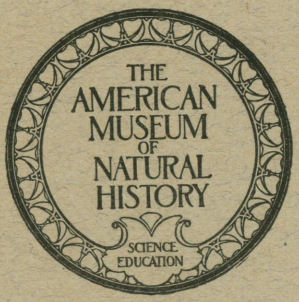
ANTHROPOLOGICAL PAPERS
OF
THE AMERICAN MUSEUM OF NATURAL HISTORY

VOL. XXIII, PART II

THE EVIDENCE AFFORDED BY THE BOSKOP SKULL OF A NEW SPECIES OF PRIMITIVE MAN (*HOMO CAPENSIS*)

BY

R. BROOM



NEW YORK
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ILLUSTRATIONS.

Text Figures.

		Page.
1.	*a*, Side View of Calvaria of Boskop Skull; *b*, Restoration of Cranial Cast of *Homo capensis*	69
2.	Views of Jaw Fragment of Boskop Skull	70
3.	*a*, Front Portion of Lower Jaw of *Homo capensis; b*, Restoration of Lower Jaw of *Homo capensis*	73
4.	*a*, Another View of the Jaw Fragment of *Homo capensis; b*, Inner Side of Jaw of *Homo capensis*	74
5.	Restoration of the Skull of *Homo capensis*	77

THE EVIDENCE AFFORDED BY THE BOSKOP SKULL OF A NEW SPECIES OF PRIMITIVE MAN (*HOMO CAPENSIS*).

Four years ago there were discovered near Boskop, Transvaal, South Africa, some human remains which prove to be of the very greatest interest. The bones were found in a surface lateritic deposit while a trench was being cut. By singular good fortune a dispute arose between two farmers as to whether the remains were human, and the skull-cap was shown to Mr. F. W. FitzSimons of the Port Elizabeth Museum with a view to settling a bet. Mr. FitzSimons at once recognized the extreme importance of the discovery and persuaded the farmer to present the remains to the Port Elizabeth Museum.

The specimen just obtained consists of the greater part of both frontals and parietals with a small part of the occipital; the farmer admits having thrown away, most unfortunately, some portions which he thought unimportant. These latter were most probably further portions of the occiput which shows a fresh fractured margin.

Excavations at the spot of the find resulted in the discovery of the nearly perfect right temporal bone, most of the horizontal ramus of the left mandible, and a number of fragments of limb bones.

The bones are all completely mineralized, all the interstices being filled with laterite.

We have little or no clue to the age of the remains, as there are no associated fossil animals, and the associated chipped stones are not, in the opinion of Dr. Peringuey, of human workmanship, but we can quite confidently state that the remains are very ancient.

In a letter to "Nature" (5th Aug., 1915) Mr. FitzSimons gave three small photographic views of the skull-cap and compared it with that of Neanderthal man. He admits, however, that "this Boskop man differs from the typical Neanderthal type in having a lesser development of the frontal sinus, and a somewhat greater development of the forehead," indicating "that the Boskop man was of the Neanderthal race, but more advanced in intelligence than the type specimen." He also holds that "the discovery of this skull offers an explanation of the origin of the Palæolithic implements which are scattered in such vast profusion all over South Africa."

Appended to Mr. FitzSimons' letter is a note by Professor A. Keith, who, unfortunately, had only seen the rather unsatisfactory photographs, in which he expressed the opinion that "the photographs of the skull-cap reveal none of the characteristic features of Neanderthal man." He considers that "the individual to whom the skull-cap belonged was apparently of the modern type, with a head of remarkably larger dimensions."

The remains were submitted to Dr. L. Peringuey of the South African Museum for further examination, and there has just recently been issued a paper entitled "Preliminary Note on the Ancient Human Skull Remains from the Transvaal. By S. H. Haughton, Assistant Director, South African Museum. With Notes appended on Fragments of Limb Bones, by R. B. Thomson; and Fragments of Stone, by L. Peringuey, Director South African Museum."[1]

Mr. Haughton has carefully examined the skull remains and discusses their affinities at considerable length. The conclusions to which he comes may be given in the words of the published abstract of the paper: —

> The skull-cap is the longest known with the exception of that of La Chapelle aux Saints. Its greatest affinities are with the skulls of the Cro-Magnon type — a Negroid type which lived in Southern Europe after that of Neanderthal. The back of the skull is elongate a feature displayed both by Neanderthal man and the Cro-Magnon man, while the forehead and anterior half of the skull agree with the Cro-Magnon and Bantu types, and not at all with the Neanderthal. The temporal bone is primitive in its characters and seems to indicate a more degenerate type than does the skull-cap, a semblance which may be due to sex. The lower jaw is small and akin in characters to that of the Bantu or Bushman type.

