

## 200 SOME NOTES ON THE EARLY HOMINIDÆ

of that species, until a specimen was procured. This mistake was quite pardonable on account of the poor light which filters through the tops of the thick foliated trees.

I myself have only seen these birds on one occasion ; they were feeding under the undergrowth, and their presence was detected on account of the rustling of the dead leaves on the ground as they scratched and hunted for seeds and snails, which food appears to be their chief diet.

They were shy and most difficult to procure.

Like *F. l. schubotzi*, these birds are much smaller than most of the other francolin, and possess very slender bills.

So far as I am aware, neither eggs nor nestlings of these birds have been taken.

It is to be hoped that further information regarding these two rare Forest Francolin will be sought for by members living near the Mabira Forest.

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## SOME NOTES ON THE EARLY HOMINIDÆ

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The discovery in 1912 of the Piltdown fragments has supplied us with a fifth species of the Hominidæ. Before touching on this interesting find, it will be well to review briefly the salient features of those portions which have been discovered of the other species.

In the year 1865 Sir John Lubbock (the late Lord Avebury) introduced two terms, which have since been in very general use. He proposed that the Stone Age should be divided into two portions. The people of the later period he called Neolithic ; while, extending far behind this Neolithic stock, and living under very different climatic conditions, we have what he termed the Palæolithic peoples—races of savages which roamed about during the glacial epoch, and were contemporary with such extinct forms as the Mammoth Elephant, Cave Bear, &c.

## PITHECANTHROPUS ERECTUS OR HOMO JAVANENSIS

In the year 1891 Dr. Eugène Dubois discovered in the Island of Java (whither he had gone with the firm intention of discovering the missing link) a portion of the calvarium or

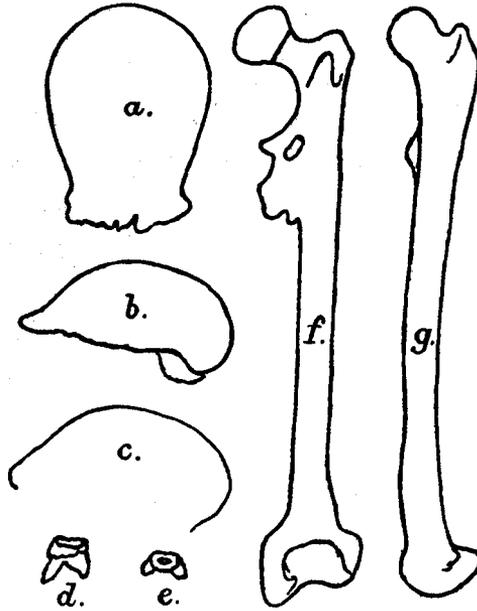


FIG. 1.—PITHECANTHROPUS ERECTUS, DUBOIS.  
*a*, Skull-cap viewed from above; *b*, in profile;  
*c*, in vertical-mesial section; *d* and *e*, the  
 first molar tooth found; *f* *g*, femur from  
 the front and in profile. (After Dubois.)

skull-cap, and a third molar tooth of the right side. In the following year a left femur or thigh-bone was found at a distance of about 50 feet from the tooth, and a little later the second molar tooth of the left side was discovered. It should be noted that though these bones and teeth were not found in close proximity, still they occupied the same horizon (Fig. 1). These bones have been subjected to a most careful examination by the leading European anatomists.

The opinion of these experts is divided: some regarding

*Pithecanthropus* as a man with marked simian tendencies, while others look upon him as an ape with some human characters. Dr. Dubois' conclusion is that it represents a stage midway between the anthropoid apes and man. Professor Cunningham notes a marked resemblance to the Gibbon, and Professor Schwalbe is also on the side of the apes.

A plaster cast of the internal surface of the calotte shows approximately what would have been the general form of the brain. The speech area of the brain is situated in the inferior frontal gyrus or Broca's area. Measurement of this area in the case of *Pithecanthropus* shows that it is twice as large as in the higher apes, and about half the size of that in normal man. It is more than probable that this first man was capable of a rudimentary form of speech.

Dr. Dubois made very careful measurements of the capacity of the calvarium; according to him the cranial cavity had a capacity of 850 c.c. The cranial capacity of the highest apes never exceeds, if it ever reaches, 600 c.c.

In a normal human being it never falls below 880 c.c. The average of these figures is 740 c.c., and this should represent the capacity of *Pithecanthropus*, supposing his position to be intermediate between the highest ape and normal man. *Pithecanthropus*, however, exceeds this by 110 c.c., and for this, the highest of all reasons, must be included in the human race. He has laboriously climbed far up the ladder, and few steps only lie between him and the dignity of *Homo sapiens*.

