Description of three Human Crania from Aveline's Hole.

By Sir Arthur Keith, F.R.S.

I am greatly indebted to the President and members of the Spelæological Society of the University of Bristol for allowing me to make an examination of the human crania found in the floor of Aveline's Hole. The circumstances under which these remains were found have already been explained by the President of the Society, Professor E. Fawcett, (Proceedings No. 1, 1919–20, p. 5., No. 2., 1920–21, p. 79), who, at the same time has also dealt with the chief features of the skulls and the racial nature of the people represented by them. The evidence reviewed in Mr. J. A. Davies' *Second Report* (Proc. No. 3, 1921–22, p. 113) settles beyond dispute that Aveline's Hole was used by men as a dwelling place, and also as a burial place, in the closing phase of the Pleistocene period—just when arctic conditions were giving place to the more temperate climatic conditions of the present time. Nowhere else in Britain, and perhaps nowhere else in Europe, have human remains been discovered which can be assigned to this precise period of time—the period of Azilian culture—the phase of transition between the late Palæolithic and early Neolithic cultures in Western Europe. Hence the importance of the discovery of human remains in the stalagmite floor, and red cave earth of Aveline's Hole. If we accept the provisional chronology which has been worked out chiefly by Scandinavian geologists—particularly by Baron de Geer—we may, until a more reliable system of reckoning has been instituted, assign the people of Aveline's Hole to a date somewhere between 8,000 B.C. and 10,000 B.C.

We have three imperfect skulls to give us a clue to the size and shape of head which prevailed amongst this people—the late Pleistocene population of the Mendips. Professor Fawcett has numbered the crania 1, 2, 3; here I will write of them as "A," "B," "C." There is also a fourth specimen—an almost complete palate of a young individual —almost certainly that of a young woman, or rather girl—under the age of 16 years. Over 100 separate teeth from the floor of the cave have been described by Mr. E. K. Tratman (Proc. 1921–22, No. 3, p. 122). Incomplete examples of a humerus, a radius, a femur, and

of a tibia, give some indication of the stature and physique of the people. Apparently they were of less than average stature and strength.

The best preserved of the three crania "A" is represented in Fig. 3 (profile), fig. 4, (vertex), fig. 5 (occipital view), fig. 6 (full face). The greater part of the base is present, but of the face only the right zygomatic arch and malar bone are preserved. The three chief sutures of the skull—sagittal, coronal and lambdoid—are in process of obliteration; the sagittal has gone, the coronal is just traceable, the lambdoid is gone above, but open below. Such a condition indicates a person in the 4th decade of life at least—probably in a later decade, the 5th or 6th. As regards the sex of this individual it is impossible to come to a positive decision; certain features, as Professor Fawcett has already noted, are feminine, but taking into account the dimensions and certain other features, to be mentioned later, I am of opinion that the skull is that of a man. The condition of the bone is exactly that of the bones of Pleistocene animals from the cave earth; the superficial laminæ are reddish, covering deeper layers which have a chalky colour, and when struck have the resonance of porcelain.

When examined in profile (Fig. 3) there is one feature of cranium "A" which at once attracts attention. Its length, as measured from the glabella to the most distant point of the occiput, is 192 mm.—a long skull, for I would separate skulls into three groups as regards length, 190 mm. and over—long; 179 mm. and under—short; over 179 mm. and under 190 mm.,—medium. In this skull the upper part of the forehead—the region of the frontal eminences—protrudes forwards so that the actual longest diameter is not the glabello-occipital as in most crania, but is represented by a line drawn obliquely from the upper forehead to the occiput, which measures 195mm.—3 mm. more than the glabello-occipital length. The amount which the first measurement exceeds the second is an indication of the degree of forward bulge of the upper frontal region. Another way of measuring this feature is to compare the arc and chord of the frontal bone in the sagittal plane. From the nasion to the bregma, the arc of the frontal bone, taken by applying a tape along the outer surface of the bone, is 137 mm.; its chord is 113 mm.; the chord is 82 per cent. of the arc; the more receeding the forehead the more does the chord approach the dimension of the arc. The subtense, drawn from the chord to the projection of the frontal eminence—in this case 31 mm.—also indicates the degree of bending of the forehead. The forward projection of the upper part of the forehead is a character of foetal and infantile life. This character shows a tendency to

persist in the most diverse races of mankind, but amongst the breeds of the European stock it is most common amongst the Mediterranean race or breed. Mr. Davies has suggested that in Aveline's Hole, as in most sites along the shores of the Mediterranean, the Aurignacian culture seems to have passed directly into the Tardenoisean. The skulls which show the greatest resemblance to this specimen are skulls from Neolithic sites in Malta. But the resemblance does not represent an identity with a Mediterranean type.