At the meeting of the Royal Society of South Africa, where Mr. Haughton's paper was read, Dr. Peringuey expressed the opinion that "it was clear that the Boskop man had no connection with the Neanderthal race" but "as to the real importance of these remains there could be no doubt."

Appended to Mr. Haughton's paper is a "Note upon the Endocranial cast obtained from the Ancient Calvaria found at Boskop, Transvaal" by Professor G. Elliot Smith.

Unfortunately, Elliot Smith had not seen the original remains and the cast submitted to him was apparently only that of the upper part of the skull. He has, however, come to one or two interesting conclusions. He points out that the cranial cast in "maximum length attains the remarkable figure of 197 mm." and that the maximum breadth must have been at least 143 mm. The following are his principal conclusions which, of course, he states guardedly, owing to his not having seen the actual skull.

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[1] *Transactions, Royal Society South Africa*, vol. 6, pt. 1, 1917.

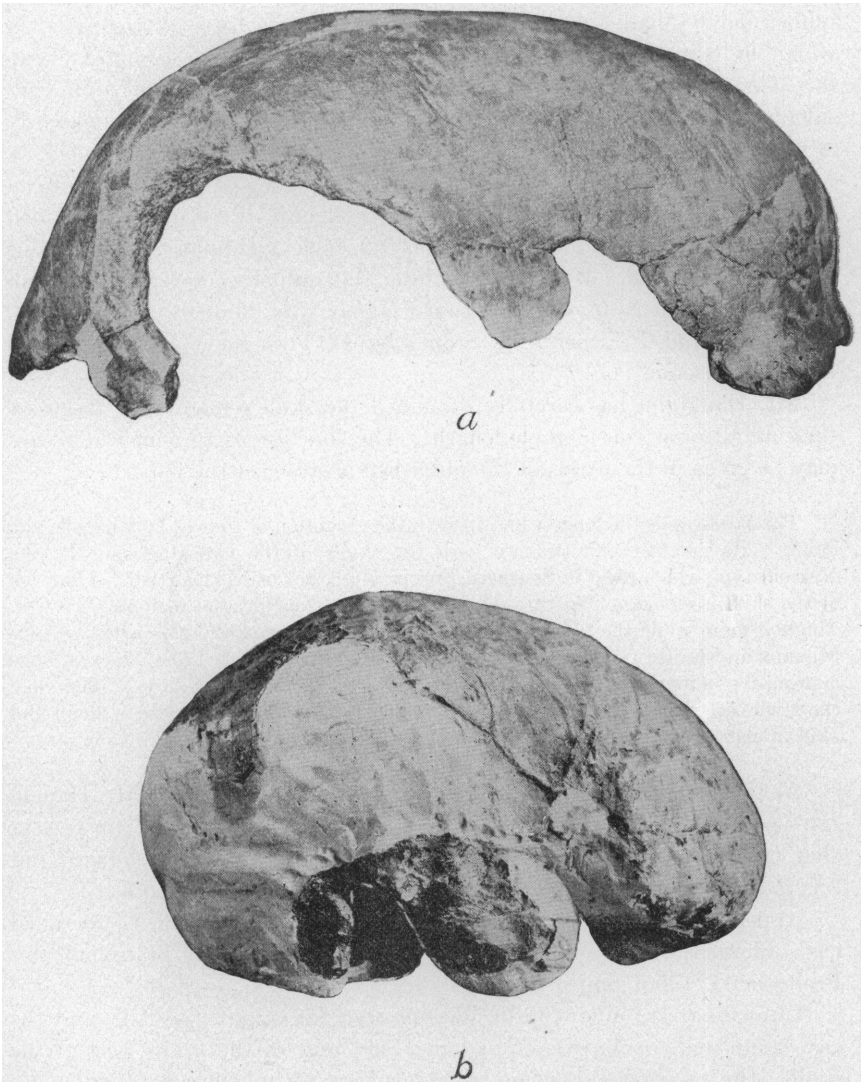

Fig. 1. *a*, Side View of Calvaria of Boskop Skull. 53/100 Nat. size. *b*, Restoration of Cranial Cast of *Homo capensis*. 42/100 Nat. size.