Some anatomists describe the remains as more pre-human than human; but at present nobody denies that they present a form intermediate between man and the generalised simian prototype. These remains do not for a moment bridge over the gap between man and the gorilla, but they form a true link, connecting man to the common stock from which all have diverged. That great authority, Manouvrier, states that *Homo Javanensis* maintained the erect posture, and with this attitude comes the differentiation of the extremities into hands and feet, which is a human characteristic of the first magnitude. The diagram (Fig. 2) shows the position of *Pithecanthropus* as intermediate between the chimpanzee and

the man of Spy, about whom I shall have more to say; and Manouvrier is of opinion that it may be more directly connected with the Australian race. Keane, in his 'Man, Past and Present,' suggests that the race of Trinil (Java) was the common ancestor of many human races, if not of all those that have been subsequently differentiated.

Professor Hepburn is very emphatic regarding the distinctly human character of the femur, also that it antedates

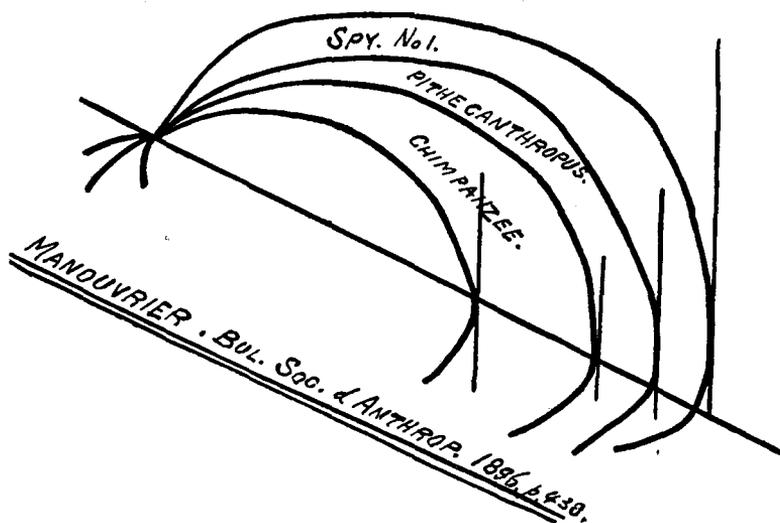


FIG. 2.—POSITION OF PITHECANTHROPUS ERECTUS.

all other human remains yet discovered, and that of living races the nearest akin are the Australians, Andamanese, and Bushmen, thereby lending support to the view that these 'low races spring from a common primeval stock' which originally inhabited the now vanished Indo-African continent.

In a sense this Upper Pliocene citizen of Java may be looked upon as the 'first man'; and as there is a strong probability that he could not have had any human ancestors elsewhere, 'the Indo-Malaysian intertropical lands' may, with a considerable amount of credence, be looked upon as the cradle-land of the human race.

This first man had in all probability occupied a large area, including the Sunda Islands and Indo-China—regions then

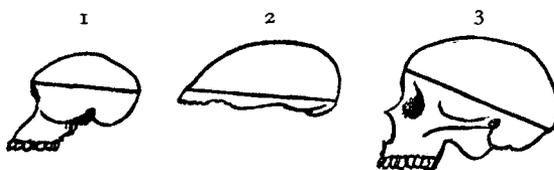


FIG. 3.—1, SKULL OF CHIMPANZEE. 2, CALVARIUM OF PITHECANTHROPUS. 3, SKULL OF MODERN MAN. Lines are drawn from points between the eyebrows to the occipital ridge at back. It will at once be seen that the dome of the skull of Pithecanthropus is much shallower than that of modern man. (From Sir E. Ray Lankester's *Extinct Animals*.)

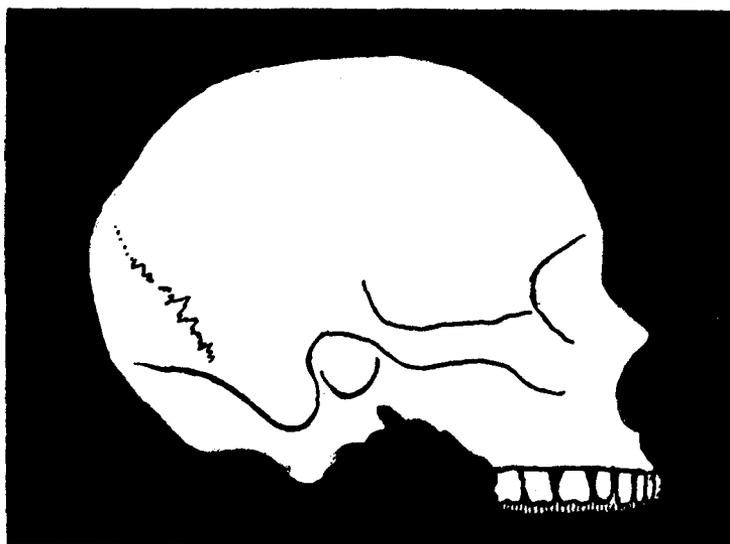


FIG. 4.—SKULL OF MODERN EUROPEAN RACE.

connected by land across the shallow waters which now exist between the Malay Peninsula, Borneo, and Java (Figs. 3 and 4).