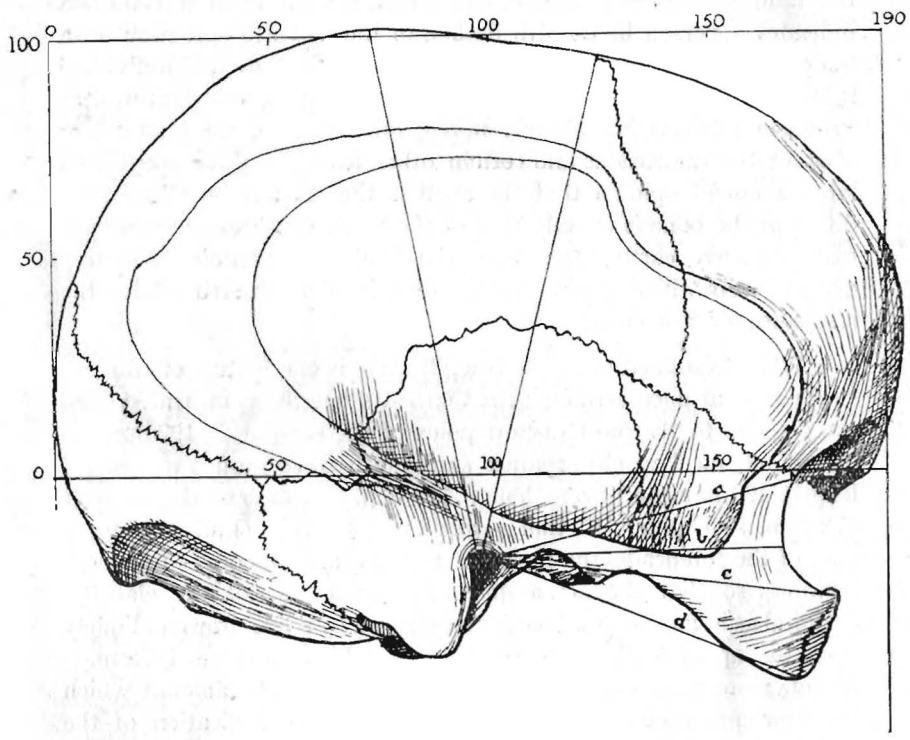

FIG. 3.

Cranium "A" in true profile; oriented on plane used by author, and placed within a framework of lines which correspond to the dimensions of modern British skulls of a common size.

There are certain features concerning the hinder or occipital projection of specimen "A"—best studied in a drawing of the profile (fig. 3)—which I will consider later with certain related features to be seen in specimens "B," "C," in order to note now the width measurements of "A." In my routine work of examining European skulls I have come to look on all specimens in which the maximum width lies above 145 mm. as absolutely wide skulls; those

which are 135 mm. or less as absolutely narrow skulls, while those above 135 mm. and under 145 mm. are of medium width. In skull "A" the width is 138 mm.—falling within the lower range of the medium group. The width is practically 72 per cent. of the length —certainly a dolichocephalic form.

However carefully pairs of mankind may be mated it will be found that the progeny of the pair will show a very considerable range as regards the proportion which the width of head will bear to length. We may get the same proportion of width in two skulls which are essentially of different conformation and lineage. Huxley was right when he relegated proportional head breath to a secondary place in the classification of mankind into races. In all the main racial

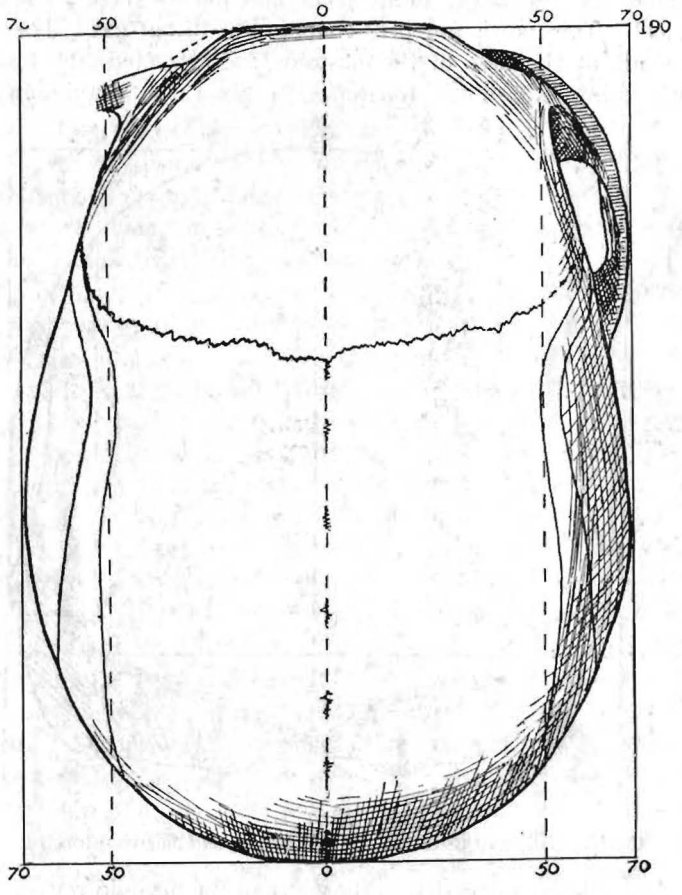

FIG. 4.

