



Translation of the Greater Part of the Address Delivered by M. Broca, President, at the Opening Meeting of the French Association for the Advancement of the Sciences, at the Havre Congress, 1877

Author(s): P. Broca

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examples to all pre-historic archæologists of the detail and accuracy required for such purposes.

Notwithstanding this, however, it appears a great number of these monuments, in which the State of Ohio is so rich, are passing away under the operations of agriculture, without having been duly described. The State Archæological Association of Ohio was originated at Mansfield in September, 1875, and held its first annual meeting at Newark in October last. Its cabinet has been located at the Capital, and will be kept in the State House, with its permanence and safe-keeping ensured by the Government. The "Cleveland Leader" of the 3rd of June, contains an appeal from the Society to the citizens of the State to aid them in the objects of the Association. A State Museum of Antiquities is to be formed at Columbus, and the next annual meeting will be held at Cincinnati, on the 3rd September, 1877. Any person may become a member by forwarding to the Secretary, Mr. Stephen D. Peet, of Ashtabula, three dollars as initiation fee, which will entitle him to an equal part in the discussions, and a copy of the annual proceedings.

A. LANE FOX.

The following is a TRANSLATION of the greater part of the ADDRESS delivered by M. BROCA, President, at the Opening Meeting of the French Association for the Advancement of the Sciences, at the Havre Congress, 1877.*

I.

THE earliest memorials of man carry us back to a time when societies were already organised, and in which nations had already acquired a certain amount of civilisation. Savages have no history; their oral traditions change and alter their original form in each generation, and at last become lost, to make room for traditions equally transient, and the most important events are thus sooner or later consigned to oblivion. Writing alone fixes memorials on a monument or in a book. Narratives more or less historical cannot then go back beyond the invention of writing, and this invention, which implies culture to a certain extent, has of necessity been very slow in progress.

Some of the nations of antiquity it is true boasted of numberless ages for their past history; they paraded in their chronologies periods of tens, and hundreds of thousands of years, but criticism has without difficulty disposed of their claims. In these days, spite of the discoveries of Champollion, and the labours of Lepsius and Mariette and their followers, who have restored upwards of twenty

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centuries to the archives of ancient Egypt, no actual date can be assigned for the commencement of the *historic* period beyond six or seven thousand years.

Thus if we only consulted history, we might well suppose that man is quite recent in his appearance on the globe, and much later than those geological phenomena which have modified the conditions of life, and, by the change in climates, have also changed the floras and faunas. These opinions were everywhere accepted when geologists undertook the vast work of reconstructing the past ages of our planet, when our illustrious Cuvier created the palæontological system, when his genius reanimated the extinct species, and summoned before the tribunal of Science these mute but eloquent witnesses of the successive phases of our globe. Though still devoted to the hypothesis of sudden revolutions and universal cataclysms, Cuvier understood what an immense lapse of time is represented by a geological period, and, as the shortness of the historic period contrasted to such a degree with the incalculable antiquity of the fossil animals, was it not natural to believe that man had not appeared till long after them? This was Cuvier's conclusion, and it conformed with received ideas to such an extent that it at once became classical. Some went even further than Cuvier: the author of the "*Discours sur les révolutions du Globe*" (1825), confined himself to saying that there was no proof of the existence of fossil man, and added that it was *improbable*; but even this was not enough, and on all hands it was pronounced *impossible*. For all this, many facts opposed to this opinion soon appeared, but they were met only with doubts and scorn. It was in vain that, either in the floors of caverns, or in palæontological deposits, human bones mingled and confused with those of animals of the quaternary age were discovered; systematic objections were always presented; the floor must have been rearranged by upheaval, sinking, or landslip; man might have dug there to bury the dead; he might have been entombed by earthquakes in the caverns in which he sought shelter; he might have fallen by chance to the bottom of a deep and narrow cleft; his bones rolled about by torrents might have been deposited by accident in old water-formed channels. It was fortunate when the authenticity of the discovery and the competence and sagacity of the observer were not impugned. Thus were cast aside the discoveries made in 1828 by Tournal of Narbonne in the cavern of Bize (Aude), in 1829 by Christol of Montpellier in the caverns of the Gard, afterwards by Emilien Dumas and Dr. Pitore in two caverns of the Gard and of the Hérault, and by M. Ami Boué, of Vienna, in the quaternary deposits of Lower Austria. The vast researches of Schmerling in the caverns near Liège (1833), and notably in the Grotto of Engis, now so celebrated, had no better reception. The remarkable cranium of Mont Denise (Haute Loire) found in 1844, by M. Aymard, in a bed of mud-lava which conceals the remains of many lost species, did however at last attract attention, but it was always urged in

objection, that this human relic might, through some displacement of the soil, have slipped to the bottom of a fissure.