Dr. Munro, in a thoughtful paper read before the Edinburgh Royal Society (Jan. 4, 1897), says: 'If the geological

horizon of the Java man were correctly defined as the borderland between the Pliocene and Pleistocene periods, one could form some idea how far back we had to travel to reach the common stock from which men and anthropoids had sprung.' The lower races of to-day, he concluded, were also survivals of intermediary links, which had been thrown into the side eddies of the great stream of evolution.

I will now dismiss the Java man with the statement that, besides having acquired the erect posture, he was of the average height of 5 feet 6 inches.

*Homo Heidelbergensis*.—With the dismissal of *Homo Javanensis* we find ourselves being introduced to a new species in the person of *Homo Heidelbergensis*.

Dr. Schoetensack, in 1909, at a place called Mauer, to the south-east of Heidelberg, discovered a perfectly preserved lower jaw of a primitive man, which justly claims to represent a new species. It was discovered in a bed of sand about 80 feet from the surface, and from these sands bones of several different animals have been brought to light.

Among the more important of these are the bones of *Elephas antiquus*, a form allied to the African elephant; also those of *Rhinoceros etruscus*, a species not uncommon in the Upper Pliocene deposits; a lion much like our African form; also several deer.

Teeth of a horse are also present, the species being intermediate between the existing *Equus caballus* and the Pliocene *Equus stenonis*.

The presence of *Elephas antiquus* takes us back to the Lower Palæolithic horizon, while *Rhinoceros etruscus* points to a date still more anterior. In the opinion of those best able to judge, the Mauer sands were laid down during the first genial interglacial period.

The Heidelberg jaw is unique in many respects. The dentition is normal, and is quite human in every respect; the canines do not project beyond the other teeth, the incisors are small, not larger in fact than those of the present races of men. 'The dentition is in some respect less simian than that which may be sometimes observed in existing primitive races—such, for instance, as the Australians' (Prof. Sollas,

'Ancient Hunters,' 1911). The front teeth do not project; they are curved at their roots on account of following the sloping contour of the jaw in the region of the symphysis menti. It is an ascertained fact that in apes the third molar is cut either before or, at the latest, at the same time as the permanent canine. Supposing the jaw to have belonged to an ape, one would have found that the third molar was

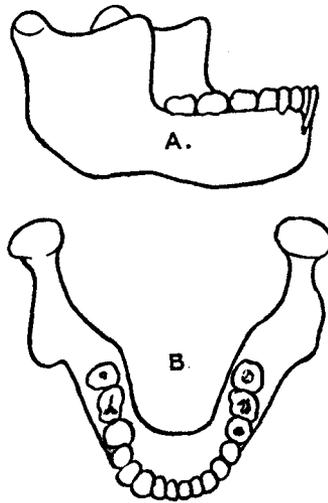


FIG. 5.—THE HEIDELBERG JAW.  
A, From the side; B, from  
above.

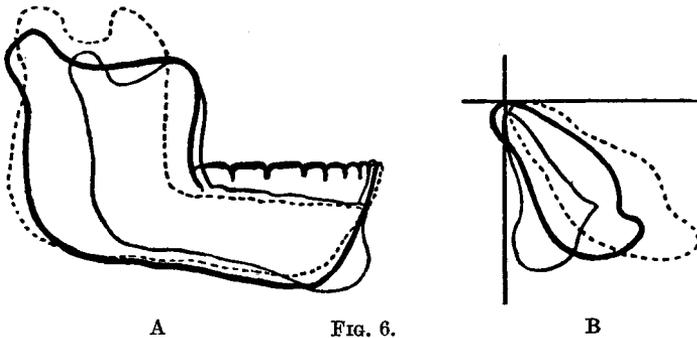
as much worn as the canine, but in the Heidelberg jaw this is not the case—a strong factor in favour of its human character. This interesting fact was pointed out by Dr. Siffre (see 'À propos de la mandibule *Homo Heidelbergensis*,' *Bull. Soc. Anthropol. Paris*, 1909).

The jaw itself shows little that is human in its appearance. Its principal characteristic is its enormous body, and the great breadth of the ascending rami. The merest tyro in anatomy could not fail to be struck by these simian characters, and had this jaw been devoid of teeth, there are some anatomists who would doubtless have described it as belonging to an ape (Fig. 5).