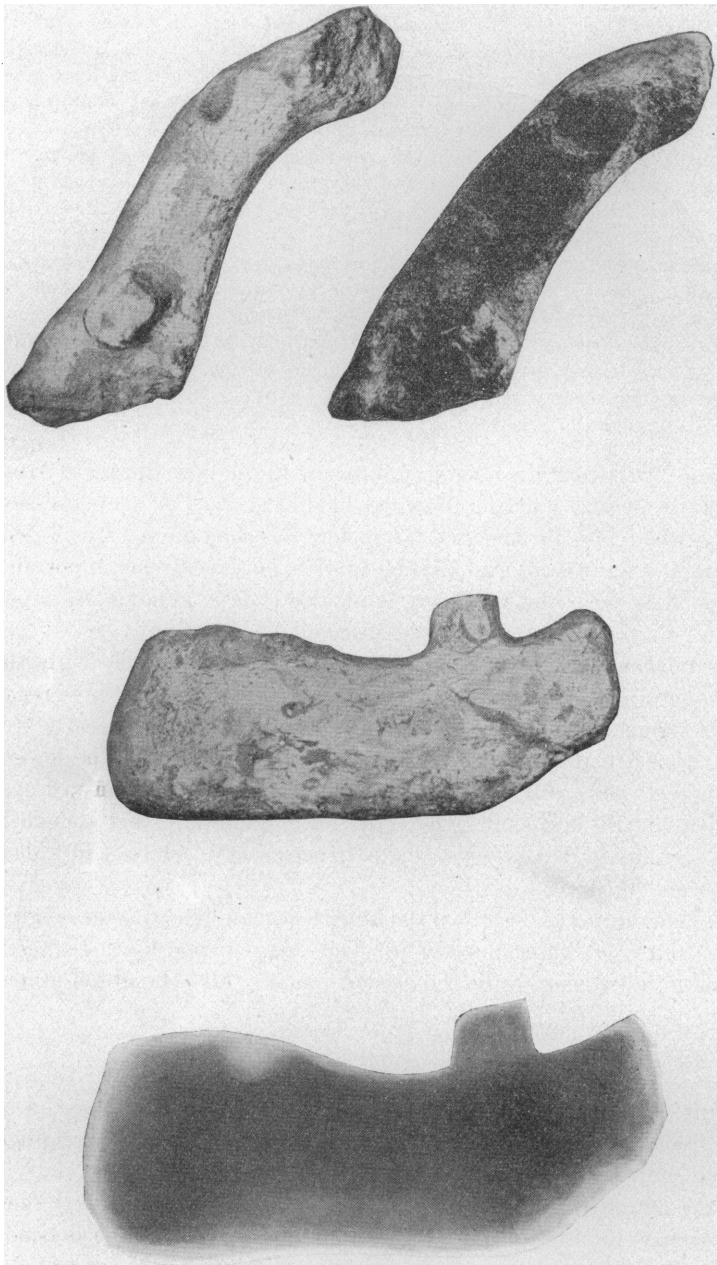

Fig. 2. Views of Jaw Fragment of Boskop Skull. Nat. size. X-ray Photograph of Jaw, viewed at right angles to ramus.

Its great size no less than its distinctive configuration present a marked contrast to the condition found in the modern inhabitants of South Africa. Its features present a curious blend of those which are regarded as distinctive of Mousterian and Aurignacian types of men respectively; but whereas the general form presents certain resemblances to the former, in all essential respects the cast conforms to the type represented by the Cro-Magnon man of Western Europe.

It must not be assumed however that the Boskop man necessarily belongs to the same type or age as Cro-Magnon man. The primitive type of *Homo sapiens* was I believe evolved from a group that was akin to but not identical with *Homo neanderthalensis*.

