DESCRIPTION OF THE IPSWICH SKELETON.

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Mr. Moir has described the circumstances under which the skeleton was found and has given the evidence on which these bones have been assigned to the period preceding the formation of the Boulder Clay. It remains for me to give a description of the skeleton and to draw certain inferences as to the kind of man to which it belonged. Before doing so, however, I should like to mention a matter which may be of service to future investigators. So fragile were the remains, such was the degree of disintegration, that Mr. Moir found it impossible to extract the bones from the matrix in which they were embedded. He therefore, most wisely, cut out the stratum in which the bones lay as solid blocks, which were forwarded to me in the condition in which they were excavated. On reaching the Museum we impregnated each block with a solution of gelatine and then proceeded to expose the bones by removing from them the overlying boulder clay piecemeal and leaving them still *in situ* on the underlying glacial sands. The removal of the boulder clay required extreme care and great patience, but the advantage of leaving the bones attached to the underlying parts of the blocks became very apparent when we came to reconstruct the position of parts of the skeleton. There is the further advantage that anyone can now examine the exact relationship of the parts to the strata in which they lie.

THE PARTS PRESERVED.—There can be no doubt the whole skeleton is represented and that its various parts are in their proper position to each other. The right side of the skeleton, which lay in contact with the glacial sands, is much better preserved than the left, which was uppermost and embedded in the boulder clay and thus most subjected to the destructive effects of the roots of plants and the eroding action of the clay. The roots reach deeply in the glacial sands and their effects are especially manifest on the skull and pelvis. The boulder clay (sandy, chalky loam) has also eaten into the bones; all the soft spongy bone, such as occurs in the feet, the ends of long bones and in the spine, was represented by dense clay in which minute fragments of the original bone could be detected. Thus there was not a single complete bone recovered with the exception of the small bones of the right hand. By great fortune the cavity of the skull must have been completely filled at an early stage with the surrounding matrix, and thus a complete cast of its interior has been preserved. A fragment of the frontal bone, sufficient to

show the characters of the forehead; parts of both temporal bones with the joints for the mandible and fragments of the parietal and occipital bones are also present. The face and jaws are gone, but fortunately nine of the teeth were found.

THE CHIEF CHARACTERS.—From the parts thus discovered it is possible to form a fairly accurate picture of the individual to which they belonged. He was a man, about 5-ft. 10-in. in height and probably between 40 and 50 years of age. He possessed none of the features of Neanderthal man, but on the other hand manifests all those characters which belong to the modern type of man. The teeth, the forehead, the thickness of the skull, the characters of the limb bones are those of the modern type of European—with one (or perhaps two) exceptions—namely, the leg bones (tibia and fibula), and perhaps the arm bone or humerus. Only the upper part of the left humerus is preserved, but so eroded is its condition that its original form cannot be quite judged. But enough remains to show that it differed in details of shape and character from the corresponding bone in modern men. I am disposed to lay great weight on the characters of the tibia and fibula. These are exactly opposite in type to the same bones in Neolithic man. The outstanding feature of the tibia is the absence of a sharp crest or shin; this is also the case in Neanderthal man, but in shape and size the tibiæ of the Ipswich and Neanderthal men belong to different types altogether. Assuming that Mr. Moir and I are right in regarding this skeleton as representative of pre-boulder clay man, then it is a most interesting fact to find that the modern type of man—with the exception of certain features of the leg bones—was evolved at this early date, for we are dealing with a period which antedates by a long interval the Mousterian period when Neanderthal man flourished in France and Belgium. I estimate from the cranial cast that the brain capacity of the Ipswich cranium was 1430 cubic centimetres. An average modern man has a cranial capacity of about 1480; a tall man, such as this, should have a certain percentage more—a little over 1500 cubic centimetres. The cranial capacity, however, varies so from individual to individual that too much stress must not be laid on the small size of the brain of the Ipswich man.

THE POSTURE OF THE SKELETON.—We come now to discuss an important matter—the posture of the skeleton. The position of the body at death is easier of realisation than of description. If one squats so that the buttocks rest on the heels and so that the knees are pressed against the front of the body, the main posture of this skeleton will be represented. Only instead of being in the squatting posture the skeleton rests on its right side with the head bent forward so as almost to reach the knees. Then the right arm is flexed and lies beneath the body so that the right hand rests under

PLATE XLI.

The Ipswich Skeleton—Position of body.

