.

Fig. 4.—C.C. Griquatown. Dark red highly polished wood, with spiral ridge carved on stem (? to represent snake). Light wooden mouthpiece.

Fig. 5.—C.C. Transkei. Dark brown wood, unpolished. Bowl has double lining. Wooden mouthpiece.

Fig. 6.—C.C. Xosa, Transkei. Brown wood. Bowl rests on wheel in same plane as stem. Bowl lined with brass. Mouthpiece is section of a bird-bone.

Fig. 7.—C.C. Xosa. Well-polished stinkwood. Horn end to stem and horn mouthpiece.

Fig. 7, *a*.—Front view of bowl of same pipe.

Plate XCIV.

Wooden Tobacco-Pipes with Representational Carving.

Fig. 1.—C.C. Fingo, Transkei. Dark brown unpolished wood. Bowl supported by small female figure. Wooden mouthpiece.

Fig. 2.—K.M., 1201. Transkei. Made of light-coloured wood to represent an ox, with spots, hoofs, ears, and horns, and end of stem branded black. The bowl is in the shoulders of the animal.

Fig. 3.—C.C. Grahamstown. Light brown, very highly polished wood, with the bowl carved in the shape of a baboon's head. The eyes are brass, inset, and there is a band of thin brass round the middle of the stem, fastened by lapping the edges over each other. The wooden mouthpiece is fairly elaborately carved.

Fig. 4.—C.C. Griquatown. Dark red karreeboom, unpolished. Bowl is carved to represent a human figure with head projecting in front instead of on top, and rudimentary arms on sides. The end of the stem is cut in the European style, instead of flanging.

Fig. 5.—C.C. Transkei. Dark brown coarse-grained wood, with a fair polish. The bowl is carved to represent a woman's figure, with sky-blue beads inset for eyes, and on her back a conventional representation of a child inlaid in lead, (figured alongside.) Wooden mouthpiece.

Fig. 6.—C.C. Fingo, Butterworth, Transkei. Dark brown highly polished wood. The bowl and its support are carved to represent the engine of a train with four wheels. The mouthpiece is a section of a bird's bone.

Fig. 7.—C.C. Griquatown. Reddish brown highly polished wood, with two bowls, the first of which is carved to represent a wheel. The mouth end of the stem is cut in the European style.

Plate XCV.

Wooden Tobacco-Pipes Carved to Represent Human Features.

Fig. 1.—C.C. Basutoland. Light brown wood, with bowl carved to represent the seated figure of a woman. The bowl is set in her body. Her head and neck

are detachable and make a stopper for the bowl. The stem of the neck has plugs to make it fit the mouth of the bowl. She has one black and two blue beads for earrings, and necklace and girdle of alternate black and white. Two black beads are inset for the eyes. Wooden mouthpiece. The pipe has not been smoked.

Fig. 1, *a*.—Front view of bowl and figure.

Fig. 2.—C.C. King Williamstown. Light-coloured fine-grained wood, with bowl carved to represent a girl carrying a pot on her head. The pot is the bowl of the pipe. Her apron, waistband, and bangles are of lead inlaid in the wood. In addition she has bent round each wrist a brass bangle of triangular wire. Her hair is branded black, and black beads are inset for her eyes. A band of lead is inlaid in the stem and the mouthpiece is of bird-bone.

Fig. 2, *a*.—Front view of bowl and figure.

Fig. 3.—C.C. Transkei. Dark brown unpolished wood. Bowl carved to represent woman's head and shoulders, with white beads for the eyes. The end of the stem is of light-coloured horn and the mouthpiece of wood.

Fig. 4.—S.A.M., 4923. Basutoland. Made of dark brown unpolished wood, very much in the European style, but the bowl is carved to represent a man's bearded face, with blue beads for the eyes.

Fig. 5.—C.C. Light-coloured coarse-grained wood, with bowl carved to represent human head and neck. White beads inserted for the eyes. The mouthpiece is wooden.

Plate XCVI.

Wooden Pipes with Metal Ornamentation wound or fastened on.

Fig. 1.—C.C. Dordrecht, O.F.S. Light brown polished wood, with three bands of brass round the stem, fastened at the back with brass tacks. Wooden mouthpiece.

Fig. 2.—C.C. Transkei. Dark brown wood, slightly polished. The upper portion of the bowl is covered with a band of thin brass, fastened at the back by lapping the edges over each other and tacking with copper tacks as well. The stem is bound with brass wire in spaced groups of five or six twistings. The end of the stem is ivory, and the wooden mouthpiece is set in a small ring of tin in the ivory end.

Fig. 3.—C.C. Transkei. Detail of ornamentation on bowl of dark wooden pipe similar to fig. 2 in shape and size. The band round the top is brass, the stars are copper, and the curved bands tin. The brass band is a fitting ring, the other pieces are nailed on with tiny copper and iron tacks.

Fig. 4.—C.C. Transkei. Dark highly-polished wood, with three bands of brass round stem, fastened at the back by lapping the edges. Round the mouth of the bowl is a jointless band of brass, with three rows of triangles cut out to show wood underneath. Band held on with brass tacks. Wooden mouthpicee.

Fig. 5.—C.C. Butterworth, Transkei. Dark brown highly-polished wood, with horn end to stem and bird-bone mouthpiece. The bowl is highly ornamented with plain bands and cut-outs, mainly of zinc, but also of copper and brass. The bands are fastened in front of the bowl by lapping the edges over, and the small cut-outs are nailed on with copper and iron tacks. The base of the bowl is inlaid with plain lead.

Fig. 6.—C.C. Transkei. Highly-polished brown wood, with wooden mouthpiece. Near the end of the stem there is a plain band of brass, fastened at the back by lapping the edges over each other.

Fig. 7.—C.C. Xosa, Transkei. Detail of ornamentation on dark brown wooden bowl. The bands round the top and the middle row of rings are zinc, and the top and bottom rows of rings copper. They are fastened on with copper tacks.

Plate XCVII.

Wooden Pipes with Patterns Inlaid on Bowls in Lead.

The process of inlaying lead has been described. It is to be noted that frequently plain bands or patches of lead are inlaid as a reliable means of mending cracks in the pipe, particularly at the junction of bowl and stem; compare Plates XCII, fig. 2, and XCIII, fig. 1.

Fig. 1.—C.C. Transkei. Red wood with dark horn end to stem and wooden mouthpiece. Bowl inlaid with simple line and four dots of lead.

Fig. 1, *a*.—Front view of bowl.

Fig. 2.—C.C. Transkei. Light brown wood, highly polished. Same design on each side of bowl inlaid with lead. Horn end to stem and wooden mouthpiece.

Fig. 3.—C.C. Transkei. Dark highly-polished wood. Long narrow bowl inlaid round mouth with deep band of lead, with jagged lower edge. Carved horn end to stem and bird-bone mouthpiece.

Fig. 4.—C.C. Transkei. Small dull brown wooden pipe with black horn end to stem and wooden mouthpiece. Bowl inlaid with heavy plain band and seven lighter diagonal vandyked bands of lead.

Fig. 5.—C.C. Transkei. Dark brown very highly-polished wood. Bowl and its support inlaid similarly on each side with lead. Wooden mouthpiece.

Fig. 6.—C.C. Transkei. ? Woman's pipe. Dark brown unpolished wood. Long narrow bowl with vandyked band round mouth, and wavy lines on bowl inlaid with lead. On each side of the bowl is a large rectangle of ivory, let into the wood and held with lead plugs.

Fig. 7.—C.C. Barkley West. Detail of lead inlay on light brown, very highly-polished wooden bowl.

Fig. 8.—C.C. Transkei. Detail of lead inlay on brown wooden bowl.

Plate XCVIII.

Wooden Tobacco-Pipes with Elaborate Designs Inlaid with Lead.