Whatever the date of the Boskop remains may be the evidence now in our possession suggests that this early inhabitant of the Transvaal represents the type of the immediate ancestors of the men of the Upper Palæolithic Age, possibly somewhat modified in the course of his Southern Migration. It probably represents the earliest (not necessarily in actual age) known phase of *Homo sapiens* in the course of his transformation from a condition analogous to that of Neanderthal man to that of Cro-Magnon.

The specimens having now been returned to the Port Elizabeth Museum for over two years, and the Trustees having given me full permission to further investigate the remains, no apology need be offered for presenting the results of a renewed examination in view of the extreme importance of the type. As with the Piltdown skull, the type is annoyingly imperfect and is likely to give rise to as much discussion.

The Piltdown skull has a skull-cap which agrees so closely with that of even modern man that it is very doubtful if any one would have regarded it as belonging to a different genus or as being more than an early strictly human type had it not been for the fortunate discovery of the lower jaw which reveals certain distinctly pre-human characters. So in my opinion is it with the Boskop skull, where the lower jaw, imperfect though it is, reveals certain characters which make it necessary to place it in a distinct new species of *Homo*.

Mr. Haughton has described the imperfect mandible at some length and given a couple of illustrations of it. Only part of one tooth is preserved and this is quite manifestly the second molar. Mr. Haughton states: —

> its crown is not complete, but so far as can be seen it shows no trace of a posterior denticle such as appears in several primitive types.

In my opinion, the crown is completely gone, and what appears to be crown is only the worn upper portions of the roots. The X-ray photograph seems to show this quite satisfactorily.

In the anterior part of the jaw, as preserved, are the imperfect remains of the sockets of three teeth. How the jaw must be restored depends on how those teeth are identified. About 24 mm. in front of the most anterior

part of the root of m^2 is a large oval socket which is being partly filled in by new bone formation. The larger diameter of the oval lies in line with the alveolar border. Whether this large socket has been formed by the root of a tooth or very largely by pyorrhoea is a point on which opinions will differ, but no doubt it is mainly due to the root of a tooth, and unfortunately, there is a difference of opinion as to which tooth it represents.

Haughton in describing the anterior part of the mandible says: —

> The alveolus for the 1st incisor is missing; that of the second incisor (represented by its inner portion) is small. That for the first premolar is enlarged into a roughly circular hole with a diameter of 9 mm.

In my view the three sockets of which we have remains are those not of pm^1, c, and i^2, but c, i^2 and i^1. If we assume that the large socket is that of the first premolar we have a space of, at the very least, 24 mm. to be filled by pm^2 and m^1, and if we consider the socket to have been enlarged by pyorrhoea, a still larger space. Though the series of human skulls and of illustrations of jaws at hand is limited, I can find no case of a human jaw where pm^2 and m^1 occupy nearly 24 mm. Further, if the large socket is that of pm^1 the anterior part of the jaw must have had a contour unlike that of any known human type.

If, however, we regard the large socket as that of the canine we are able to restore the jaw not quite like a modern human jaw but as one which is not very far removed from the human form. In my opinion there is no reasonable doubt that the socket is that of the canine, and I am also of the opinion that the canine was appreciably larger than in the jaw of modern man. But whether the canine was enlarged or of the normal human size, the incisors must have been enlarged as the space occupied by the incisors must have been at least 28 mm.— possibly considerably more. If the canine were of the normal human size and occupied the center of the socket, then the space occupied by the incisors must have been over 30 mm.

Though with the loss of the teeth, much of the upper part of the jaw has been absorbed, what remains shows that the jaw must have been unusually massive. The restorations I give indicate the probable contours before loss of the teeth. In front of m^2 the thickness of the jaw is about 17 mm. and in the plane behind m^2 about 20 mm. making allowance for a slight displacement of the bone. In the region of m^3 the width must have been at least 21 mm.

In the figure given of the outer side of the jaw there are seen to be two foramina for the exit of the sensory nerve — a posterior small one below m^1 and a large anterior below pm^1.