Facts of this nature, in those days made no impression, however decisive they may appear to us. They were, so to speak, challenged beforehand. To overcome such an opposition, an overwhelming amount of evidence was required. To afford this, it was necessary to prove the presence of man, not only in caverns of the quaternary epoch or in ossiferous breccias, or in earth on the surface of declivities more or less liable to slip, but also in the soil of great valleys, in horizontal and undisturbed strata still *in situ*, and under such conditions as to render the hypothesis of their having undergone any kind of "remaniement" altogether impossible. The extensive beds of sand or gravel deposited in the bottoms of existing valleys by the powerful streams of the quaternary age most often combine these conditions. It was there that Boucher de Perthes sought for proofs of the existence of ancient man. There it was he discovered lying mingled with the bones of the rhinoceros and mammoth the flint weapons used by man in his struggles with these monsters of another age, and the innumerable implements fashioned by his hands to supply his wants.

Boucher des Perthes was not a certificated *savant*, and for a long time his assertions were not believed. His illusions were smiled at, and the dreamer who wasted his life in search of an impossible goal was pitied. But this dreamer possessed a conviction which gives courage, and a perseverance which leads to success. From 1840 to 1858 he struggled patiently with the indifference of some and the scoffs of others. He only asked for examination and verification, but he could not obtain even these, for Dr. Rigollot, the only believer he had convinced, was not in earnest. At last, after eighteen years of struggles, he saw the day of justice dawn. The celebrated English palæontologist, Falconer, willingly went to Abbeville in 1858 to examine at one and the same time the sites explored by our indefatigable compatriot, and the rich collection of worked flints and fossil bones there found. Other English *savants*, Messrs. Prestwich, Evans, Flower, and Lyell followed close at hand. They themselves made successful searches at different points in the valley of the Somme, particularly at St. Acheul, near Amiens, in a site already in 1854 pointed out by Rigollot. Stimulated by this example, French *savants* in their turn arrived; and M. Gaudry, M. George Pouchet, and others were able to obtain with their own hands axes of worked flint from the quaternary deposits of the Somme.

The facts discovered by Boucher des Perthes were thus fully confirmed. The sanction of public discussion alone was now needed. This was given them by the Société d'Anthropologie of Paris. In that body a *savant* whose prudence was equal to his good faith, Isidore-Géoffroy Saint Hilaire, declared that the last objections to the antiquity of man had vanished. The question was examined in all its aspects at several meetings, and all hesitation was removed. The discussions, published in the papers even before the appearance

of the Proceedings of the Society, had a great effect. Fossil man henceforth had an established place in positive science, and the glorious name of Boucher de Perthes resounded through all Europe.

This name will for ever be connected with one of the greatest discoveries. History is under obligations to all who have cleared the approaches to important truths, to all who have had but glimpses of those truths, as also to those who have supplied the proofs, but to him who has enabled her to triumph, a yet higher place is assigned. History will recount how before Boucher de Perthes, the fact of the existence of fossil man already rested on authentic grounds. It will record notably the discoveries made in the caverns of Liège by the learned and courageous Schmerling, and published by him in a work of the highest merit. To the names already mentioned, history will add those of Eberhardt of Würtemberg, of Esper, of John Frere, who in the 18th century, before the classification of the geological epochs, dug up human remains and worked flints now recognised as belonging to the quaternary deposits; justice will be rendered to Jäger, who in 1835 recognised the great antiquity of the Canstadt skull (discovered upwards of a century earlier, and for long considered apocryphal); but with due praise to these workers in the advanced guard, it is Boucher de Perthes who will receive the homage due to the bold wrestler who maintained the final struggle and came off the victor.

The year 1859, which beheld the theory of the antiquity of man burst upon the scientific world with irresistible force, marks the commencement of an era rich beyond others. New and boundless horizons opened out before *savants*. All Europe, geologists, archaeologists, anthropologists, threw themselves into the work with startling energy. Only eighteen years have elapsed, and never perhaps in so short a time has such a rich harvest been garnered. Who can forget those days of new life when from the bowels of the earth, from the depths of caverns, sounded the voice of the past; when the fossil communities lived again, became again alive:—

“When the old world, like Lazarus, upheaved
The stone which held his now reviving youth
Within the tomb.”