Vertex of Cranium "A" oriented on the Frankfort Plane.

divisions of mankind we find breeds or stocks which tend to round-headedness, and others which tend to long-headedness. The European stock also shows this diverse tendency, but it does not follow that a round-headed stock may be of a totally different lineage to that of a neighbouring long-headed stock. This preliminary statement is called forth by what is to follow, for specimens " B " and " C " as we shall see, show a degree of round-headedness never found before in British skulls of a Palæolithic date.

As seen in vertical view (Fig. 4) specimen " A " is of an ovoid form, the widest parts of the skull being situated above and in front of the ears, and occupying not a point, but a considerable length of the sides. When the width is studied in the occipital view (Fig. 5) the sides are seen to be, for a considerable part of their extent, almost vertical. The roof is not pent-shaped, but rather flat. The sides of the skull, at the base of the mastoids, are retracted, the bismastoid width being 128 mm.—10 mm. less than the maximum width.

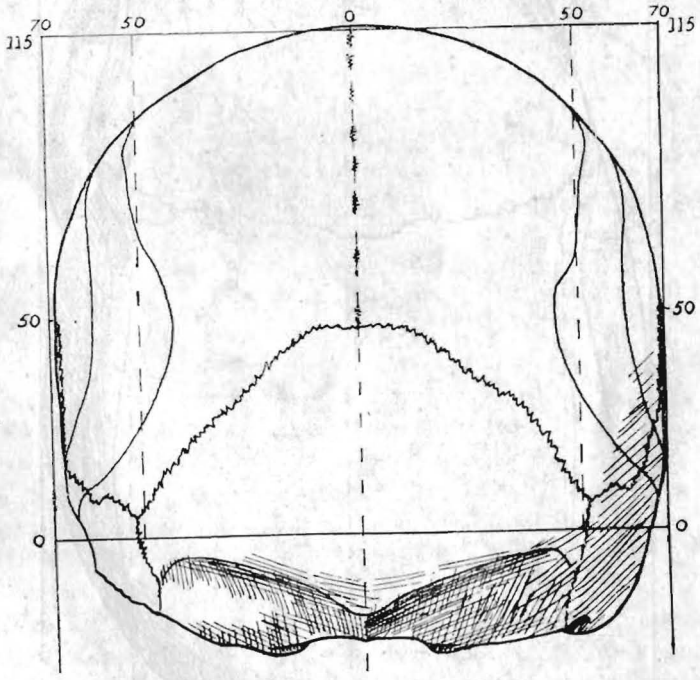

FIG. 5.
Occipital view of Cranium " A " oriented on the Frankfort Plane.

The relative retraction in the width of the mastoid region, the vertical direction of the sides as seen in the occipital view, the even swell of the vault itself, give a feminine character to the skull, although 126 mm.

is a wide bimastoid diameter for a woman. The length of the mastoid process itself, measured along the anterior border of the process from the level of the auditory meatus to the level of the apex, is short —25 mm.—and this also might be construed as a feminine feature, but it is one which holds for all three crania from this cave. Two other width measurements may be mentioned here. They are taken on the right and left masto-parietal suture—one between the anterior ends, the other between the posterior ends, on the two sides of the skull. The posterior measurement is the biasterionic width, but to bring both under the same designation I would name this the posterior biasterionic width, and the other the anterior biasterionic width. It will be found that the difference between these two measurements can serve as an index of the rate at which the posterior part of the head tapers in width. In " A," the anterior biasterionic width is 126 mm., the posterior 110 mm.—a fairly rapid degree of taper.

Other width measurements including those of the region of the forehead need mention here. The forehead is wide, namely 100 mm. at its minimum diameter; the maximum frontal width is 119 mm. rather a small amount; the temporal ridges cross the coronal sutures just above the points of greatest frontal width. Further, both middle and lateral areas of the supra-orbital ridges are less than moderately developed. Indeed in all three skulls this is the case, although in " C," which I regard as the skull of a male, the development is quite moderate in amount. The frontal sinuses are particularly small, and are restricted purely to the interorbital area of the frontal—the area of bone which projects between the orbits and lies below the level of the supra-orbital margins. In " B " and " C " the frontal sinuses are also small in size. There is nothing primitive in any feature of the frontal region of any one of them; the opposite is true. The width of the supra-orbital part of the forehead of " A "—measured between the external angular processes—is 106 mm. Thus there is a difference of only 6 mm. between the minimal frontal width and the supra-orbital width in " A "; in skulls of a robust and primitive type the supra-orbital width will exceed the minimal frontal diameter by 15 mm. or more. In every aspect of the skull—mastoid width temporal ridges and supra-orbital ridges we meet with mild manifestations of muscular development which I am inclined to regard as a mark of race or breed rather than of sex. Mr. Tratman has also noted the very moderate size of the crown and roots of the teeth from the floor of the cave; these must represent men as well as women. We cannot suppose that all the individuals buried in the cave were women. The dimensions of this skull " A," are those more usually