Fig. 1.—C.C. Transkeien type, from Johannesburg. Dark brown wood, with fair polish. The bowl and its pedestal are carved to represent a railway engine and inlaid with lead and copper, on the bowl purely for ornament and on the base to emphasise the features of the engine. Wooden mouthpiece.

Fig. 2.—C.C. From Port Elizabeth. Dark polished wood. Bowl rests on a carved hand. The stem is in two parts, one of which is like the wrist of the hand, each of which is inserted into the end of a narrow brass tube, so that the tube has the effect of being slipped over the stem. Wooden mouthpiece.

Fig. 2, *a*.—Front view of bowl and support.

Fig. 3.—C.C. Transkei. Detail of ornamentation on dark wooden bowl of woman's pipe. The stars are inlaid with lead, and the brass band round the mouth is a deep ring held on by exactness of fit.

Fig. 4.—C.C. Griquatown. Detail of lead inlay on light brown wooden bowl.

Fig. 5.—C.C. Transkei. Detail of lead inlay on dark brown wooden bowl.

Fig. 5, *a*.—End of stem of the same pipe, showing the alternate bands of lead (white) and black horn (shaded) which are put over the wooden stem to make a flanging mouth. Wooden mouthpiece.

Fig. 6.—C.C. Transkei. Detail of lead inlay on reddish wooden bowl that is so highly polished as to look like mahogany.

Fig. 6, *a*.—Carved horn end to stem of same pipe.

Fig. 7.—C.C. Transkei. Brown polished wood. Large round bowl inlaid with lead in naturalistic and conventional patterns. A piece of tin is nailed with brass tacks at the base of the bowl over its junction with the stem, possibly to strengthen a crack. The stem ends in a flanging mouth of ivory and has a wooden mouthpiece.

Fig. 7, *a*.—Detail of lead inlay on bowl of same pipe.

Plate XCIX.

Pipes from South West Africa and Northern Rhodesia.

Fig. 1.—S.A.M., 2074. Batonga, N. Rhodesia. Black earthenware bowl, widest just above its centre, where a deep horizontal groove separates the plain polished upper part from the cross-hatched lower part. The bowl is on a short stem, set at an angle on a small pedestal from the side of which a short tube, all in one with the bowl and pedestal, projects and is inserted in a hole in the side of a long reed stem. The pipe-head is secured to the stem by a binding of copper wire round the top of the pedestal and below the hole, and by a single brass wire which passes through two holes in the side of the bowl and round the stem. The stem is a thick bamboo with ornamental bindings of zinc, copper, and brass wire. At its base is inserted a pointed wooden peg bound in with copper wire, to stick in the ground so that the pipe may stand upright. Total length of stem with point, $23\frac{5}{8}$ inches.

Fig. 2.—S.A.M., 3342. Baila, Kafue River, N. Rhodesia. Glazed black earthenware pipe-head, of which the bowl rests on a ring, which is decorated with oval depressions (? idea of head-pad for carrying pots), on the shoulders of an antelope, the upturned body of which forms the stem of the pipe-head. The upper part of the bowl is plain, and is separated by a deep horizontal groove from the cross-hatched lower part. A long thin bamboo stem is inserted in the mouth of the clay stem, and has a band of tin, secured only by fit, round the base. Length of stem, 27 inches.

Fig. 3.—K.M., 2016. Ovambo, S.W. Africa. Pipe-head of dark reddish-brown hard wood. Bowl, pedestal, and short stem in one piece, with lines, zigzags, and geometrical designs carved in relief. Should have a long stem of iron or wood inserted in the mouth of the stem of the bowl.

Fig. 4.—S.A.M., 5676. Mampukushu, Okavango River, S.W. Africa. Simple pipe-head of reddish unglazed clay. May be smoked with or without additional reed stem.

Fig. 5.—S.A.M., 3341. Mampukushu, Andara, S.W. Africa. Said to have belonged to the chief Libebe, about 1860. A stem, holder for bowl, and "figure-head," all cut in one piece of light reddish wood, decorated similarly on each side with round depressions as shown. A jointless band of skin has been put on wet round the mouth of the stem. A thin piece of iron has been bent round to a funnel shape with edges slightly overlapping, and put right down into the wooden bowl so that only about half its length shows above the wood. It is packed in with wood, and a ring of thick spirally-twisted native-made iron wire at the top of the wooden bowl helps to hold it in place.

Fig. 6.—S.A.M., 3332. Herero, S.W. Africa. Dark grey earthenware pipe-bowl, all in one with pedestal and short stem. The mouth of the bowl has a flanging lip. The pedestal and stem are strengthened with hide; a jointless piece drawn over the stem while wet, and another piece sewn and bound round the pedestal and base of stem. The bowl is decorated with rows of punched dots in vertical bands. A wooden or reed stem should be inserted in the mouth of the earthenware stem.

Fig. 7.—S.A.M., 3332. Herero, S.W. Africa. Black earthenware pipe-bowl with pedestal and short stem. The mouth of the bowl has a flanging lip. The bowl is decorated with cross-hatching and vertical bands of punched dots. The mouth of the stem is bound with sinew. A wooden or bamboo stem should be inserted in the mouth of the earthenware stem.