Boucher de Perthes had only lifted a corner of that mysterious veil which hides the origin of man. He had proved that man had existed throughout the quaternary epoch, that he had been in our country, the contemporary of the reindeer and of animals which now only exist elsewhere, of the mammoth and other extinct animals. But was this all? and was not the human race even yet more ancient? This last question, more important than the other, presented itself at once. More important, I say, for each of the three periods of the tertiary age was of much greater duration than the quaternary. I will not here recount the researches concerning tertiary man. The discoveries of M. Desnoyers at St. Prest, near Chartres, and of Professor Capellini in many tertiary sites in Tuscany, tend to establish the fact of the existence of man in the pliocene age; those

of the Abbé Bourgeois, in the commune of Thenay (Loir-et-Cher), would carry back even to the miocene age, that is to say, to the middle tertiary, the existence of an intelligent being who could work flints, and could only be man.

But these facts, though collected by highly competent observers, and accepted after careful discussion by many eminent *savants*, are not yet sufficiently numerous or unopposed to constitute a definitive proof.

Tertiary man is as yet only on the threshold of science, and he is in the same position that quaternary man held some twenty years back. Will another Boucher de Perthes arise to prove his existence by evidence convincing to all? That is one of the secrets of posterity.

Quaternary man, on the other hand, has now become classical. He has been found in most parts of Europe, and in many places in the New World. His weapons and implements, preserved in many public and private collections, are numbered by hundreds of thousands. The diggings in the valley of the Lesse, in Belgium, have alone supplied 80,000 worked flints. These innumerable *débris* of quaternary manufacture have been got, sometimes from the earth of valleys in which the relative position of the strata is enough to mark their date: at others from deposits rich in natural flints, where man had established his workshops; here in the rock shelters where he camped; there, in the caves in which he lived. In the cave dwelling places the finds have been most abundant: in these last we have been able to study even the details of the life of a tribe, the remains of feasts, the weapons for the chase and for fishing, the sewing implements, all the products of the flint worker, to which may be added at a certain period, handsome implements of bone and reindeer horn: then, the symbols of power, ornaments, objects of commerce, and lastly, wonderful to relate, the works of artists, sometimes rude and uncivilised, at other times full of grace, motion, and truth, representing by engraving or sculpture the animals hunted in those days—the bull, horse, aurochs, reindeer, the great cave bear, and even the gigantic mammoth.

Thanks to many discoveries, the authors of which are too numerous to be named, quaternary man is now-a-days better known than many historical nations. He has his chronology, not one of years or epochs, like ours, but of archæological and palæontological periods, vast spaces of time, taking date according to the various fossil species which predominated successively around him, and according to the different types of implements marking the gradual evolution of his work. He has his history also, not indeed political, but anthropological; not that of peoples and chiefs who became celebrated, but that of races who supplanted and succeeded one another on the same soil.

These races are distinguished by the skulls and bones which have been found in the quaternary deposits. We cannot say we know them well, or even their exact number, for the valuable remains which represent them are as yet too scarce, and often too much

damaged to be of use as a foundation for complete descriptions. We, however, know enough to be certain of a great number and variety of quaternary races, and although the regions hitherto examined comprise only western and part of central Europe, we can henceforth, in this small corner of our globe, recognise and distinguish at least three fossil human races which may be referred to two essentially different types. I will first say what are these two types, and then what are these three races.

II.

Under the name *dolichocephalic*, which means long-headed, are classed the skulls of a long shape, and under that of *brachycephalic*, or short-headed, those of a round shape.

The horizontal contour of the head, an idea of which may be formed by looking at the opening of a hat, is a kind of oval, longer than it is broad, of which the form, in other respects very variable, depends principally on the relative extent of its two diameters.

When it is much longer than it is broad, or in other words, when the antero-posterior diameter much exceeds the transverse diameter, the skull is *dolichocephalic*, or long. On the other hand, when the difference of these two diameters is slight, it is *brachycephalic*, or short.