(From a drawing by Professor Keith, photographed by Mr. F. Woolnough.)

the right leg. The left arm is more acutely flexed than the right, its elbow being gripped between the knees while the left hand is turned against the left shoulder. It will be seen that the position of the skeleton somewhat resembles the contracted postures found in neolithic burials, and the question arises—Was there a burial here, or did the man sink down, die, and afterwards become overwhelmed beneath the stratum of boulder clay? I do not remember any contracted burial in which the thighs were so tightly flexed on the body as was the case in the Ipswich skeleton, nor one in which there was quite the same disposition of the limbs. A Peruvian mummy in the Museum of the College of Surgeons does show the same degree of contracture of the limbs and almost the same position of the limbs. It occupies a squatting position. From the appearance of the mummy I suspect the body was forced into its present position after death—but there is no certainty of this having been the case. My first impression was that the position of parts seen in the Ipswich skeleton could not be assumed by the body at death, and that therefore force must have been employed to place the limbs in the position which they occupied when the skeleton was discovered. Were I, however, placed in the witness-box and asked if it is impossible for a dying man to assume this posture, and for this posture to be preserved after death, I should have to agree with Dr. Sturge, and admit that such a posture does seem possible. Yet I have never seen a dead body in this posture, but then I have to admit that I have only seen the bodies of those dying under the conditions of modern civilization. I have seen people cuddled up in a drunken sleep, who if they had died in that condition would have retained the ultra-contracted posture.

I therefore abandon the point that the contracted posture necessarily means burial. If there had been a burial we ought to be able to detect in the glacial sands just under the body a distinct junctional line indicating the floor of the grave. No distinct line is visible; such indication as there is—a loss in the distinctness of the stratification to the depth of an inch or more below the skeleton—seems to me to have been caused by the action of the roots which have reached the body and passed some distance beneath it. Mention must also be made of various pebbles and splinters of stone which are found immediately beneath certain parts of the skeleton—as if they might have rolled into an open grave. It must be remembered, however, that in the deepest stratum of the boulder clay such stones are extremely abundant. The question of burial must be left open: it can neither be absolutely proved nor completely excluded, although the balance of evidence is perhaps against burial. In any case, whether burial or accidental inhumation, one must presume that there must have been a land surface at this horizon. That surface may have been obliterated during the deposition of the boulder clay, yet I have great difficulty in picturing a land surface at this place under any of the current theories relating to the manner in which the boulder clay was deposited.

SIGNS OF ANTIQUITY IN THE BONES.—The bones are not mineralised; on the contrary, they are extremely light. When a fragment is broken off, it is seen that the bone matter has exactly the appearance of chalk—it is white and homogeneous. The surfaces of the bones are stained a light reddish brown, probably an iron stain, but it is seen to affect only the surface layer; the stain never penetrates to a greater depth than a millimetre, often much less. The fragments of chalk in the boulder clay are also white, merely their surfaces bear the red stain. I placed a fragment of the tibia and of the skull in 5% of hydrochloric acid; as controls I took fragments of fossil bones from under brick earth, from beneath the red crag, from a Neolithic skeleton found in chalk, and from an ancient skull from the Thames bed. In the sub-crag and brick earth fossils the bones crumbled to a sediment; in the Ipswich skeleton the bones also crumbled but formed a flaky ragged sediment; the fragments of the other bones retained their shape owing to the cartilaginous and gelatinous tissue preserved in them. So far as this rough test goes, it is in favour of the antiquity assumed for the Ipswich bones. Too much weight must not be attached to the condition of the bones; a mandible from the coprolite pit at Foxhall, near Ipswich, which we must presume is older than the skeleton here described, was rejected because it contained a high percentage of gelatine and did not show a greater degree of mineralisation than the teeth and bones of the Ipswich skeleton. For a similar reason the human mandible removed

The Ipswich skeleton - Skull.
(Photo by Butterworth, Savoy House, 115, Strand, W. C.)

The Ipswich Skeleton.

1 - Cranium—Vertex view. 2—Full face. 3—Profile. 4—Tibiae: modern examples on left; Ipswich Skeleton on right.

(From drawings by Professor Keith, photographed by Mr. F. Woolbrough.)

by Boucher de Perthes from a bed which Prestwich described as the oldest in the Somme Valley was rejected. The Engis skull, found with bones of the mammoth and rhinoceros is also being rejected because it is not mineralised. The human and reindeer bones found in a cave at Langwith-Bassett, Derbyshire, by the Rev. E. H. Mullins, were remarkably fresh in appearance. I therefore conclude that there is nothing in the condition of the Ipswich bones which prevents us from accepting them as of pre-boulder clay date.

Another condition requires explanation. How did the skull become filled? The matrix is exactly the same as the stratum in which the skull lay—a sandy loam with a certain percentage of chalk. One cannot easily conceive a skull becoming filled if it were now buried in this stratum—a stratum which requires a pick to pierce and dislodge it. The matrix could be carried in by three agencies,* (1) water, (2) roots, (3) worms. I think the two last may be excluded, for they are selective in their action. I should not expect them to carry within the skull an accurate sample of the material which surrounded the skull. We must therefore revert to water. Could the rain permeate the boulder clay to this depth? Mr. Moir is quite definite on this point: he denies the possibility. Yet one must remember the roots are now reaching and penetrating the skull, and we may be quite certain that moisture penetrates as far as roots. Yet I do not think moisture could penetrate in such quantities as would fill the skull. We are therefore driven back to suppose that when the skull came to rest here there existed a more moist or fluid condition of the stratum. It is not only the skull which is filled; all the medullary cavities of the long bones are also packed with the surrounding matrix. Even the pulp cavities of the teeth and the finer closed spaces of the bones are stained and contain fine grains of sand.