found in men. One notes, too, that the frontal bosses are not set widely apart, but are partly fused on the mid-line of the frontal into a single median boss—a feature so often seen in early Mediterranean skulls of Neolithic date.

We now turn to other features of cranium "A," the height and contour of its vault. When skulls are oriented on the Frankfort plane, the bregma is the highest point, or almost the highest point, of the vault. In modern British (male) skulls the vault rises about 115 mm. above the upper margin of the ear passages; in "A" its height is 116 mm. Thus in its main dimensions "A" approaches very closely to the average modern British skull, its width being 3 or 4 mm. below the average amount, while its length is about the same amount above. We can thus judge that its capacity—the size of its brain chamber—will fall very nearly on the average size: namely 1480 cc. The Lee-Pearson formula gives it a capacity of 1440 cc. It is somewhat surprising to find so early a native of Britain conforming so closely in form and dimension to our modern average.

The Frankfort plane—drawn through the upper border of the auditory meatus and lower border of the orbit is essentially an axis of the facial part of the skull—not of its cerebral or cranial part. For an analysis of the cranial vault and also for the reason that both auditory meatus and floor of orbit are so often missing in ancient skulls, I have been in the habit of using another plane—the sub-cerebral plane—shown in Fig. 3. The exact way to indicate this plane on the drawing of a true profile of a skull is to mark (1) the mid point of the fronto-malar suture—as seen on the lateral aspect of the skull; and (2) the mid point on the masto-parietal suture—midway between the points named anterior asterion and posterior asterion on page 21. The plane crosses these points (Fig. 3). The sub-cerebral plane is the base from which the brain expands during its development and growth; it may expand upwards to an exceptional amount, thus raising the vault of the skull as a whole, or more frequently, pressing against and raising the middle part, or even the hinder part of the roof, thus giving certain peculiarities of outline to the vault—both as seen in profile, and in the occipital view. The brain may expand on the sub-cerebral plane carrying the frontal eminences forwards, as in skull "A" or the occipital end of the skull backwards, into a cap-like form, as is also common in ancient skulls of Western European and of the Mediterranean; or the brain may expand laterally, giving great width to the skull at the expense of length.

In Fig. 3 it will be seen that the vault of skull " A " rises 102 mm. above the sub-cerebral plane ; the average British skull just touches the 100 mm. level. Further the highest point will be seen to lie near the mid-point—or just in front of it—of the parietal arc. Thus there is a tendency in " A " to high vaulting of the parietal. In its two comparisons " B " and " C " this tendency is carried to a very high and exceptional degree (see Figs. 7 and 8). Another way of indicating the curvature of the parietal bone is to compare the length of its sagittal arc with its chord—measured along the sagittal suture from bregma to lambda. In " A " the parietal arc measures 151 mm. —an exceptional length ; its chord, 130 mm.—the latter being 86 per cent. of the former ; the subtense of the arc is 32 mm. ; the parietal, in spite of its length, shows a high degree of curvature.

I have now finished with the chief feature of that part of cranium " A " which is concerned in forming the walls of the brain cavity, and I turn to note the few points which can be discerned of its facial conformation. There can be no doubt whatsoever that the features of the face are infinitely more reliable guides in the recognition of human races than are those of the cranial parts we have just been considering. In the present case we have merely the left zygomatic arch and malar bone to assist us (Fig. 3). Here, too, we have to bear in mind that all parts of the face, with the exception of the nose, are concerned in the function of mastication, and that these parts will be influenced in size and shape by the amount and severity of the use to which they are put. I am in the habit of using the following method of indicating the length of the fibres of the temporal muscle, and the height to which its upper attachment has ascended on the vault of the skull. The distance is measured from the upper border of the zygoma—near its hinder part—to a point in the sagittal suture 20 mm. behind the bregma, the tape being stretched on the side of the skull from one point to the other. The points at which the lower and upper temporal lines cross the tape are noted. In the present example the lower temporal line lay 85 mm. above the zygoma, the upper 93 mm., while the sagittal point was 150 mm. This was on the right side, but the measurements on the left were almost identical, although a degree of asymmetry is usual. In this instance the measurements of the temporal lines are the common ones for modern British skulls. There was no exceptional development, at least in a vertical direction, of the temporal muscles.