Between these two extreme types there is a medium shape, called *mesaticephalic*, or intermedial. In order to obtain, according to this classification, an exact definition, we measure the two diameters with a compass; we divide the second by the first, and obtain a decimal fraction called the *cephalic index*. The two first figures of this decimal are the *characteristic* of the index. We thus reduce the long or short-shaped skull to a numerical expression. Those are dolichocephalic in which the cephalic index is less than the fraction $\frac{75}{100}$, or as 75:100, the brachycephalic are those in which the cephalic index is greater than the fraction $\frac{83}{100}$, or as 83:100, and the mesaticephalic are those whose index lies between these two limits. But the variations of the cephalic index are so numerous that it has seemed advisable to distinguish two degrees of the dolichocephalic type, *i.e.*, the dolichocephalic proper, whose index is below 75:100, and the sub-dolichocephalic, whose index is above this point. In the same way, in the brachycephalic, we distinguish between the brachycephalic proper and the sub-brachycephalic, according as the index is less or greater than the fraction $\frac{83}{100}$, or as 83:100.

In consequence of the numerous mixtures of race during the historic period, these different forms of skulls exist to-day amongst nearly all the European populations to a varying degree of frequency.

Most often, however, there is a certain cephalic type, which prevails to a greater extent than any other, and which points to the greater influence of such and such a race. In France, for instance, the brachycephalic predominates from the Alps to Brittany, through the region occupied in Julius Cæsar's time, by the celebrated Celtic

confederation, whilst to the north of the Seine and the Marne in the ancient Belgic Gaul, the population is mostly sub-dolichocephalic. From this fact, and researches of a similar kind which have been made in other countries, we may conclude with certainty that the peoples of Europe are derived from many races, differing much in the shape of the skull.

The illustrious Swedish anatomist, Retzius, who first in 1842 established the difference between the brachycephalic and dolichocephalic forms, thought that this continued division of cephalic types might be attributed to the mixture of two races only, the one brachycephalic, the other dolichocephalic. At this date the existence of fossil man was not yet admitted, though many years previously Thomsen already had discovered the succession of the ages of industry, stone, bronze, and iron, and it was no longer doubted that before the period of the Indo-European migrations, Europe had autochthonous peoples. Combining this idea with his craniological studies, Retzius supposed that the primitive European race was brachycephalic, and that the dolichocephalic type was first introduced by the conquering Asiatic race. The obscure and complicated problem of the origin of the European race was thus reduced to a charming simplicity and clearness, and never had hypothesis such a general and rapid success. For nearly twenty years, Retzius's ethnogenic theory was admitted without opposition, and some few facts favourably interpreted, seemed to strengthen it: but when it was decided to investigate it more closely, these facts faded away one after another, and this brilliant theory, already much shaken, was finally upset by the discovery of the fossil human races.

The difference between the races of Europe does not date from the almost recent era of the Asiatic invasions, nor from that long age of polished stone which preceded the introduction of metals and succeeded the reindeer age. It goes back to the quaternary age. In that fact, Retzius's hypothesis would lose much of its importance; but further, the dolichocephalic type, so far from being the last arrival, is the earliest of all; the emigrations and mixtures of races far from developing, only weakened it, and these brachycephalic people considered till lately as autochthones, overcome and dispossessed by stronger and more civilized races, were, on the contrary, the invading strangers whose slow and progressive immigration modified, in a manner as decided as durable, the ethnology of Western Europe. They only appeared on the scene in the last days of the quaternary age. Before them two dolichocephalic races had successively occupied the land, and we shall now show the chief characteristic differences between these three races, recovered by science after so many centuries of oblivion.

III.

By what names shall we designate them? A race of which there are no records, can only have a conventional name. The most suitable one will be that of the place whence the first authentic

and characteristic facts concerning them were derived. On this plan, borrowed from geologists, MM. de Quatrefages and Hamy have called the three principal fossil races by the names Canstadt, Cromagnon, and Furfooz. The Canstadt race is the oldest of all, and its remains are the scarcest; by chance, however, they were the first discovered. In 1700 Duke Eberhard of Württemberg, a great antiquary, had some excavations made in an *oppidum* of the Roman period at Canstadt, near Stuttgart. The workmen drove their picks into the neighbouring earth, and discovered there a certain quantity of fossil horns and bones, amongst which was a large fragment of a human skull. But no attention was paid to this precious relic. It was only 135 years later, that is in 1835, that the learned palæontologist, Fred. Jäger, rediscovered it in the collection of the Princes of Württemberg and recognised its value. He ventured to conclude from it that man had been the cotemporary of the large quaternary animals. He was answered, that excavations of so remote a date were not to be relied on, but to-day the genuineness of the Canstadt skull is undisputed, and this cranium, so long disdained, has had the honour of conferring its name on the first fossil race.