CHARACTERS OF THE HEAD.—In dimensions, in shape, and in its essential characters, the head, so far as we may judge from the cranial cast and fragments of the skull, does not differ in any essential feature from that of modern Europeans. Its maximum length, 192 mm. is a common skull length among modern Englishmen; the maximum width, 144 mm., is also a common measurement; the proportion of breadth to the length, 75 %, also abounds. There is one peculiar feature in the maximum width of the skull—it is situated nearer the posterior or occipital end of the skull than is usually the case amongst modern races, and in this feature the Ipswich man recalls the Neanderthal race. Another primitive feature of the skull is its flattened form; it is

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* I have seen lately several skulls from graves dug in chalky loamy soil, which were perfectly filled with a matrix exactly similar to the surrounding soil.

compressed from above downwards so that the vault rises only 110 mm.—15 or 20 mm. less than is usual in modern European races. The forehead is sloping; the supra-orbital ridges are not strongly marked; there is absolutely no trace of the massive supra-orbital bar which characterises the Neanderthal race. Indeed, the bones of the skull are remarkably thin—varying from 4 to 5 mm.; at the root of the nose the frontal bone measures 18 mm. in thickness—an amount which occurs in modern skulls. The frontal air sinuses at the root of the nose are small. The joint for receiving the articulation of the lower jaw is of the form which occurs to-day. The muscles of mastication were not large.

CHARACTERS OF THE TEETH.—Nine teeth were discovered, and it may be at once said that in size and shape they present no feature which distinguishes them from the teeth in late prehistoric times. The crowns of the teeth are worn down so that the dentine is exposed on the crowns. An upper wisdom tooth is peg-shaped and remarkably small. I admit freely that we did not expect to find the teeth and the masticatory apparatus in the form just described at so early a date, but what we expect is one thing—what we actually find is another. The teeth showed no marks of disease; only signs of severe wear. They are not deeply stained or mineralised; they are remarkably light, and when broken across the pulp cavities are seen to be stained a brownish red, and so is the layer of dentine surrounding the pulp cavity. The rest of the dentine is chalky in appearance.

CHARACTERS OF THE LIMB BONES.—I do not propose to describe fully all the characters of the limb bones at present. It must be remembered that all of them are fragmentary, and my estimation of their original lengths has been arrived at by comparing them with other bones from men of various statures. Without doubt the man was tall; I estimate the length of the femur at about 490 mm. and the tibia at 380 mm., both really long bones. Neither show traces of a great muscular development—rather the reverse. The femur shows no outstanding feature. The flattening of the upper extremity, which is almost invariably present in Neolithic femora, is here absent. As already said, the leg bones—the tibiæ and fibulæ—show the most remarkable features. In Neolithic tibiæ there is a very marked flattening of the shaft from side to side. In the tibia of this skeleton there is no flattening; rather the opposite. In a section at the junction of the lower and middle thirds the shape is that of the letter “D.” There is no crest or shin in front of the shaft. The significance of this feature is not easy of explanation, because we do not know the functional meaning of the pronounced shin of the tibiæ seen in all races of modern man. We know, however, the sharp shin is absent in the leg bones of anthropoids, and is but ill-

marked in the tibia of the Neanderthal race. It is, therefore, a significant feature, and one which I expect will characterise the race to which this isolated skeleton belongs. The fibula is also peculiar in form—it is oval in section and does not show the peculiar flutings found in modern and ancient races. No trace of the foot bones was found—which is unfortunate, for from them we might have obtained an explanation of the shape of the tibia.

Mention has already been made of peculiar features of the humerus, but the bone is in too imperfect a condition to allow stress to be laid on them. The forearm bones are slender; the bones of the hand small for a man of 5 ft. 10 in. The individual bones are exactly similar in shape and arrangement to the same bones in modern man.

SUMMARY.—If Mr. Moir and I are right in assigning the remains here described to a man who lived in Suffolk before the formation of the boulder clay, then there can be no doubt we are dealing with one of the earliest representations of man yet discovered. The only other remains which are certainly older are the Heidelberg jaw and the fossil man of Java—*Pithecanthropus erectus*. The Ipswich man differed profoundly from both of these, and in every point in which he differs from them he approaches modern man. In features—excepting the leg bones and some aspects of the head—he is modern man. That the human body should have attained its present form at the period to which the Ipswich man is referred does or should not come to either the zoologist or anthropologist as a surprise. The majority of the mammalia which accompany him had also arrived by then at their present place in the Animal Kingdom. It would certainly be a matter of surprise if the modern type of man was not then evolved. This discovery raises so many issues that it will take some time fully to realise its bearing on many problems concerning the evolution of man.