Haughton has given a full description of the skull-cap with good figures

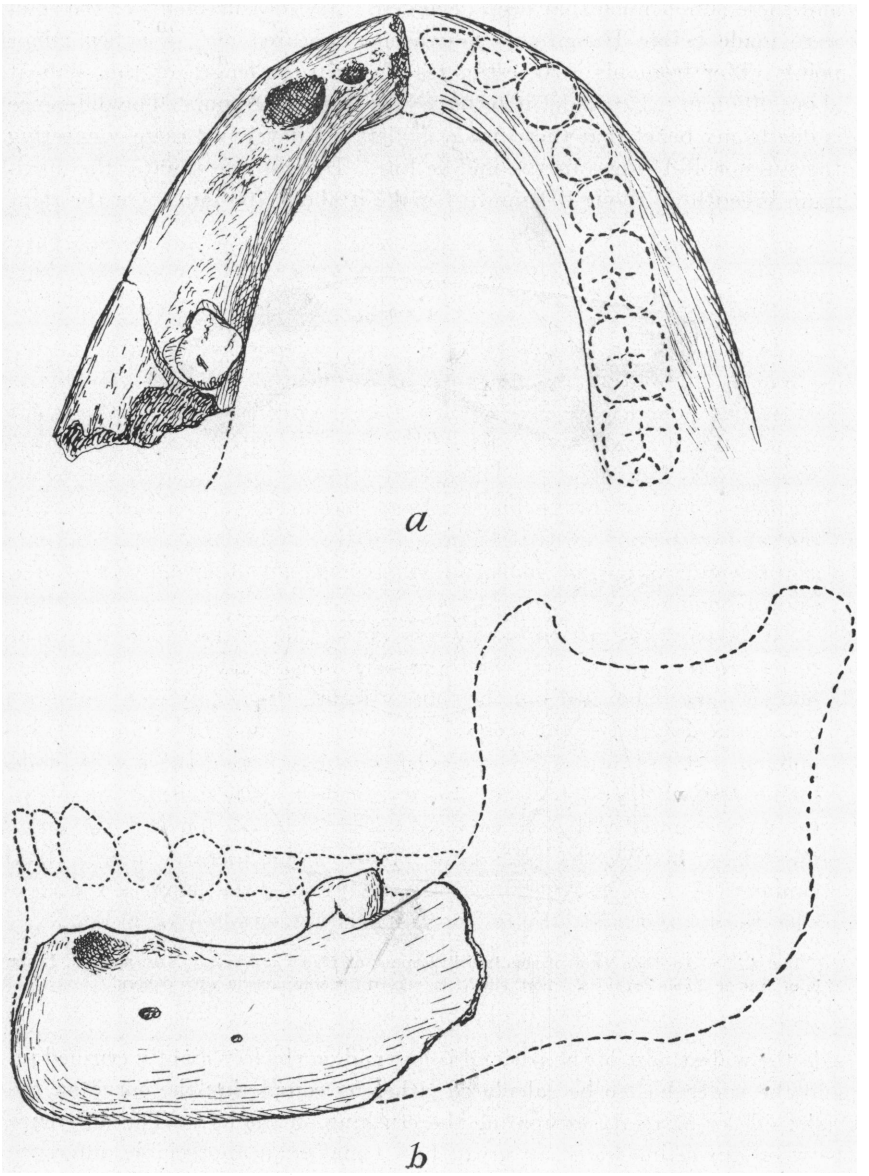

Fig. 3. *a*, Front Portion of Lower Jaw of *Homo capensis*. Nat. size. Upper view. The left ramus is represented as preserved; the right is restored with the teeth as they probably were before being worn and lost; *b*, Restoration of Lower Jaw of *Homo capensis*. Nat. size. The fragment known is shown in true side view and foreshortened.

and there is not much that need be added. My measurements of the skull were made before Haughton's description appeared and in a few minor points differ from his. He estimates the greatest length of the skull at about 205 mm.; I consider it to have been about 210 mm. The difference is due to my belief that there was a moderately developed ridge connecting the supraorbital ridges in the middle line. Haughton estimates the maximum breadth at about 154 mm.; I make it about 160 mm. On the right