On the other hand the parts to which the masseter muscles were attached—the zygoma and malar—are exceptional. As may be seen from Fig. 4 the zygomatic arches were prominent on the

sides of the face; I estimate that the bizygomatic diameter was 140 mm.—10 mm. more than is usual among modern Englishmen. The malar or cheek bones projected further forwards on the face than is now usual—the condition usually described as high-cheek boned—a feature which tends to give the upper face an appearance of flattening—a Mongolian feature. This feature I have been in the habit of measuring by the lines shown in Fig. 3. They are measured on the drawing made of the skull, set in true profile. Line *a* passes from the middle of the auditory border of the post-glenoid spine to the anterior margin of the fronto-malar suture. In the average English male skull it measures 73 mm., in "A" it is 72 mm. Line *b* passes from the same post-glenoid point to the mid-point of the lateral margin of the orbit. In the average English male skull it is 67 mm.; on "A" it is 63 mm.—a decidedly low amount; line *c* passes from the post-glenoid point to the lower margin of the orbit where it is cut by the malo-maxillary suture. In modern British male skulls it is 76 mm.; in "A" it is 79 mm.—showing a forward prominence. The line *d* is drawn from the same base as before to the point at which the lower end of the malo-maxillary suture cuts the anterior attachment of the masseter muscle. In modern English male skulls this measures 66 mm.; in "A" it measures 73 mm.—showing great forward prominence, and an extensive anterior origin for the masseter muscle. To complete the set of measurements I make of this region I also take *e* the distance between the orbital and masseteric borders of the malar and *f* the distance from the masseteric border to the anterior end of the fronto-malar suture. In skull "A," the distance *e* was 23 mm.—a millimetre under the modern average, while *f* amounted to 45 mm.—almost exactly the modern average.

When we speak of people as being high cheek-boned we mean not only that the cheeks are prominent laterally and carried forward on the face, but also that the lower margin or sill of the orbit approaches the supra-orbital margin or lintel of the orbit more than is usual. In other words, the height of the orbit is especially low in regard to the width of the orbit, which in primitive skulls is relatively and absolutely great. Now in skull "A" an estimate can be made of the dimensions of the orbit (Fig. 6). I estimate that its height was 32 mm.—about 1.5 mm. below the modern average, and about 41 mm. wide—also a little under the modern average. Further the width of the maxillary part of the face, measured between the lower ends of the right and left malo-maxillary sutures, marking the anterior points of origin of the masseter muscles, was not more

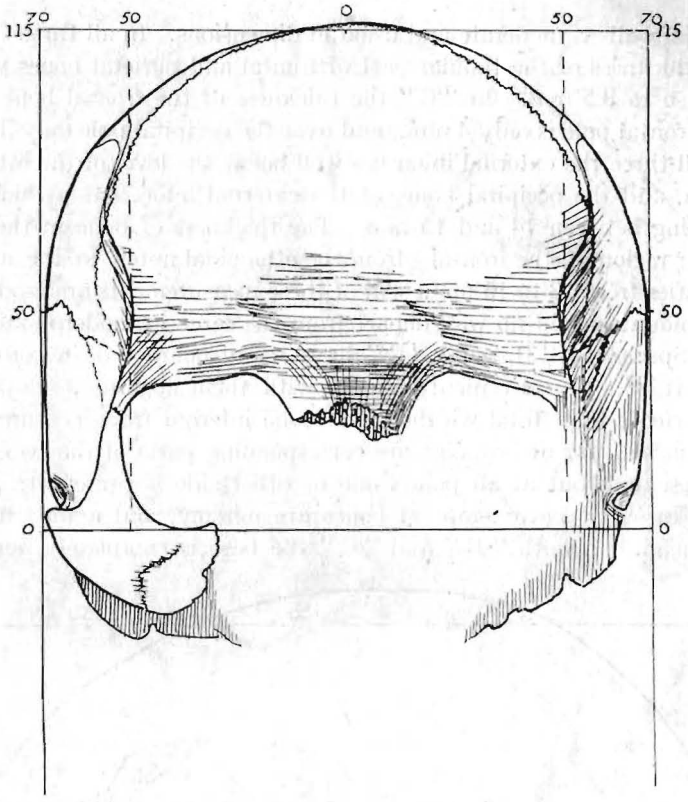

FIG. 6.

Full face view of Cranium "A" oriented on the Frankfort Plane.

than 94 mm.—a measurement which is quite frequent in the faces of modern Englishmen.

Thus, so far as the material at our disposal will permit us to judge there is no indication of an element alien to British people in either the facial or cranial conformation of skull "A." It is true the conformation of the cheek was exceptional, but it is possible to find in the "celtic fringe" of Britain many individuals who possess the same feature. There is no valid reason for assigning "A" to a Mongolian strain, because it happens to possess this feature.