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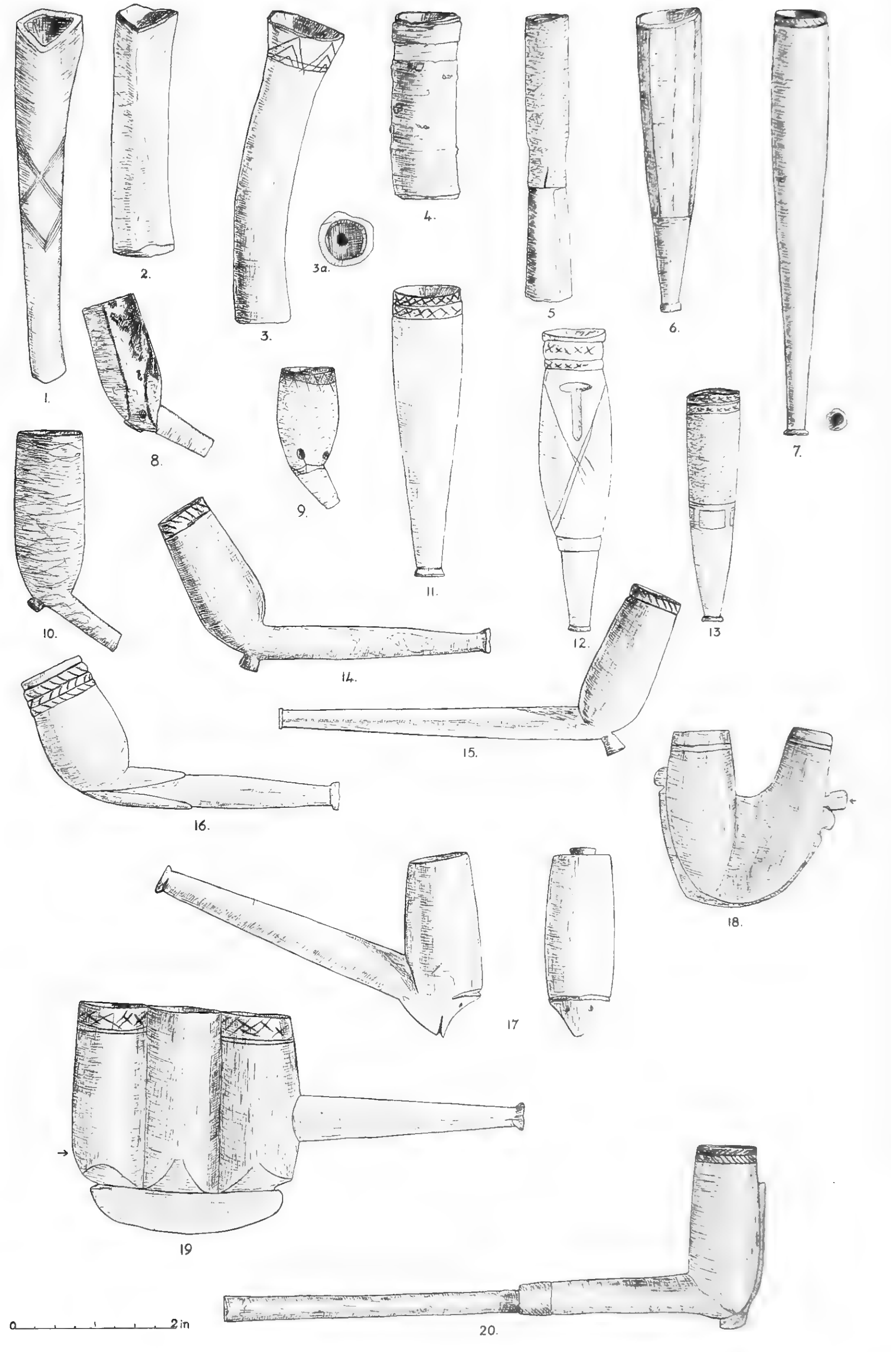
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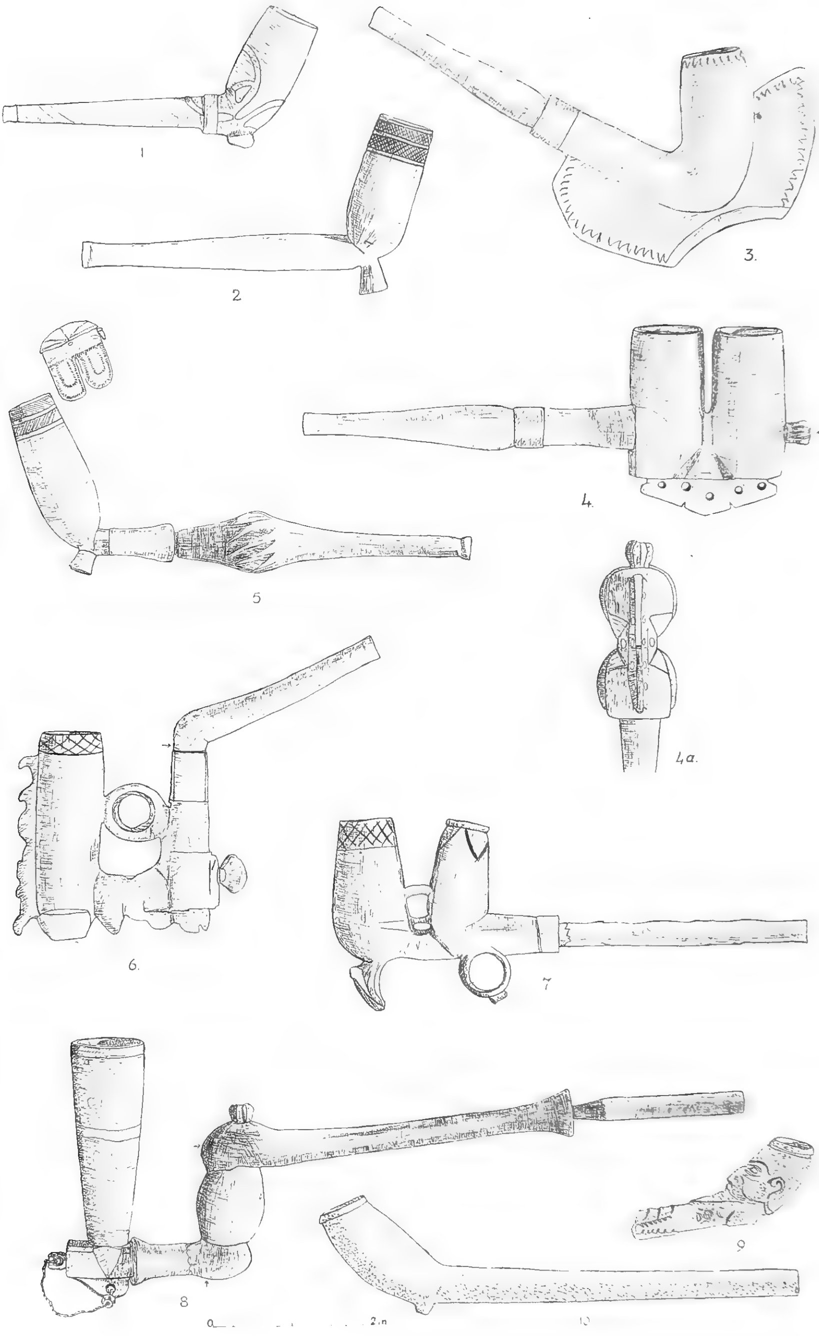
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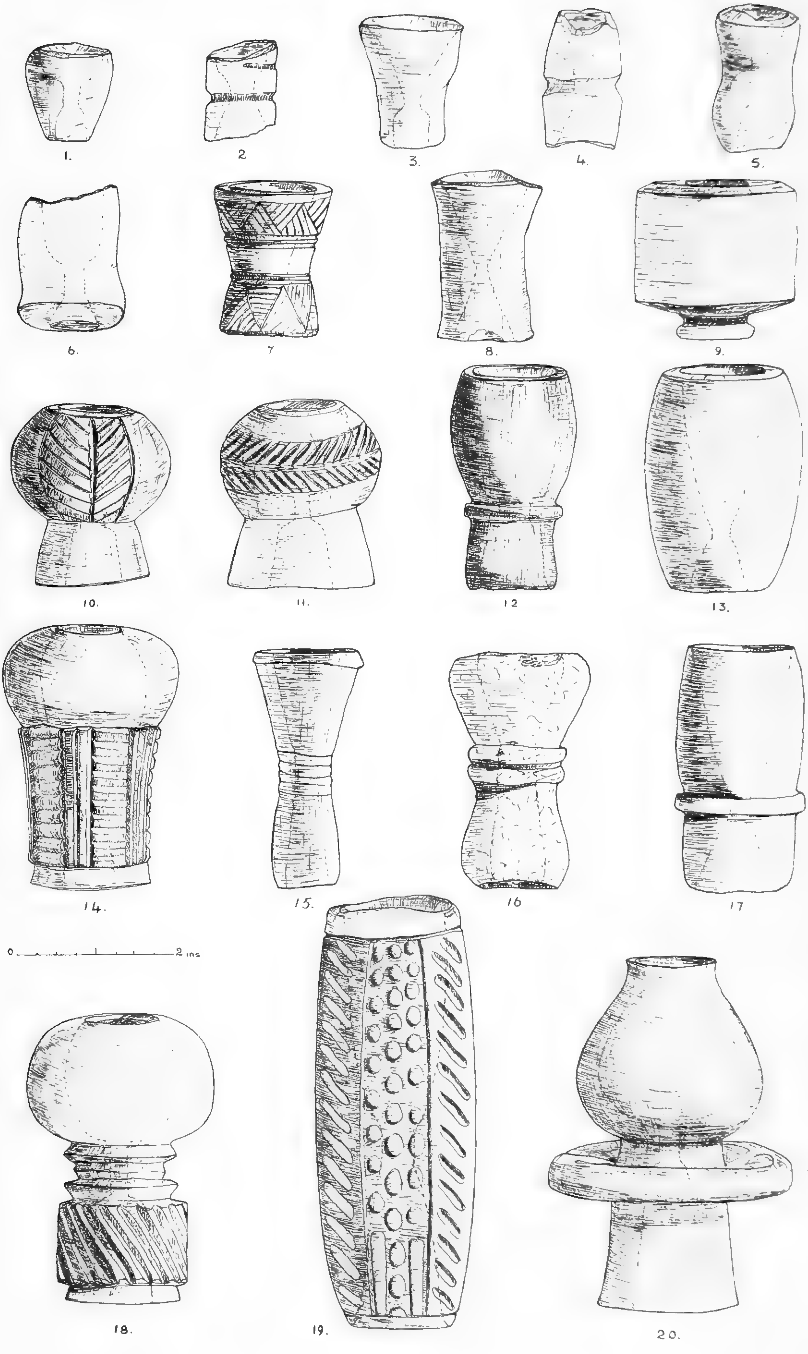
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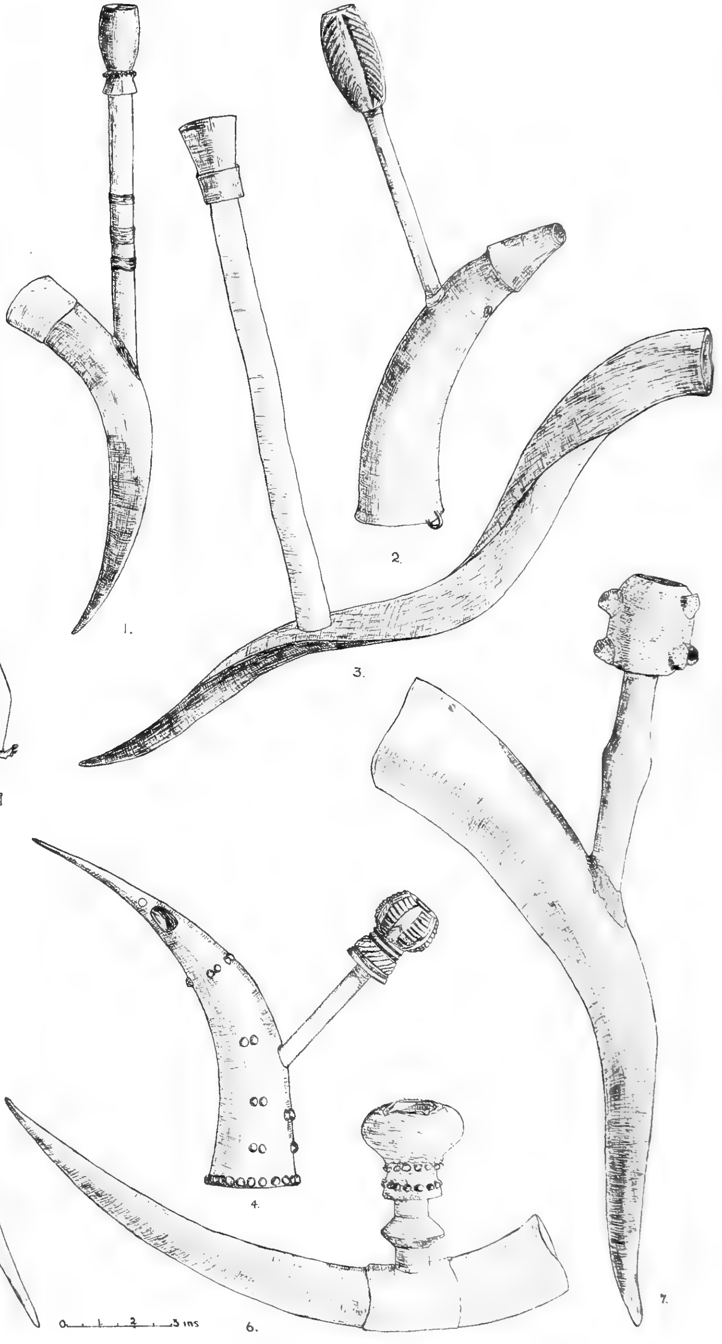