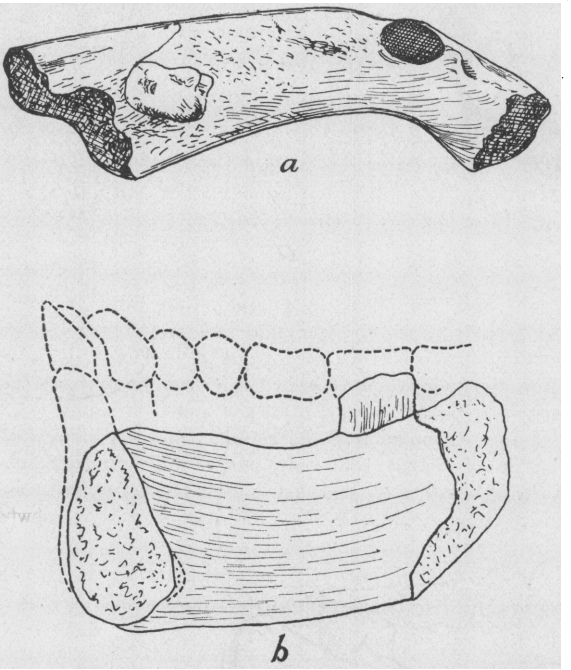

Fig. 4. *a*, Another View of the Jaw Fragment of *Homo capensis*. Nat. size; *b*, Inner Side of Jaw of *Homo capensis*. Nat. size. Reversed for comparison with others.

side the widest part of the parietal is lost and on the left slightly crushed in, and the width has to be calculated either by completing the curve on the right side or correctly estimating the crushing on the left. The difference between our estimates is not great, but it makes an appreciable difference in the cephalic index. According to Haughton's estimates this is 75.1; according to mine, 76.19.

One of the most marked characters of the Boskop skull is the great thickness of the bone in parts. The parietals in the region of the bosses

are from 13 mm. to 15 mm. thick, but thin rapidly towards the temporal borders. The frontals in the thickest part are 12 mm. thick but comparatively thin 30 mm. above the small supraorbital ridges. The frontal sinuses are small and the supra-orbital ridges scarcely more developed than in modern Kaffirs.

Haughton gives for comparison with the contour of the skull-cap of the Boskop man similar outlines from the skulls of various races — the Cro-Magnon, Neanderthal, Bantu, Bushman, and Hottentot — and concludes that the general characters of the calvaria "agree closely with those of the Cro-Magnon type." The mode of comparison adopted by Haughton is, however, I think open to criticism, and it will be observed that even taking the outlines he gives, the curve of Spy II agrees much more nearly with that of the Boskop skull than it does with that of the Gibraltar skull, which is generally held to be like Spy II of Neanderthal type.

As the skull-cap is unusually long and also very broad, the brain cavity must also have been of altogether exceptional dimensions. Haughton states: —

> The cranial capacity must have been very large .... In order to obtain the basilo-bregmatic height I have placed the temporal bone in what I conceive to be the highest possible position and so obtain a height of 140 mm. Even supposing the height to be 10 mm. too great which must be the maximum error possible the calculation of the capacity by Broca's method gives the minimum figure as 1832 cc .... In this connection it must be noted that the skull wall is very thick and that the bi-stephanic width is small so that some reduction of this figure is necessary .... The brain capacity of the Boskop skull must have been at least as great as that of Cro-Magnon which is given as roughly 1660 ccs. and was probably somewhat greater.

Elliot Smith, not having seen the temporal bone or its cast, gives no estimate of the cranial capacity, though he speaks of its great size and the "remarkable figure" of the length.

The temporal bone is well preserved and nearly perfect. A small portion of the parietal is in contact with its posterior part, and part of the articulation for the alisphenoid is present. The squamous portion is all preserved, except the flat thin part, which overlaps the parietal. As we have preserved a part of the parietal with the articulation for the temporal quite complete in depth, we can be pretty certain of the position of the temporal as regards relative height to within 2 or 3 mm. and its position antero-posteriorly to within 10 mm. In the restoration I have given of the side view of the skull I do not think the error in the position of the upper part of the temporal can be more than 2 mm. in height or 5 mm. antero-posteriorly. With the temporal placed in this position the height of the bregma above the level of the mastoid is 148 mm. It might be made a little more, but it cannot

possibly be made less. I cannot understand how Haughton, after placing the temporal in what he conceives to be "its highest possible position" and getting a height of 140 mm., should, to calculate the cranial capacity, place it still 10 mm. higher. Had he made the calculation according to Broca's formula with the height as 140 mm. the result obtained would have been 1972 cc. which is probably very nearly the correct figure.