The crucial differences between the human and simian jaw are found in the region of the anterior extremity—that region where the two halves are welded together to form the so-called symphysis menti.

The chin is a modern human acquirement, and is absent in the apes.

In the ape the contour of the jaw at its anterior extremity forms a sudden back-sweeping curve. The Heidelberg jaw



A FIG. 6.  
MAUER JAW = THICK LINE; AUSTRALIAN  
NATIVE = THIN LINE; CHIMPANZEE  
= BROKEN LINE.

B  
VERTICAL MESIAL SECTION  
THROUGH THE SYMPHYSIS  
OF MAUER JAW (THICK  
LINE); AUSTRALIAN  
(THIN LINE); AND A  
CHIMPANZEE (BROKEN  
LINE).

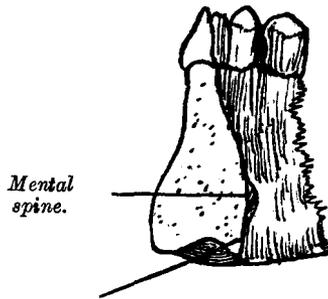
possess no chin, the contour here being exactly what one finds in the apes. This is well seen in Fig. 6.

The internal surface of the region of the symphysis in the present races of man slopes sharply downwards from the posterior surface of the incisors, and as a rule does not show any differentiation into regions. In the higher apes the slope is very gentle, especially in its upper portion. With regard to this peculiarity the Heidelberg jaw holds an intermediate position. If the internal surface of the symphysis menti of a modern man is examined, it will be noted that in its lower one-third it shows what are called mental spines: the lower being a slight median ridge or roughness to which are attached the genio-hyoid muscles, the upper forming a

pair of somewhat prominent tubercles which give origin to the genio-hyoglossi muscles. (See Fig. 7.)

In all the apes this spinous roughened surface is absent, and is replaced by a depression. In most of the primitive jaws this ape-like condition maintains, but in none is it so marked as in the Heidelberg jaw.

The jaw itself is very massive, the excessive breadth of the ascending rami pointing to an abnormal size of the masseter



*Mental ridge for genio-hyoid muscles.*

FIG. 7.—VERTICAL MESIAL SECTION OF INFERIOR MAXILLA OF MODERN MAN. The upper mental spines form a pair, showing bilateral symmetry. The lower are in the form of a small median ridge. (Modified from *Quain's Anatomy*, vol. ii. pt. i.)

muscles, and this in its turn hints at an enormous development of the zygomatic arches.

A word before leaving *Homo Heidelbergensis*. The earliest known remains have been discovered in two deposits: (a) the Trinil beds of Java, and (b) the Mauer sands of Heidelberg—deposits laid down at a period not far removed from the dawn of the Pleistocene.

As pointed out by others, it is interesting to note that the lower form (*Homo Javanensis*) occurs in that portion of the world where the most primitive races (Australian &c.), until lately, continued to thrive; while on the other hand the higher form (*Homo Heidelbergensis*) wandered over Europe,

which has for a very long time been the birth-place of the highest intellects of the world.

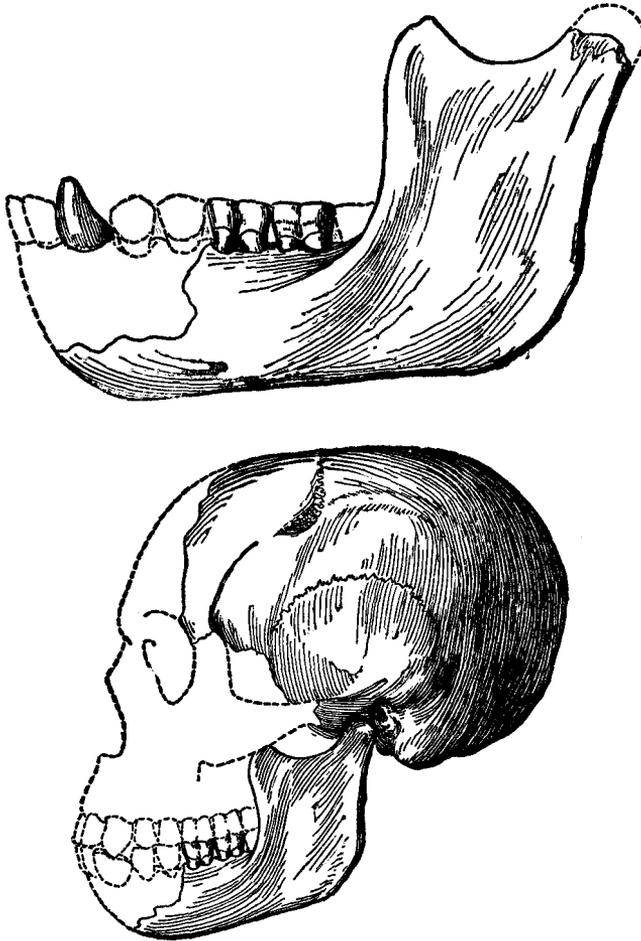


FIG. 8.—SKULL OF EOANTHROPUS DAWSONI.