Six or seven other skulls, very imperfect, some fragments of jawbones, and some portions of long bones are up till now the only remains of the Canstadt race.

Two of these relics have owed their great celebrity to the discussions raised concerning them: these are the skull found in 1857, by Dr. Fühlrott, in the Neanderthal cave, near Düsseldorf, and the lower jawbone, discovered in 1865 by M. Dupont in the Naulette cave, in the valley of the Lesse (Belgium). The jawbone of Naulette presents a combination of marks of inferiority truly surprising, and the general shape of the Neanderthal skull, its low and retreating forehead, the enormous projection of the superciliary arches, which recalls that of anthropoid apes, is not less startling. It is well, however, to add that the characteristics of the Canstadt race are shown in an exaggerated way in these two fragments.

The examination of the fragments of the long bones which have been rediscovered shows that the Canstadt race was very robust, but of small stature, probably not more than 1 m. 68 c. to 1 m. 70 c. (5 feet 6·14 inches to 5 feet 6·93 inches). The skulls, for the most part much damaged, can only be partially studied, still they can be clearly distinguished from all that have succeeded them. One word will describe their characteristic; it is *dolichoplatycephalic*, i.e., it is at once dolichocephalic and platycephalic. By this name *platycephalic* (the etymology of which is not quite correct) we designate skulls whose roof is very flattened, and which consequently have a very small vertical diameter.

The dolichocephalism of the Canstadt men reaches a point which for a long time has ceased to exist as a mark of race in Europe, and which is only seen in modern races among the Australians and Esquimos. A dolichocephalism, almost as marked, is found in the second or Cromagnon race, and even in one of the races of the polished stone age; but in them it coincides with a much

loftier form of skull, which contrasts in a striking way with the platycephalic race of Canstadt. This platycephalism is due mainly to the great reclinatation of the forehead, which instead of rising above the face in an elegant curve, slopes rapidly backwards, in consequence of which additional volume and prominence is apparently given to the whole sub-orbital region, including the naturally voluminous and strongly-curved *orbital arches*, together with the strongly developed *superciliary eminences* and glabella. The frontal region of the skull is thus considerably diminished; whilst posteriorly, on the other hand, the occiput projects very considerably. But notwithstanding this compensation, the cranial capacity remains very small, being apparently less than that even of the Hottentot and Australian. And it is still further diminished, it may be added, by the great thickness of the cranial walls. Other marks of inferiority are evident in the lower jawbone. These are the proclivity of the incisors, the great size of the molars, the total absence of the projection of the chin, and the elliptic form of the alveolar arch, which has a tendency to contract behind, like a horseshoe.

The only skull in which it has been possible to study the face in its entirety, is one found in the Forbes Quarry at Gibraltar. I think with MM. de Quatrefages and Hamy that this skull belongs to the Canstadt race; with which its connection is shown chiefly by the conformation of the superciliary eminences, the forehead, the occiput, the thickness of the walls, and the smallness of the brain-case; unfortunately the absence of characteristic fossils prevents our being able to determine the date of the deposit in which it was found.

Be that as it may, the Forbes Quarry skull exhibits extremely curious characteristics in its facial region; the very oblique line of profile, the very wide and deep nasal orifice, the great width between the cheek bones, the rounded and truly immense orbits, exceeding by more than 100 square millimetres the largest orbital area up to this time measured on any human skull, and lastly, what is still more strange, a strongly-marked convexity, in place of the canine fossa. Such are the principal features of this facial region, which has nothing analogous in other known races, and which would be a type in itself if we did not class it with that of Canstadt.