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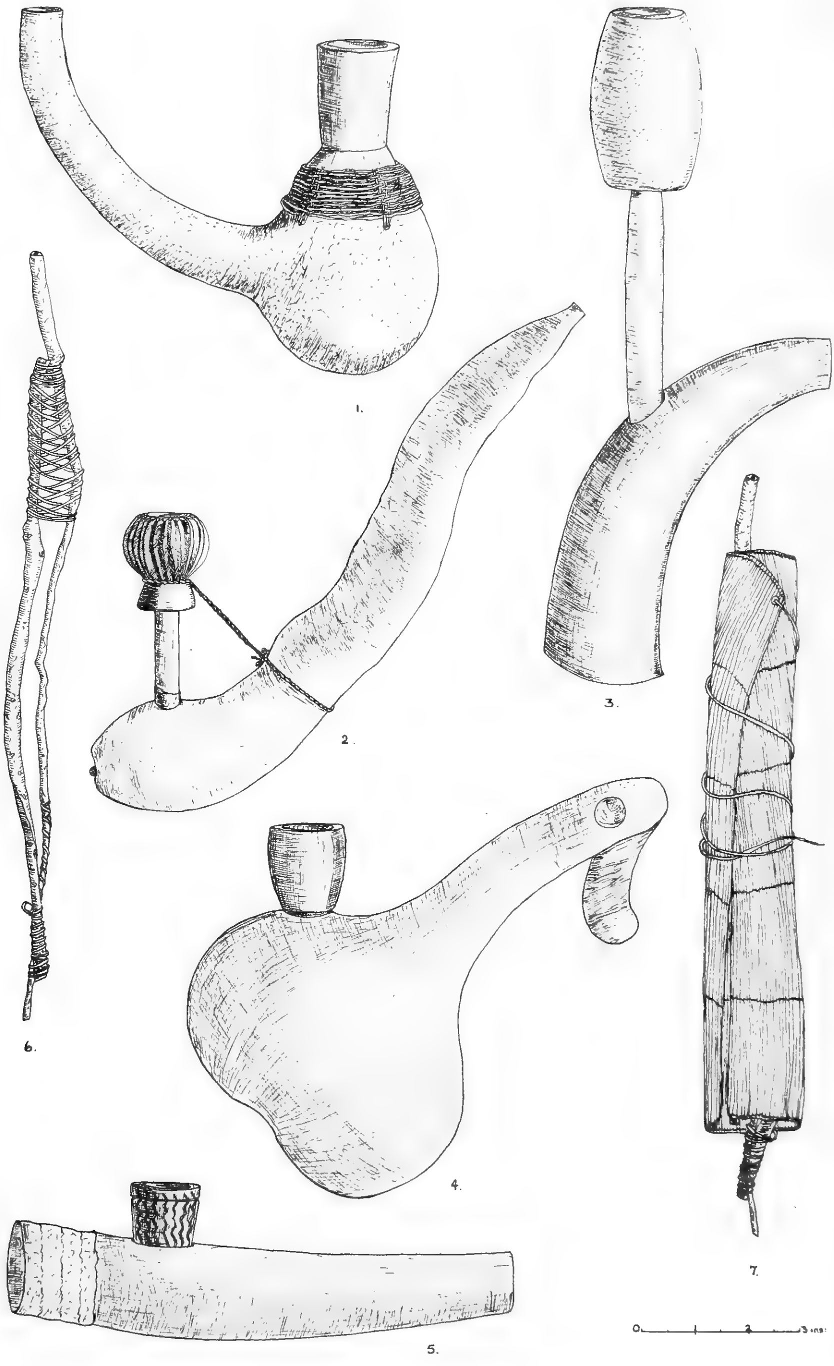

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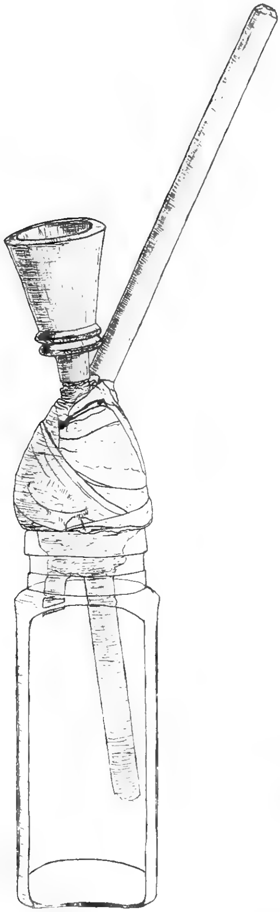