*By kind permission of the Geological Society.*

The Piltdown Race, *Eoanthropus Dawsoni*. (See Fig. 8.)—  
In 1912, Mr. C. Dawson and Dr. Smith Woodward made a discovery in Sussex, which is of the utmost scientific importance, and has resulted in a fifth species of the Hominidæ.

The chief points of interest in regard to the Piltdown skull are :—

1. The brain-case is, without a doubt, human ; the vault of the skull, and the flat bones generally, are, however, of much greater thickness than in modern man. It would be interesting to know whether the pachyonian bodies had been evolved in these early men, as there can be little doubt that their presence is closely related to the thinning out of the cranial vault, which in modern man forms so marked a contrast to what maintains in primitive skulls.

I have no work of reference at hand, but, if my memory is not cheating me, these bodies which spring from the arachnoid mater, or middle membranous covering of the brain, do not become functional until about the age of eighteen, after which period they continuously exert an absorbing influence on the inner table of the cranial vault, and thus prevent too great a thickening from occurring in this region. It might be offered as a suggestion that in modern man, where the brain is so highly developed, this thinning-out influence of the pachyonian bodies was associated with the growth of the brain, and by their presence prevented any encroachment of the inner table of the skull in the direction of that most delicate organ.

2. The cranial capacity is about 1070 c.c., which is low, but is not lower than the lowest savages of to-day.

3. The forehead is fairly developed, and there is an absence of the massive brow-ridges (superciliary ridges) which are so characteristic of some ancient skulls.

4. The lower jaw offers some interesting points for examination. The ascending rami are wide, and the sigmoid notch (which lies between the two projections surmounting the ramus—namely, the condyle and coronoid process) is shallow.

5. The symphysis or junction of the two halves of the jaw is reinforced by a distinct plate of bone situated on the internal aspect, which sweeps across the angle of recession, and evidently adds great strength to this part of the jaw. In modern man this osseous bridge or ledge is absent, and it is well to note that it is a structure of purely simian nature. (See Fig. 9.)

The roughness for the genio-hyoid and genio-hyoglossi muscles are absent ; and when this is taken in conjunction

with the fact that the mylo-hyoid ridge and the surface of attachment for the internal pterygoid muscle on the inner aspect of the angle and ascending ramus are poorly developed, one may be reasonably allowed to conclude that the race represented by *Eoanthropus Dawsoni* was speechless.

6. The front of the original jaw was absent ; but the dis-

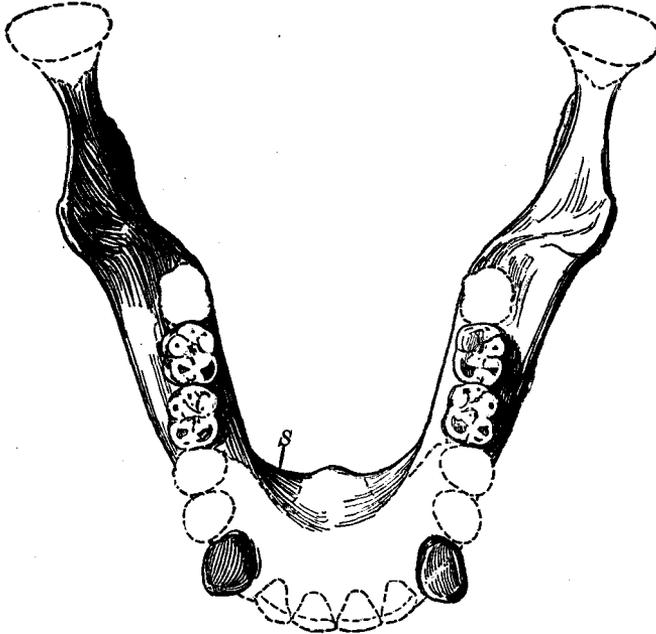


FIG. 9.—THE PILTOWN JAW. S=HORIZONTAL PLATE OF BONE.

*By kind permission of the Geological Society.*

covery a few months later of a canine tooth shows that the modelled teeth are in harmony with nature.

The teeth are of great size, eclipsing all the members of the Hominidæ with the exception of the Java man.