The Canstadt race was decidedly very savage, more so without doubt than any existing race; it possessed none but very rude implements, and its wandering tribes struggled painfully with the hardships of life on a soil of which the powerful quaternary animals, the great Bear, the Rhinoceros, and the Mammoth disputed the possession. Nevertheless its geographical spread was immense. It has been met with at Brux in Bohemia, at Canstadt in Würtemberg, and Neanderthal in the Rhenish Provinces, at La Naulette in Belgium, at Eguisheim in Alsace, at Paris in the lowest gravels of Grenelle and Clichy, at Arcy-sur-Cure in the department of the Yonne, at Mont Denise in that of the Haute Loire, at Olmo near Arezzo, in Tuscany, and lastly, probably in Gibraltar. It occupied therefore a large part of Western and Central Europe, where it kept its hold from the beginning of the quaternary age till near the

middle of that period. But then appeared another race more powerful and more capable of improvement, which possessed itself of its domains, and doubtless only succeeded it on its almost extermination. This second fossil race is that of Cromagnon. It derives its name from a rock-shelter discovered in 1868, near the village of Les Eyzies in the valley of the Vézère, Dordogne. The celebrated Engis skull, found by Schmerling in 1834, belongs to the same race, as also do the two skulls found in 1867 by M. Brun in the shelter of Lafaye, near Bruniquel; but Schmerling had referred the Engis man to a negro or a negroid race; and the Lafaye skulls were not sufficiently characteristic to reveal the existence of a special race. It is then the Cromagnon discovery which for the first time allows us to distinguish and describe the second fossil race, since then found in a host of other places.

This race represented in our museums by a score of skulls, some of which are perfect, by some skeletons almost complete, and by a very large number of bones more or less isolated, is now well known. It is dolichocephalic, like that of Canstadt, and almost to the same degree, but in other respects it differs widely from it. Its stature is much taller, the Mentone skeleton, which M. Rivière was able to preserve entire, measures 1 m. 85 c. (6 ft. '83 in.). The Cromagnon old man is more than 1 m. 80 c. (5 ft. 10·86 in.), and the mean height of the men is as high as 1 m. 78 c. (5 ft. 10·08 in.). The skull is very large, and its capacity is equal to, if not greater than, that of the modern Parisian. The strong superciliary ridge which characterises the Canstadt race is not found here. The forehead is not retreating, on the contrary, it is straight and high, forming as far as the bregma a fine curve, below which the frontal eminences and the glabella, reduced to a moderate size, form an even surface. The vertical diameter is well developed, and the lofty well-arched roof contrasts with the platycephalic roofs of the skulls of the first race. The occipital region is always roomy, and still considerably vaulted, but it is only moderately prolonged behind the parietal bones.

The facial region presents distinct characteristics quite as marked as the foregoing. The chin, instead of retreating, as in the cases of La Naulette and of Arcy, stands well out, and the lower incisors have become vertical. The superior orbital borders are no longer strongly arched; on the contrary, they are much flattened, and the orbital opening considerably developed in width, is of slight height. The nasal region, long and narrow, shows the leptorhithian shape common to all Caucasian races. Nevertheless, the cheek bones are very wide apart, and though the face on the whole is but little slanting, the region of the upper incisors presents a marked obliquity. The Cromagnon race is not only distinguished by the conformation of the skull and of the face, but also by that of the principal bones of the limbs. It would take too long to describe here the pilaster-like femur, the flattened or platycnemic tibia, the grooved fibula, the bowed ulna; these special forms, which are still found now-a-days in certain individuals, not combined—but isolated, and besides more

or less unpronounced—were normal in the Cromagnon people, which was in that respect distinguished from all modern races.

Those who consider the volume of the brain as an element of the intellectual power; those who know that in this respect there are mean differences of 130 to 150 cubic centimetres and more, between the superior and inferior races, have been somewhat surprised to find that the character of the mean cranial capacity, places the Cromagnon people on a level with ourselves.

But it must be noted that we are here dealing only with averages, for the study of individual cases show that on the contrary our maxima exceed theirs. Civilized societies support among them those who are weak and feeble, and infirm in mind or body. These outcasts of nature could not carry on the struggle for life in the earlier societies, where every individual could only reckon on himself, and where each day his existence depended on his own strength, sagacity, and foresight; in each generation the stern law of selection eliminated the weakly; and it is their absence which gives an apparent superiority, not alone to the Cromagnon race, but also to one of those which succeeded it during the polished stone period.

Besides, if we study the relative development of the anterior and posterior portions of the skull according to the Abbé Frère's method, we find that the anterior portion, which contains the nobler part of the brain, is markedly smaller in these prehistoric races, than in our modern races perfected by education.