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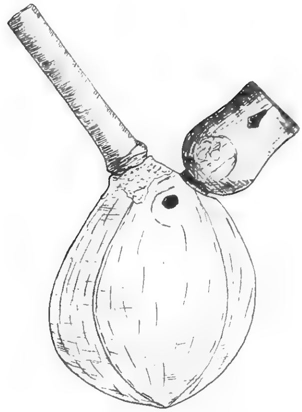

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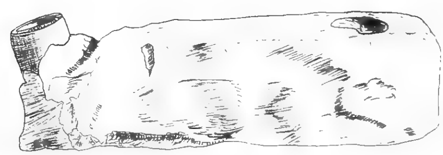

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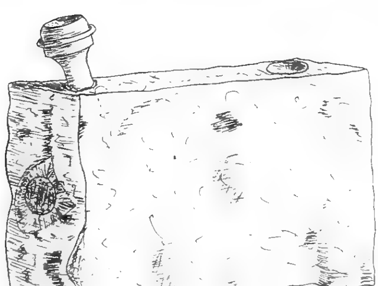

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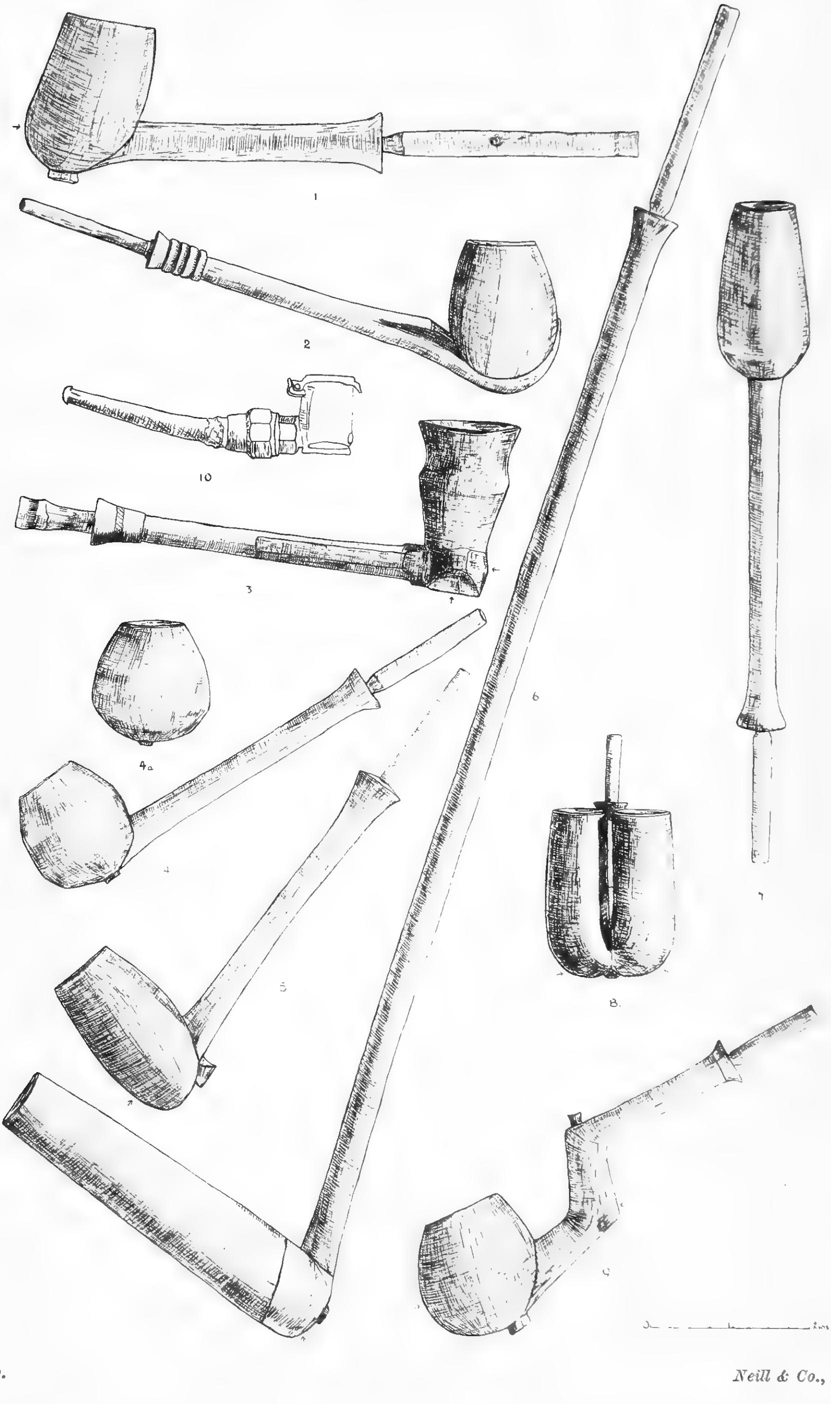

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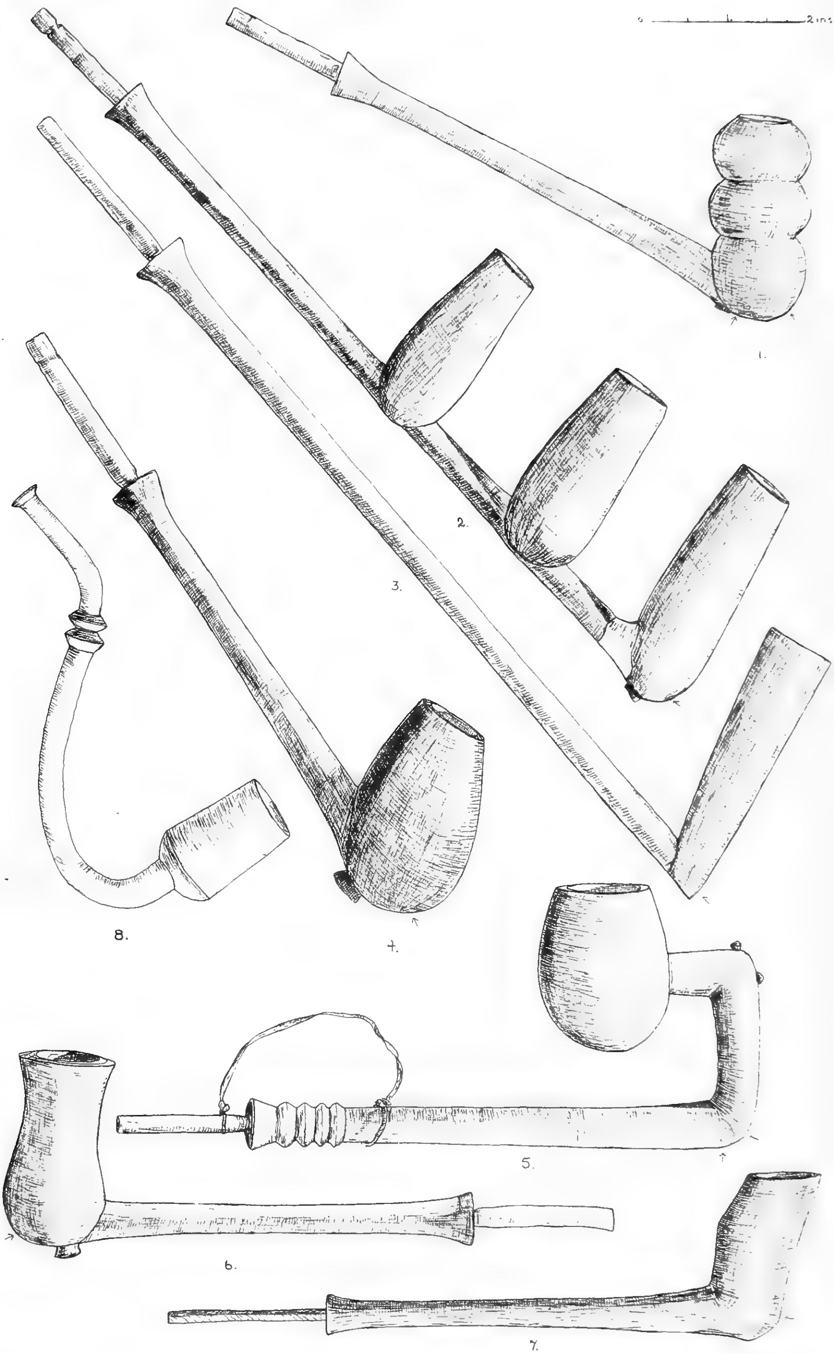