I have finished now with the first and most perfect specimen of the Aveline's Hole skulls; it fits very well into the British cranial type, and has features which link it up with one of the prevalent Mediterranean types. I have said nothing of the thickness of the walls of its cranial chamber—and may consider this feature with the corresponding ones of the two other skulls. The thickness of their

cranial walls is moderate and usual in dimensions. In all three crania the thickness of the tabular part of frontal and parietal bones varies from 6 to 8.5 mm. In "C" the thickness of the frontal bone over the frontal pole is only 4 mm., and over the occipital pole only 3 mm. In all three the external inion lies well below the level of the internal inion, and the occipital bone, at the external inion, has a thickness varying between 14 and 15 mm. The thickness of bone in the glabellar region of the frontal—from the ethmoidal notch to the naison—varies from 13 to 15 mm. All of these measurements are moderate in amount and in no way depart from the same in modern skulls.

Specimens "B" and "C" have many characters in common, and it will be convenient to deal with them together. Both are imperfect; their total widths have to be inferred from measurement of one half, for at no point are corresponding parts of the two sides represented, but at all points one or other side is present to guide us. In "B" both temporal bones are missing, and a part of the forehead. In both "B" and "C" the base is completely missing.

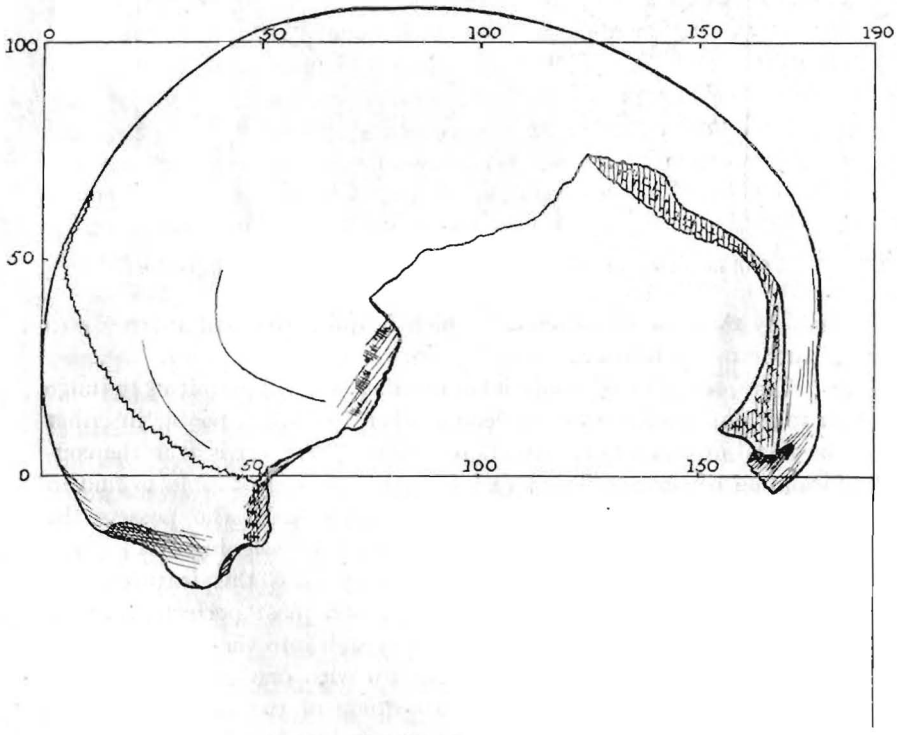

FIG. 7.

Profile of specimen "B" oriented on the Sub-Cerebral Plane.