If these observations be true, the large cerebral volume of the Cromagnon race ceases to be a paradox, but it is still of the greatest importance. It shows us that this race must have been very intelligent, and we know in fact that it was so. To it was due the remarkable perfecting of the working in flint. It was this race which first learnt to work the reindeer horn, bone, and ivory; and rising to the conception of art, discovered drawing, carving, and sculpture. Such progress in such an age, is evidence of the intelligence of the race that effected it.

This race does not seem to have spread as far eastward as that of Canstadt. Traces of it have been found in Southern Italy, and probably also in Great Britain, but it chiefly occupied France and Belgium.

The south-west of France, between Périgord and the Pyrenees, seems to have been its chief dominion. Its chronology embraces about the second half of the great quaternary age; its most ancient stations correspond with the mean level of the valleys, that is to say with the so-called *intermediate age*, and its latest bring us up to the end of the reindeer age, which was the third and last of the quaternary period. This reindeer age was the epoch of its prosperity, I might almost say its splendour. But when the disappearance of the reindeer, and the increasing mildness of the climate, marked the end of the palæontological period, and the commencement of the present geological epoch, the Cromagnon race heard the knell of their decadence sound.

It was reindeer flesh which supplied their chief food; the reindeer horn was the first material of their industry and arts.

The manner of life, choice of dwelling places, division of labour, social constitution of these tribes, all depended on the supplies afforded by their hunting grounds, and when these were insufficient, the society of these reindeer hunters was thoroughly disorganised.

The chase henceforth could not supply the wants of a numerous population; the future belonged to pastoral and agricultural peoples and the men of the polished stone age, who had arrived at this pitch of civilization, speedily supplanted the Cromagnon race. If we only consulted archæology, it might be thought that this last race vanished at the same time as the reindeer. It is certain, in fact, that the localities which characterise it, and the industry and arts connected with its name, are not found in the polished stone or *neolithic* age; but the race itself, though considerably weakened, had not quite perished. Some tribes, as that of the Homme Mort cave in Lozère, maintained themselves for a long time, even in the midst of the neolithic population. Elsewhere, as at Solutré, the survivors mingled with the new races; and in this cross their influence was sufficiently strong to leave a lasting anthropological stamp. Their anatomical characteristics, doubtless rendered fainter, but always recognisable, persisted for a certain number of generations; and even at the present day they sometimes re-appear, following the laws of the remote heredity, designated *atavism*.

The Cromagnon race has brought us down to neolithic times. The study of the third fossil race, or that of Furfooz, will bring us back to the reindeer age.

The Furfooz race was discovered in 1866 and 1867 by M. Dupont in several caves situated on the right bank of the Lesse, near the village of Furfooz, Belgium. A burial cave afforded skulls and bones which characterise the race, and the dwelling caves have enabled us to observe the industries and manners of the population. The Furfooz is quite different from the large Cromagnon race. The height, much less, varies between 1 m. 53 c. and 1 m. 62 c. (5 ft. 23 in. and 5 ft. 3.78 in.), descending as low almost as among the Laplanders. The bones of the limbs do not show in their conformation any of the remarkable characteristics which distinguish the men of Cromagnon. The femur, tibia, fibula, and ulna, are exactly similar to our own, and the sole peculiarity to be noticed is the degree of frequency of the perforation of the humerus in the olecranon fossa. This perforation, which has been wrongly considered as a simian characteristic, or at least one of inferiority, has no rank-signification either in man or in apes. It is not constant in any race, and is found more or less commonly or more or less rarely in both. It is now somewhat exceptional in Europe, but was much less so formerly. Thus it is only found in about 4 per cent. of the bodies in the Paris cemeteries, while in some burial places of the neolithic age it amounts to 15 or even 25 per cent. In the Furfooz race it occurs in 28 to 30 per cent. It is worthy of remark that the perforated humerus has not yet been found in the first two

fossil races. If it existed among them it was only as an exception, and we may suppose that this interesting characteristic was introduced into Western Europe by the Furfooz race.

But it is in the form of the skull particularly that this race differs from those which preceded it. With it appeared for the first time a rounded type of skull which is not quite the true brachycephalic, but which heralds the approach of the brachycephalic people. The skull on the whole is small, particularly so in the anterior portion; the forehead is narrow, low, and retreating, the roof but little elevated; in these respects the Furfooz skulls take place below those of Cromagnon, and are a little allied to the Canstadt type. The face, in comparison with the Cromagnon one is smaller, the cheek bones less prominent, the orbits not so broad, and higher, the nasal opening shorter in proportion to its breadth, the lower jaw bones smaller and less thick. That would be quite sufficient to distinguish the two races, even if the cephalic index did not mark the difference between them.