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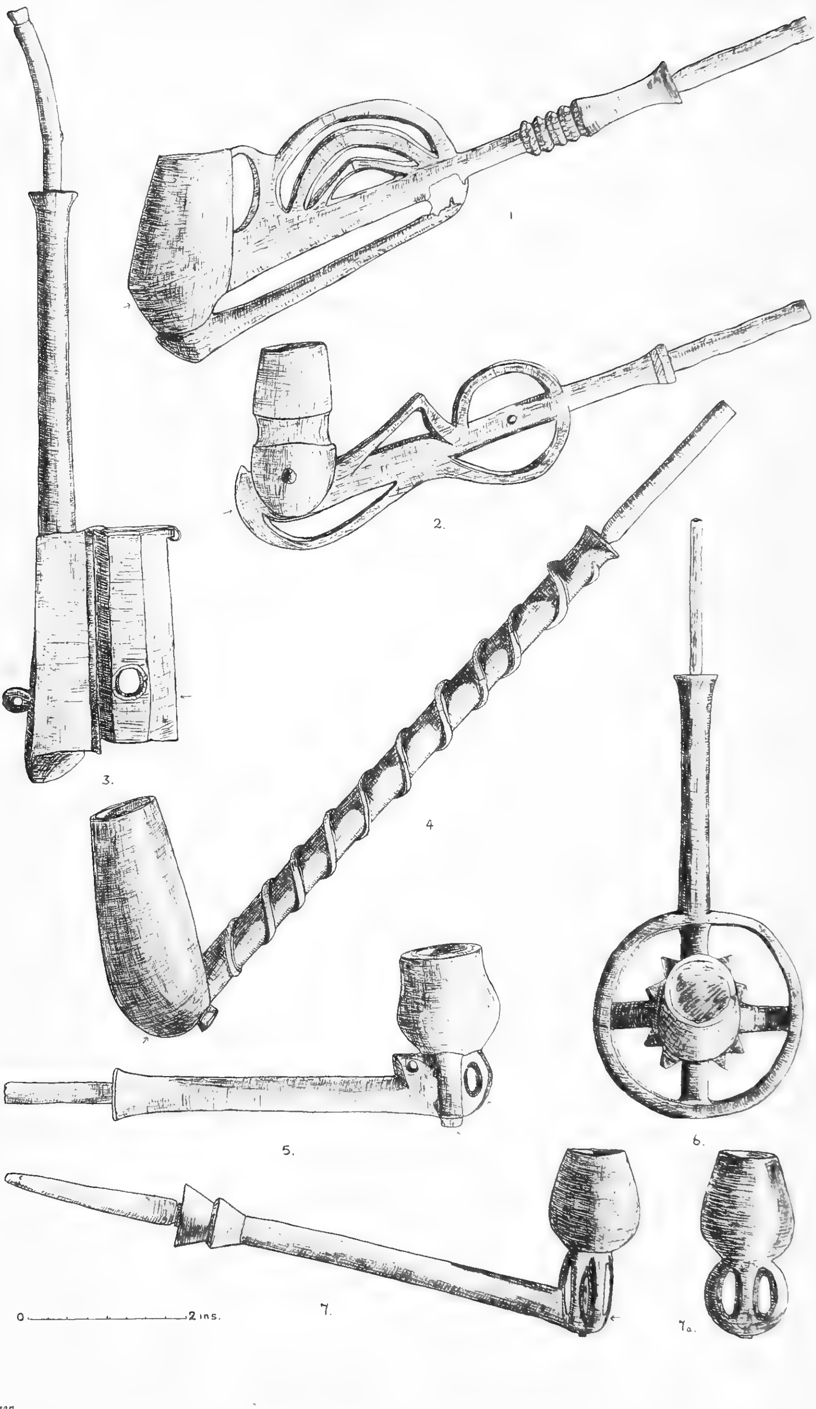
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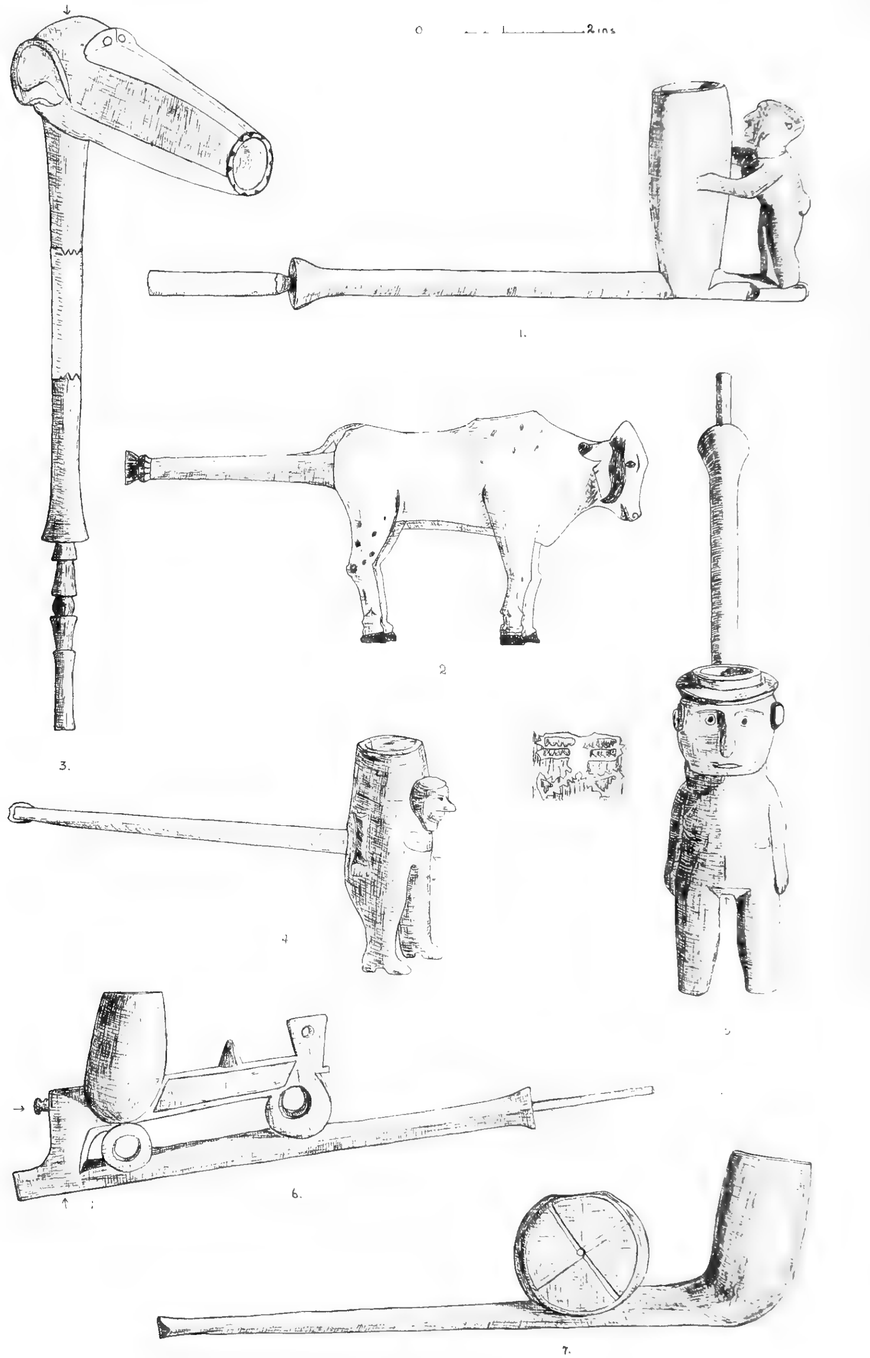