The Piltown skull is in all probability contemporaneous with the Palæolithic implements found in its proximity. These implements point to the Chellean epoch, and Woodward's explanation of the presence of such a markedly simian jaw on a Chellean horizon is that this race, living in the region of Britain, was the last remnant of a very ancient stock, which probably was exterminated by *Homo Heidelbergensis*.

The Heidelberg jaw must be referred to the first interglacial period, and the Piltdown skull to the second.

There is a strong probability that the Piltdown skull belonged to a woman, the evidence for such a conclusion being based on the somewhat small cranial capacity, and also on account of the slender nature of the jaw and the smallness of the brow-ridges.

*Homo Neanderthalensis* or Mousterian Man. Near Düsseldorf the Düssel valley is much narrowed to form a gorge, called the Neanderthal. In this region are found several caves, among them being the far-famed Neanderthal cave, in which the well-known skull was found and from which the fourth species of the Hominidæ has taken its name. This wonderful specimen was first described by Schaffhausen; and Prof. Huxley, speaking of it, says: 'Under whatever aspect we view this cranium, whether we regard its vertical depression, the enormous thickness of the superciliary ridges, its sloping occiput, or its long and straight squamosal suture, we meet with ape-like characters, stamping it as the most pithecoïd of human crania yet discovered.' These words of Huxley carry the same weight to-day as when they were uttered.

Recognising the skull as human, but at the same time the most simian-like he had ever examined, he placed it on a lower level than the Australian, believing, however, that this race represents its closest relatives.

When the skull was first examined there were many who doubted its human character: the famous Virchow attempting to elucidate the abnormal appearance of the skull-cap by ascribing its eccentricities to the effect of disease.

New discoveries, however, followed which settled the question as to the normal nature of the Neanderthal specimen, each new piece of evidence acquired only going to strengthen Huxley's dictum of 1868.

At present there is a large amount of material representing the Mousterians. A few may be mentioned: A lower jaw found at La Naulette in 1866; a portion of a lower jaw from Sipka, 1879; two skeletons from Spy, 1885; many fragments from Krapina; the specimens from La Chapelle aux Saints and Le Moustier.

On examining a Neanderthal skull from the front, the one outstanding feature which most forcibly strikes one is the enormous development of the superciliary ridges and glabella. There is not only an enormous exaggeration of these parts, but they have as it were all become joined up so as to form a continuous elevation extending from the external angular process of one side, traversing the region immediately above the supra-orbital margin, becoming confluent with the glabella, and, passing above the supra-orbital margin of the opposite side to the region of the opposite external angular process, forming what has been termed the frontal torus. (See Fig. 10.)

The existing race which makes some approach to this condition is the Australian, but only in a very modified degree: the only portion of the torus which in any way approaches in size the Neanderthal skull being the region of the glabella.

Coursing along the upper margin of the torus is a depression, which by its presence greatly adds to the massive appearance of this high ridge. There is nothing homologous to this in the Australian skull.

The bony orbits are peculiarly large, and slope, as it were, upwards on to the region of the forehead—a characteristic well marked in the anthropoid apes.

The anterior nasal aperture is of great size, and it is safe to surmise that the fleshy parts of the nose were very massive.

In some of the Neanderthal race marked prognathism was present, as in the skull from the cave of Le Moustier; while in others, as in the Gibraltar skull, orthognathism was the normal condition.

The lower jaw shows hardly any rudiment of a chin, the jaw itself being very massive.

The Heidelberg jaw showed this characteristic in an even more accentuated form; so it would be just to conclude that the chinless condition (which is markedly simian) is gradually disappearing.

The canine teeth are very large, the incisors being small. In *Homo sapiens* the first molar is larger than molar 2, and molar 2 than molar 3; in *Homo Neanderthalensis* this order is reversed.