In the Cromagnon race, which is highly dolichocephalic, this index is only 73 on an average, whilst the two perfect skulls of Furfooz, with their indices of 79 and 81, the average of which is 80, are on the border of the mesaticephalic and the sub-brachycephalic, and it even seems probable that in these two skulls the cephalic index had been lessened by a mixture of race, for in the same grave and near them, a less perfect skull was found, which was very dolichocephalic, and belonging apparently to the Cromagnon race.

The Furfooz race only appeared in Belgium in the latter part of the reindeer age. No remains of the large mammal contemporaries of the mammoth have been found in the remains of its feasts. The reindeer even is rather rare, and it is evident that this animal was about to disappear. The Furfooz people only lived by the chase, and dwelt in caves. They had that much in common with the Cromagnon race, but were far inferior to it in other respects. They were not acquainted with drawing or sculpture, their industry was very backward, their worked flints careless in execution, their weapons of reindeer horn shaped without taste; nothing reminds us of the handsome daggers, and barbed arrows of the troglodytes of the Vézère. It may be questioned even if they were acquainted with the use of the bow; but they could make articles of pottery, very rude, it is true, but no trace of which is found in the stations of the Cromagnon race, and which marks a date little anterior to the polished stone age. At the same period that this mesaticephalic or sub-brachycephalic race inhabited Belgium, men with rounder heads, true brachycephalic people, with indices of 83, 85, and even more, penetrated into France on the eastern frontier. At Solutré in the Mâcon country they mingled with those we can hardly call the reindeer hunters, for the reindeer was already scarce, and now it was horse flesh that formed the chief diet. In this locality, where the perfection of the flint working is remarkable, we find side by side with the Cromagnon skulls, some which are quite brachycephalic. Those found by Emile Martin in the upper sands of Grenelle,

tend to prove that the brachycephalic race had then advanced as far as the Paris district, but there is some doubt as to the degree of antiquity of this station, in which Emile Martin has not found the remains of any quaternary animal. Be that as it may, the discovery made in the loess of Nagy-Sap near Gran, in Hungary, proves that the true brachycephalic people already existed on the Danube in the middle of the quaternary age. It is easy to understand that towards the end of that period they may have struck westward, but their ethnogenic influence was then much restricted. Their immigration did not actually take place till the following ages, which belong to the existing geological period, and do not enter into the present subject.

Should we consider these brachycephalic people as forming a fourth fossil race? Yes, no doubt; if we give a purely morphological acceptance to the word *race*, but, if we join to that the idea of *filiation*, the result will possibly be different. It is, in fact, neither impossible nor unlikely that the Furfooz race was nearly affiliated to these true brachycephalic people, that it was a first swarm from them, modified by intermixture, after a long residence in the midst of the dolichocephalic race of Belgium, and actual community of habitation, as the fact of their common burials clearly proves.

Since the quaternary period of which I have spoken, many centuries have elapsed; numerous populations and many races have, before and since the historical period, clashed and supplanted each other on our soil; and it is not the lightest task of Anthropology to determine amongst the physical, intellectual and moral characters of the existing population, the respective influences of so many diverse elements. Nations, like families, are fond of counting up their ancestors, of enhancing the length of their genealogy, and of regarding the antiquity of their origin as a title of nobility. Our complex nation, which derives its modern name from a Germanic people, its civilisation from the Latins, its chief glory from the Gauls, may now add to its past an incalculable series of ages.

If it does not blush for the barbarism of the Celts, why should it be ashamed to number among its ancestors those neolithic Triptolemi who knew how to render the soil fruitful by agriculture; those rough quaternary hunters who had skill to wrest its possession from animals more terrible and more real than the monsters with which Hercules fought—and above all those intelligent Troglodytes of the Vézère who, first of mankind, were able to kindle the torch of Art long before the Assyrians and Egyptians?

Barbarous no doubt they were, but are not we also barbarous in some degree? we who can only settle our differences on the battlefield. *They* were not acquainted with electricity or steam, they had neither metals nor gunpowder; but wretched as they were, and with only weapons of stone, they carried on against nature no mean struggle; and the progress they slowly effected with such efforts, prepared the soil on which civilisation was hereafter destined to flourish.

P. BROCA,

Professeur à la Faculté de Médecine de Paris.