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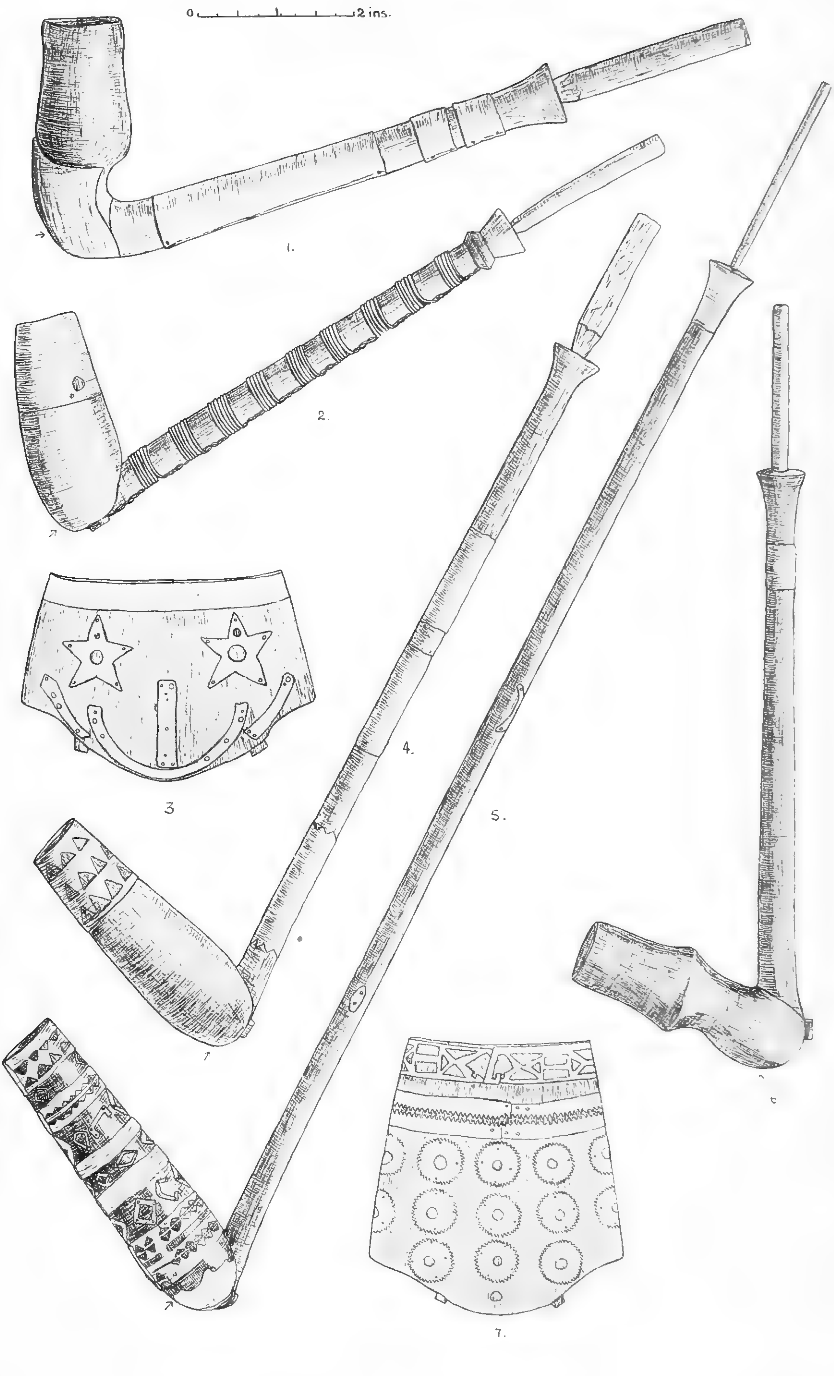
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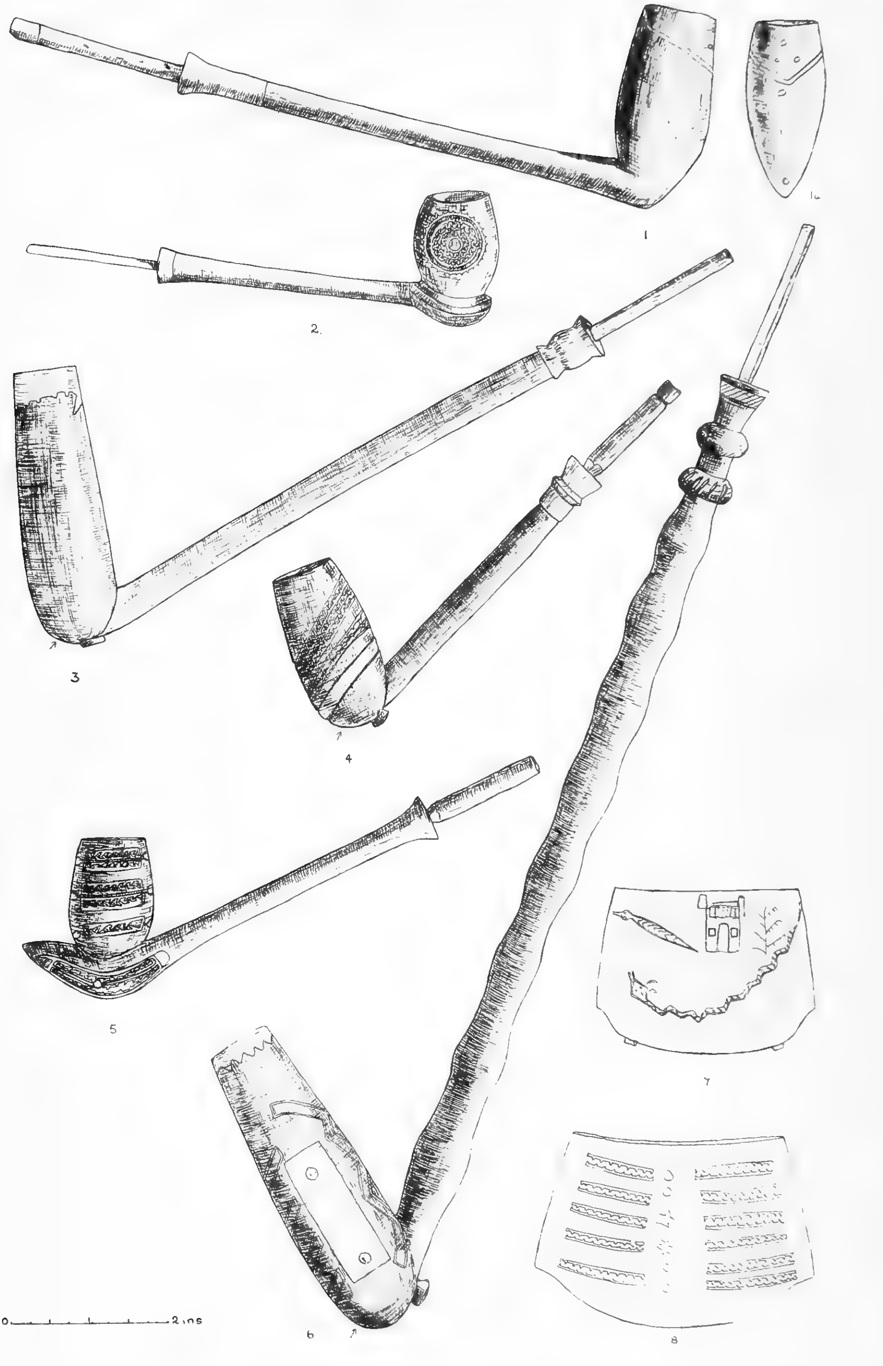
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