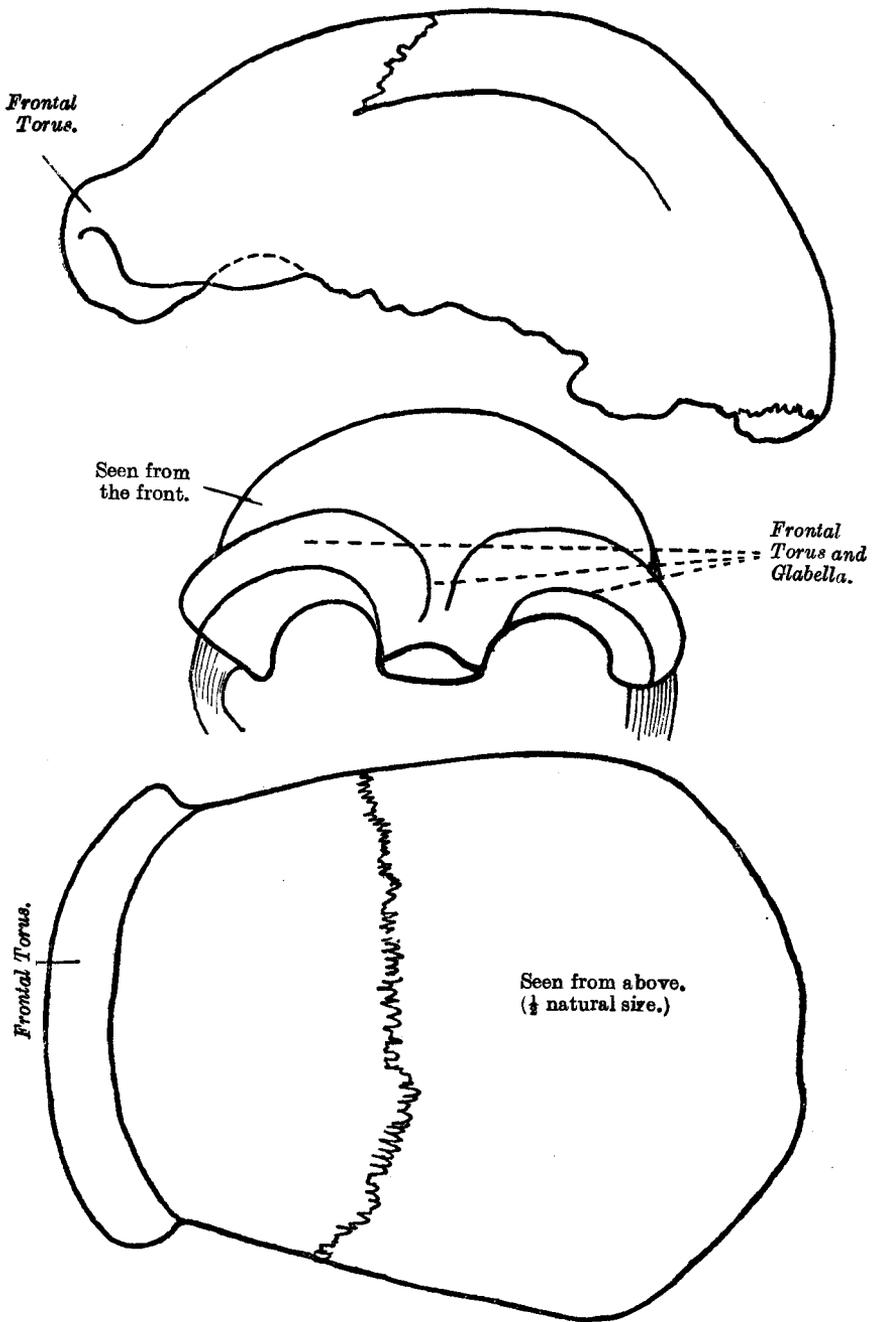


FIG. 10.—THE NEANDERTHAL SKULL. Seen from the side. ( $\frac{1}{3}$  natural size.)  
The outlines from camera lucida drawings by Mr. Busk.

The frontal bone immediately above the torus slopes rapidly backwards, the vertex being low and flat. The bones of the skull are of great thickness, especially in the region of the superciliary ridges.

In the frontal region the base of the skull is abnormally high, thus encroaching on the space reserved for the frontal lobes of the brain. It must not be concluded from this that the Neanderthal race possessed a small cranial capacity, for careful measurements of the La Chapelle aux Saints skull gave the enormous capacity of 1600 c.c. Other skulls of the race give similar measurements.



FIG. 11.—THE GIBRALTAR SKULL (AFTER SOLLAS).

The Gibraltar skull, however, is an exception, giving a capacity of 1250 c.c. Should this skull be that of a woman, another 150 c.c. added would give 1400 c.c., which would be the relative weight for a man. (Fig. 11.)

As regards cranial capacity the Neanderthal race is superior to the modern European, with an average capacity of 1500 c.c.

It is evident from the above that the Mousterians were a big-brained race; their nearest living allies, the Australians, being much inferior in this respect.

The two Spy skulls, discovered by Professor Max Lohest, are in complete harmony as regards anatomical detail with the Neanderthal specimen.

The jaw found in the cave of La Naulette shows very simian characters, so much so that Virchow denied its human

origin. Since then, however, other specimens have come to light—especially the Krapina fragments—which have removed any doubts which existed, and it must be ascribed to the Neanderthal race.

The rock shelter of Krapina was doubtless formed by the ancient Krapinica river, since which the river has sunk 80 feet below the base of the recess.