Haughton thinks Broca's formula will give too large a figure because of the thickness of the skull, but the skull is by no means uniformly thick. The frontals in front of the frontal lobes are in fact very thin and the occiput not unduly thick, as may be seen from the fact that the cranial cast has a measurement of 197 mm. greatest length, or only 8 mm. less than what Haughton gives for the maximum length of the calvaria. Further, though the parietals have extremely thick bosses these stand out and do not encroach much on the cranial cavity.

I have made a complete restoration of the cranial cast by placing the temporal in its true position and restoring the left side from the right, and an examination of the photograph of the cast will show how very little is left to the imagination. The temporal gives us the size and position of the temporal lobes, and the position of the lateral sinus, and considerable indication as to the position of the occiput. The cranial cast as thus restored displaces about 1960 cc. of water. If we add 20 cc. as correction for the slight crushing of the left side we get for the corrected cranial capacity of the Boskop skull the very remarkable figure of 1980 cc.

There is always a tendency to consider that any new and unexpected type of human skull must be abnormal or pathological. The Neanderthal skull was for long held to be pathological, and the Trinil skull has been regarded as that of a microcephalic idiot. But fortunately it is unlikely that any one will, after Elliot Smith's report on the brain cast, maintain that the large brain of the Boskop skull is pathological and there seems to remain but one conclusion, namely, that in South Africa in very early times there lived a race of primitive man characterized by having a large skull with very thick parietal bosses, a brain of great size and a powerful jaw with incisors and canines much larger than those in modern man. For this type of which we at present only know the one specimen, I propose the name *Homo capensis*, regarding it as sufficiently distinct from *Homo sapiens* to be worthy of specific rank.

The large size of the cranium naturally suggests affinity with the Cro-Magnon type, but there are many important differences, and while it may be ancestral to the Cro-Magnon race, it cannot in my opinion belong to that type. This is practically the conclusion suggested by Elliot Smith from the examination of the upper part of the brain cast alone. "It probably repre-

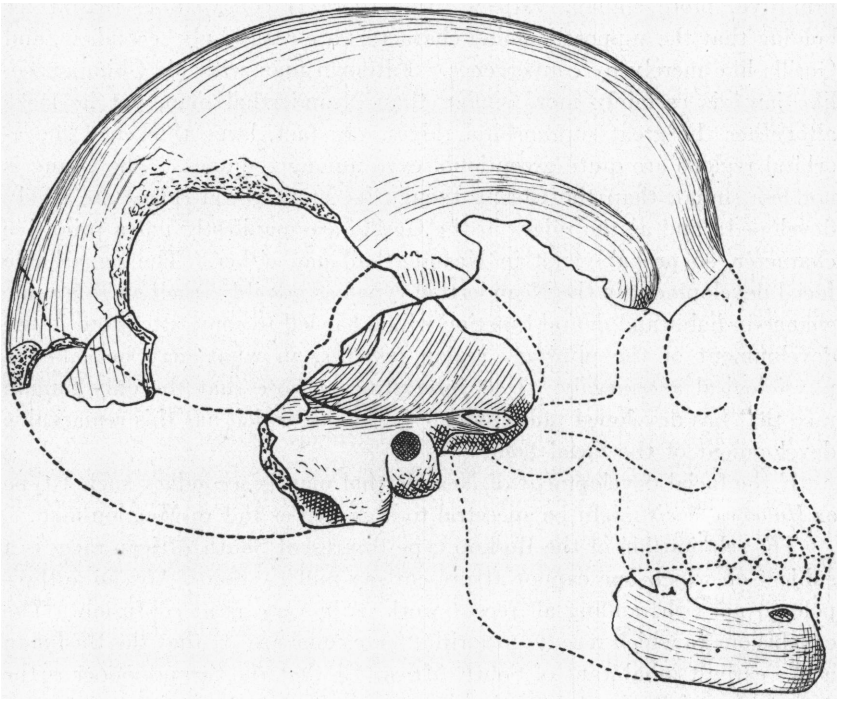

Fig. 5. Restoration of the Skull of *Homo capensis*. 46/100 Nat. size. The parts shaded are those known.

sents," he says, "the earliest known phase of *Homo sapiens* in the course of his transformation from a condition analogous to that of Neanderthal man to that of Cro-Magnon."