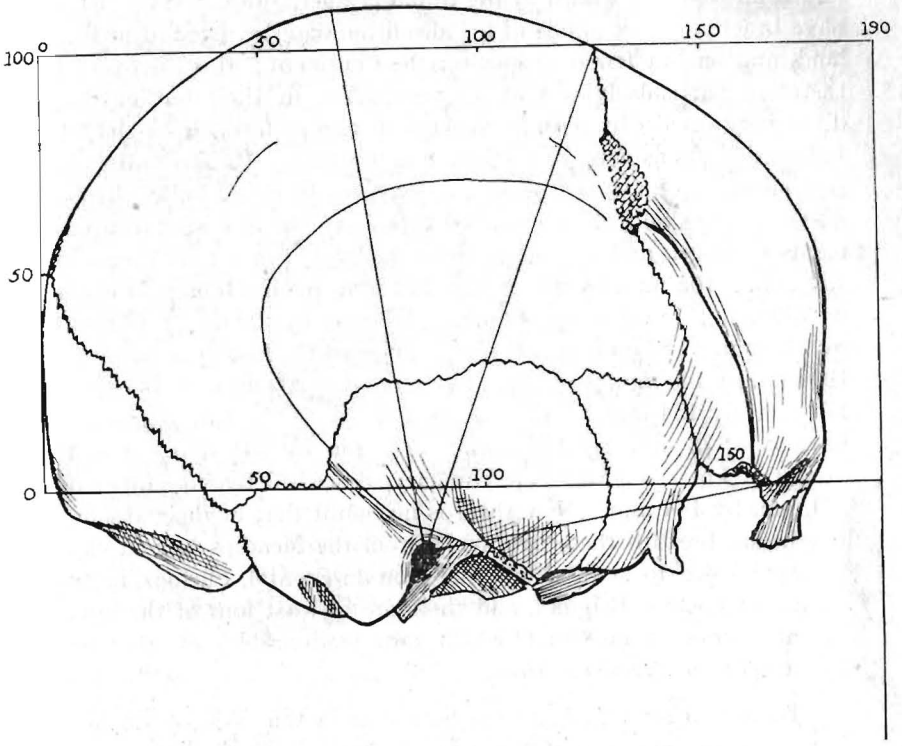

FIG. 8.

Profile of specimen "C" oriented on the Sub-Cerebral Plane.

Their profiles are represented in Figs. 7 and 8. From a consideration of their character I infer that "B" is a woman's skull, and as the sagittal suture is obliterated or nearly so, the coronal only traceable in parts and the lambdoid in process of uniting, I consider her to have been in the 5th decade of life at least, perhaps older. Specimen "C" on the other hand, has certain male indications, and I consider it to be the skull of a man about 40 years of age, for although the lambdoid suture remains open, the coronal and sagittal have commenced to close.

In both, the glabello-occipital length is almost identical, 178 mm. As regards length both fall into the "short" group. The oblique fronto-occipital length is almost the same as the glabello-occipital, showing relatively upright forehead. As regards width, both are almost identical—143 mm. in "B," 142 in "C." As regards width, both fall within the medium group—between 135 and 146 mm. In both the width is approximately 80 per cent. of the length; they

lie within the lowest limit of the round-headed group. Never before have brachycephalic skulls of a Palæolithic date been found in England, and on but few occasions on the Continent; this discovery is therefore particularly worthy of note. Yet in their outline they differ very decidedly, both in dimensions and in form, from the late Palæolithic skulls found at Ofnet and Furfooz. These Continental specimens are of a squarish form, or even rounded and bullet-shaped. At Ofnet the skulls of the rounded type have the following measurements of length and breadth: 180 mm. by 150 mm.; 174 mm. by 150 mm.; 162 mm. by 144 mm.; 174 mm. by 136 mm.; 175 mm. by 136 mm.; 180 mm. by 142 mm.; 177 mm. by 136 mm.; 182 mm. by 146 mm.; 183 mm. by 144 mm. Those of the long type measure: 190 mm. by 140 mm.; 187 mm. by 136 mm.; 200 mm. by 141 mm.; 174 mm. by 134 mm.; 177 mm. by 134 mm. The two skulls from Furfooz: 178 mm. by 142 mm.; 174 mm. by 141 mm. A skull from the Loess at Naga-sap, Hungary, described by von Luschan, 170 mm. by 144 mm. Now there is no doubt that in their absolute length and breadth these two skulls from the Mendips have a close correspondence to skulls from the Trou-du-Frontal, Furfooz, in the ravines of Eastern Belgium, and there are at least four of the intermediate series from Ofnet which are comparable to the two specimens from Aveline's Hole.

There is a strong suggestion here that in the West of England there was an extension of the round-headed element which spread across Europe in later Palæolithic times. But there is a closer tie, I think, to a cranial type found lately at Solutré, to the North of Lyons, and to another found nearly 40 years at Chancelade, near Perigueux. It is true that the Chancelade skull (Magdalenian in date) falls into the long-headed group; its length is 193 mm.; its width 139 mm.; the width is only 72 per cent. of the length; it is dolichocephalic. And yet anyone who has examined this skull in the Museum at Perigueux, and looked at it in profile, must have been struck with the outline of its vault and occiput; they are exactly those of our brachycephalic "beaker" skulls. It is with surprise one afterwards notes its narrowness, and at first is inclined to question whether it may not have been flattened in the earth. In particular, one notes the extreme height of the vault of this skull—it rises 125 mm. above the ear holes—for in height as well as in its hinder profile the Chancelade skull has affinities to the Mendip specimens "B" and "C." Recently three skulls have been discovered by Depéret and Féaux in the Aurignacian strata at Solutré (C. R. Acad. Sc. Paris, 1923, Vol. 177, p. 618). In the two males the width is 79 per cent.

of the length ; in the woman, 77 per cent. The length of the larger skull I infer to be 184 mm. ; its width 146 mm. ; its vault is very high, 127 mm. Now it is to this Solutrean type, and also to the Chancelade skull, in spite of its length, that I would link the Mendips specimens " B " and " C." My reasons will appear in the next paragraph, but in the meantime I would state that the spread of a round-headed element, which we encounter at Ofnet and Furfooz at the end of the Palæolithic period, may have reached France in the Aurignacian period. I may also add that a very little infection of a long-headed people by a round-headed element may leaven and infect the whole of that people. The head diameters of a population may be altered and yet the bulk of its original blood be but little diluted. We must not suppose that a change of cephalic index means a complete change of race ; it is a change of only one of the thousand characters which go to make up the racial definition of the original people.