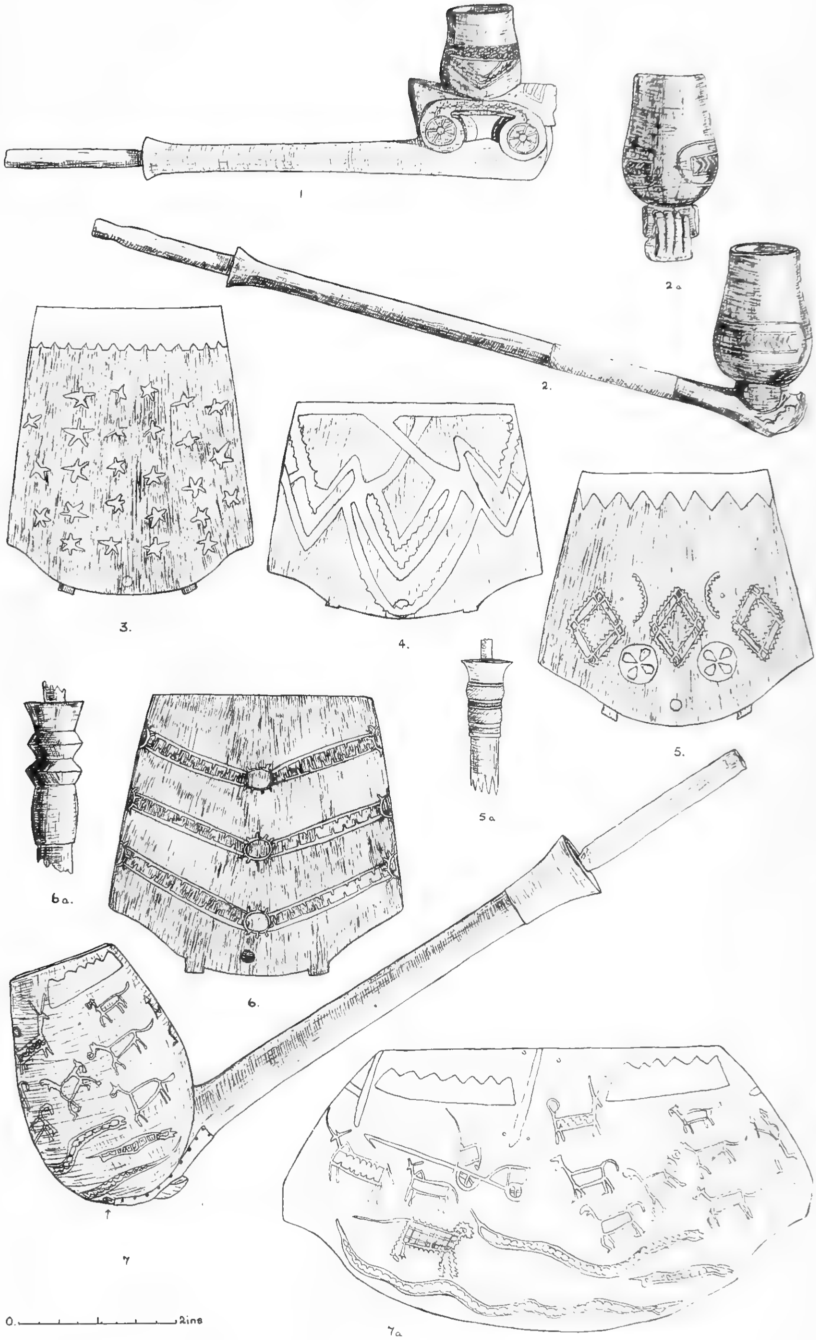
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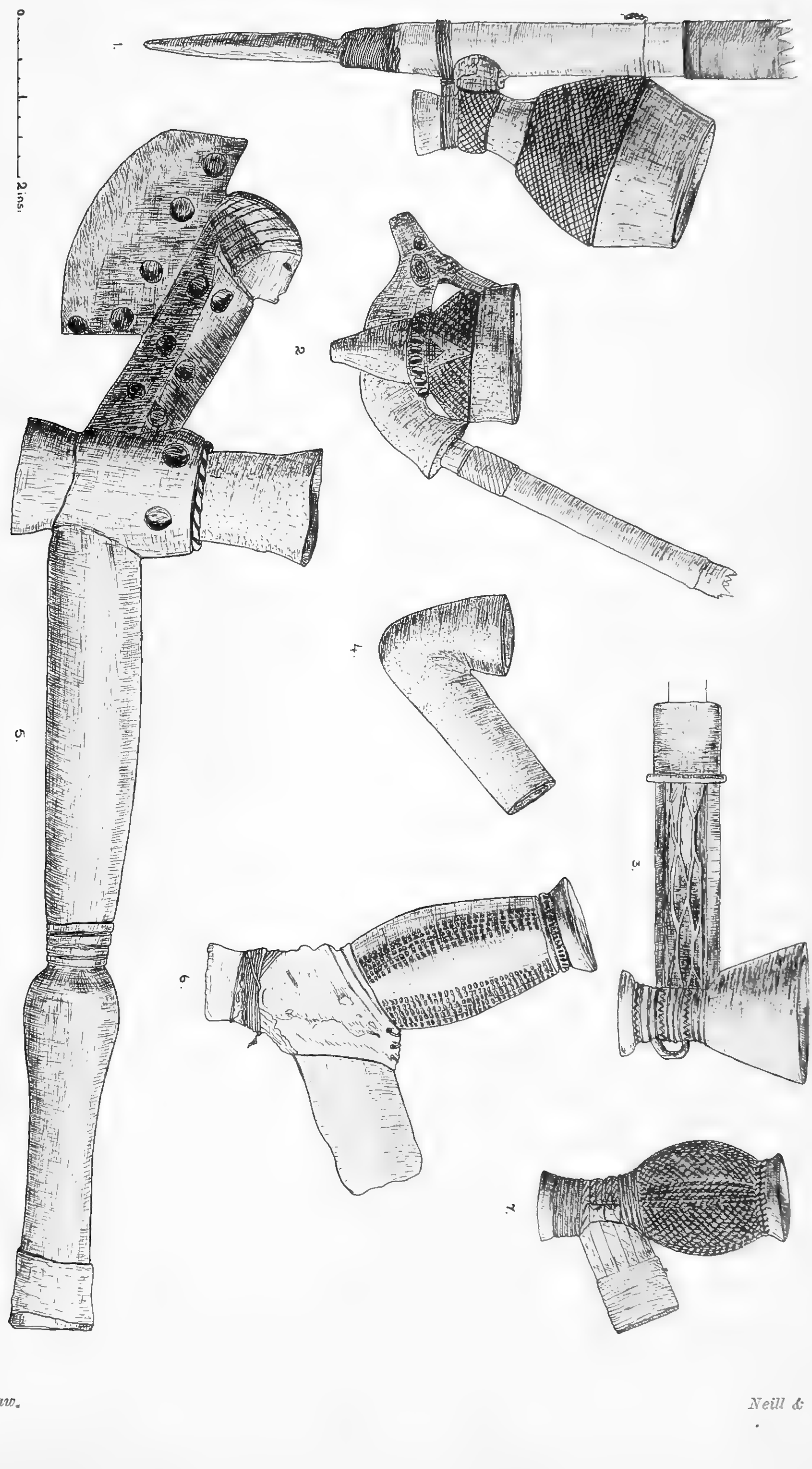
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