Apart from the great development of the supraorbital ridges and unusual development of the facial region, the resemblance of the Boskop type to the Neanderthal is about as great as to the Cro-Magnon.

By most anthropologists it is held that the Neanderthal type of man is a primitive, more simian, variety. But there is considerable reason for holding that the supposed simian characters are really only secondary, and Gorilla-like merely by convergence. Piltdown man with his Chimpanzee-like jaw[1] is certainly more simian than Neanderthal man, yet he lacks altogether the great supraorbital ridges. In fact, large thickened supraorbital regions are quite exceptional even among the apes. The Orang is not less simian than the Gorilla though its supraorbital ridges are feebly developed; and as the ridges in the Gorilla are manifestly not a primitive character, so probably not in Neanderthal man either. The remarkable facial development in the Neanderthal type has possibly resulted from some change in habit and dental function which has led to some alteration in the development of the pituitary region resulting in what may be called a physiological acromegaly. It is interesting to note that the only human race that has developed taurodontism is the one which has this remarkable development of the facial bones.

If the facial development of Neanderthal man is secondary such a type as *Homo capensis* might be ancestral to it as well as to Cro-Magnon man.

The relationship of the Boskop type to present South African races is a subject on which one cannot at present say much. South African anthropology, notwithstanding all recent work, is in very great confusion. The conclusions to which recent authorities have come are (1) that the Bushman is the earliest inhabitant of South Africa, (2) that the Strand-looper is the purest type of Bushman, (3) that the up-country Bushman is a mixture of Bushman and Hottentot, and (4) that the Hottentot is a cross between Bushman and a Negroid or Bantu race.

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[1] In view of the doubt that has been expressed as to whether the Piltdown jaw really belongs to the skull, it may be as well to state quite definitely the reasons why I side with Smith-Woodward, Elliot Smith, and Keith, as against Gerrit Miller, Osborn, and Gregory. Apart altogether from the great improbability, as Elliot Smith expresses it, of a large ape-like man and a large man-like ape dying at the same spot and at the same time, and one leaving his skull without the jaw and the other the jaw without the skull, I regard the jaw as essentially a human jaw. Even if large Chimpanzees had been very common in Northern Europe in Pleistocene times, I should still hold that this could not be a Chimpanzee jaw from the fact that the molar teeth are ground down by a transverse movement which it is physically impossible for any Chimpanzee to accomplish. There does not seem to me the slightest reason why we should hesitate in regarding the jaw as belonging to the same individual as the skull.

As regards the first conclusion, we have known for many years from non-Bushman implements that the Bushman was not the earliest inhabitant, and the discovery of the Boskop skull proves it beyond question. With regard to the second conclusion whether the Strand-looper is a pure race or not he cannot by any right be called Bushman as he is the typical Hottentot. The Strand-loopers around Table Bay had been called Hottentots for a hundred years before the Bushman was known. Whether the up-country so-called Hottentots such as Korannas are a hybrid race and a recent incursion, it is at present impossible to say, but I hope ere long to be able to throw some light on the subject.

From the study of implements we get some clues to early South African races. For example we have conclusive proof that probably ten or fifteen thousand years ago the banks of the Vaal River were inhabited by great numbers of a powerful race. This race was probably not Bushman. Still earlier — perhaps very much earlier — was another also powerful race — the race who made implements of the Stellenbosch type — and certainly not Bushman. This oldest race is possibly represented by the Boskop man. The second race I have some reason to suspect to be allied to the Koranna.

If the Boskop man were the maker of the Stellenbosch type of implements he may be looked upon as Man of the Chellean or Acheulean period.

(*Continued from 2d p. of cover.*)

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