On the floor of the cave is a layer of pebbles deposited by the river; this layer is covered by one of sand. Here and there patches occur of a grey and red colour. These tell of a series of human occupations, burnt and broken bones and

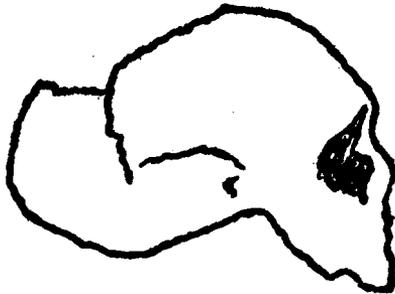


FIG. 12.—THE SKULL OF LA CHAPELLE AUX SAINTS (M. BOULE).

stone implements being found in them. The remains of a dozen individuals or so have been discovered, which are all distinctly Mousterian in their characters.

The bones, strange to say, show unmistakable signs of having been subjected to the action of fire, and for this reason some have voiced the suspicion that Mousterian man was addicted to cannibalism.

The skull found at La Chapelle aux Saints, especially as regards the skull-cap, agrees very closely with the Neanderthal specimen. The implements found on the same horizon are truly Mousterian. (Fig. 12.)

The skeleton found at La Moustier belonged to a youth of about sixteen years of age. The great cranial capacity is in harmony with the skulls from La Chapelle aux Saints and Spy.

There is strong evidence from all these remains that the Mousterians possessed extraordinarily large heads, and were of short stature.

It should be remembered that Mousterian man was essentially a cave-dweller. His remains, however, have sometimes been discovered in open country, but these areas probably only represented summer stations.

Palæolithic man lived during the Pleistocene or glacial period. It is well known that in Britain the glacial period was not continuous, but was subdivided into probably four cycles by three warm interglacial periods.

The Palæolithic Age has been subdivided into certain epochs, which mark the different stages of cultural efficiency. They are named as follows, reading from the latest to the most ancient :

(1) Azilian ; (2) Magdalenian ; (3) Solutrean ; (4) Aurignacian ; (5) Mousterian ; (6) Acheulian ; (7) Chellean ; (8) Strepyan ; (9) Mesomian ; and (10) Icenian.

Icenian and Mesomian implements are regarded by some as belonging to the class known as 'eoliths,' the artificial origin of which is seriously doubted by certain authorities. On the other hand, some of the Icenian implements are regarded by distinguished experts as being actually pre-glacial. The Mesomian implements have, however, at the last moment established their reputation for respectability, and are now described (even by the hyper-sceptical) as being genuine.

It is probable that the Strepyan, Chellean, and Acheulian cultures predominated during the middle inter-glacial period. The Mousterian, commencing in the middle inter-glacial, extends to, and overlaps, the Aurignacian, which must be associated with the last inter-glacial period ; while the Solutrean, Magdalenian, and Azilian carry us into post-glacial times.

There occurs one very wide gap in the history of Palæolithic man in Europe, wider than the breach between the Stone and the Metal Ages, and wider even than that between Palæolithic and Neolithic man.

This apparent solution of continuity occurs between the Mousterian epoch, when *Homo Neanderthalensis* lived in his

caves, and the Aurignacian, which probably occupied the greater portion of the last inter-glacial period.

During the last four Palæolithic epochs—namely, the Azilian, Magdalenian, Solutrean, and Aurignacian—Europe was inhabited by distinct races. Whether these peoples left any progeny to carry on the evolution of the human race, or whether they suffered the fate of extermination, is unknown; but they differed only very slightly from modern man and certainly belonged to the species *Homo sapiens*. Between Mousterian man and modern man there is a wide breach. At times the discovery of the remains of modern man have been reported in strata considerably antedating Aurignacian times; but expert evidence has always gone to show that these hypothetical pre-Aurignacian *H. sapiens* will not stand a rigid scrutiny.

Thus Palæolithic times may well be divided into two portions:

1. An early period, in which four different species of the Hominidæ came into existence, and disappeared—namely (a) *Homo Javanensis*, (b) *Homo Heidelbergensis*, (c) *Eoanthropus Dawsoni*, and (d) *Homo Neanderthalensis*.

2. A later period, the greater outstanding feature of which is the total disappearance of all the above species, and in their place the appearance of *Homo sapiens*.

The Aurignacian and his successors constitute essential man; before this we find ourselves among unfamiliar forms, which mark the slow steps of evolution upwards—from the semi-simian precursor to *Homo sapiens* himself.

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## MIGRATION OF BIRDS

(Paper read at the Ninth Ordinary Meeting of Members, July 9)

BY V. G. L. VAN SOMEREN, M.B.O.U. &c.

The subject of the Migration of Birds is an extremely wide one, of absorbing interest, and one about which we know very little.