I have called attention to the highly pitched vaults of the new Solutré crania, and also of the Chancelade skull—which by the way has no essential resemblance to the crania of Eskimo. Now it will be seen that the vaults of specimens " B " and " C " (Figs. 7 and 8) are exceptionally highly sprung. In both, the highest point of the vault rises 107 mm. above the sub-cerebral plane. In " C " the bregma rose 122 mm. above the ear passage when the skull is placed in the Frankfort plane, and 124 mm. when on the sub-cerebral plane. In these features both " B " and " C " resemble the Solutré and Chancelade specimens. It is as if the expansion of the brain had gained space by lifting up the parietal part of the vault, leaving the width but slightly increased but leading to a great diminution of the length. If we are to understand the meaning of cranial dimensions and shapes we must keep our eye on the various directions and means by which brain space is obtained. As I have said, skulls may have the same length and width, and yet belong to totally different types.

Further, it will be noted that in " C " the outline of the occiput, as seen in profile, tends to the vertical, as in " beaker " skulls, but it has not the posterior width of a " beaker " skull. In " B " the tendency to occipital flattening is not so great. The arc of the frontal bone in " B " is 124 mm., its chord 109 mm. ; its subtense 24 mm. ; in " C " the corresponding measurements are 125 mm., 107 mm., 26 mm. In "B" the parietal arc is 150 mm. (?) its chord, 119 mm. ; in "C" the corresponding measurements are 146 mm., 136 mm., and the subtense 30 mm. In "B" from lambda to inion measures 60 mm. ; in "C" 70 mm. In all it will be noted how far below the sub-cerebral plane

is situated the external occipital protuberance (Figs. 3, 7 and 8.) Also in " A " it will be noted that the occipital condyles project 5 mm. below the apices of the mastoid process—the skull being high set in this sense. In both " B " and " C " the cranial capacity may be fixed at about 1450 cc.

Those who are impressed with the difference between the cephalic index of " A " (72) and of " B " and " C " (80) may incline to place them in different races. But a consideration of the reasoning I have outlined above, will, I hope, make them reconsider their decision. If all the characters of these three crania are compared it will be seen they are essentially the same ; all three show the same tendencies, but in " A," the brain capacity has been obtained by an expansion in length rather than in height ; in " B " and " C " the capacity has been got in height at the expense of length.

A close study of the Cheddar cave skull shows many and close resemblances to " A." The skull from the Langwith Cave, Derbyshire, is of a much more robust and primitive type ; it represents a different human breed, and yet it has a cranial form by no means rare amongst modern Englishmen. The Halling skull, another specimen which can claim a late Palæolithic date, has no close resemblance to either of the Aveline's Hole types. Another Palæolithic skull from the 50 foot terrace at Baker's Hole, near Gravesend probably of Aurignacian date, is exactly of the Cissbury type—low roofed and wide, with no close affinity to the high vaulted type of Aveline's Hole.

Thus in Aveline's Hole we do come across a distinct evidence of that spread of round-headedness which occurred in Europe late in Palæolithic times, and it is a memorable discovery, because it has brought to light the earliest known form of brachycephalism in England.

As regards the palate of the young person there is no need to give a full description, for there is not a single point which marks it off from a modern palate at the same stage of development. The crowns of the 3rd molars were still uncut at the time of death, I am doubtful if the germ for the 3rd molar of the left side had ever been developed. The width between the outer borders of the alveoli for the canine teeth is 39 mm. ; the width between the outer surfaces of the first pair of molars, 54 mm. of the second molars, 57 mm. All these measurements are small. Even were the 3rd molars in place the length of the " dental " palate would not exceed 47 mm. The palate is almost certainly that of a girl about 16 years of age. One other point on this specimen is worthy of note. The lower margin of the nasal aperture is represented. Its width is only 20 mm. ; its

lower margin is well defined by a linear bone margin. Apparently, as at Chancelade and Solutré, the nose was narrow.

Most of the teeth of this palate have fallen from their sockets after death. The crowns of the first molars are present, and are but slightly worn. They measure 11 mm. in their medio-distal diameter 12 mm. in the labio-lingual diameter. The corresponding diameters of the crown of the right second molar is 9.5 mm. by 12 mm. This molar has the usual four cusps, but the postero-lingual cusp is reduced. The palate is flat and shallow; there is no suspicion of contraction, or of malgrowth. The suture between maxillary and premaxillary elements is open.