THE DIET OF THE PRECIBICULTURISTS.

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VIII.

EXTINCT PALEOLITHIC MAN.

HAVING dealt with the diet of existing precibicultural peoples we may now inquire into that of extinct man belonging to the stone age. And first, as to the diet of extinct paleolithic man, as revealed more particularly by the relics he has left in Western Europe. By studying these relics we can form some estimate of this far-off ancestor of ours, both as to his physical characters, his mode of life, and the kind of food on which he subsisted.

There can be no doubt that it was during the tertiary epoch that man passed through the hominid stage of his phylogeny. Some hold that man proper did not appear until the quaternary, but there can, I think, be little doubt that long anterior to this a being worthy to be classed as *homo* had already evolved. Inasmuch, however, as our knowledge of man proper practically dates from the quaternary, it is of quaternary man, or rather ancient quaternary, or pleistocene man, that I shall here refer.

In his upward march man has passed through a stone age, followed by an age of metal. The beginning of the former in the tertiary is sometimes spoken of as the *colithic* age of rudely-chipped stone implements, while the more advanced age of chipped implements, coterminous with the ancient quaternary, is generally referred to as the *paleolithic* age. Then followed the *neolithic* age, in which polished, as well as chipped, stone implements were employed, and this again was followed by the *prehistoric* and historic periods.

The paleolithic age, which, as just observed, is coterminous with the ancient quaternary, is divided by Mortillet into four periods, each of which is named after some place where human relics characteristic of it have been found.

Ancient Quaternary or Pleistocene.	<i>The Chellian</i> (lower quaternary) lasting 80,000 years.	
	(<i>The Acheullian</i>)	
	<i>The Mousterian</i> (mid quaternary)	" 100,000 "
	<i>The Solutrean</i> (upper quaternary)	" 8,000 "
	<i>The Magdalenian</i> (upper quaternary)	" 30,000 "
	(<i>The Tourassian</i>)	218,000

The figures indicating the supposed duration of each period are Mortillet's, who thus makes the entire paleolithic age to extend over some 218,000 years, less than one half of Keene's estimate. However this may be, its duration certainly ran into hundreds of thousands of years, and it will readily be understood that during so vast a period great changes must have taken place in the earth's surface, and that correlative changes in climate and in its flora and fauna must have occurred. During the Chellian and Mousterian periods, for example, Britain was on the east joined on to Europe, and in the north-west to America. The climate of western Europe during the Chellian was warm and moist, and the elephant, rhinoceros, hippopotamus, wolf, bear, hyena, lion and tiger flourished there. During the Mousterian, which practically corresponded to the last ice age, the temperature sank, snow fell heavily, and a large part of Europe, including the whole of Switzerland, became covered with ice. The Solutrean and Magdalenian periods were characterized by very hot summers and very cold winters, while during the Tourassian the climate was very like that of the present day.

The vastness of the quaternary period will be the better realized when it is remembered that during it new species of mammals not only rose into being, but actually became extinct. Thus the mammoth appeared at the junction of the Chellian and Mousterian and had become extinct at the end of the Magdalenian, and again the rhinoceros *etruscus* originated in the summit of the Tertiary and vanished with the Chellian.

Paleolithic Man as Evidenced by his Skeletal Remains.

During the long paleolithic age man had ample time to mount up the ladder of evolution and his skeletal remains, as well as his industrial relics, furnish unmistakable evidence of that evolution. Unfortunately the ancient quaternary strata have yielded only a few human fossil remains, but from such as have come to light we can form a fairly accurate notion of the kind of being man was in those days. No bones of Chellian man have yet been discovered: the earliest quaternary remains belong either to the Acheullian or the Mousterian period and were found in the loam forming the floor of the famous Neanderthal cave near Düsseldorf. Hence Mortillet

has termed the early quaternary race of Europe the Neanderthal race. The chief skeletal characters of this race were as follows: the skull, of which the cranial capacity has been estimated at 1,230 c.cm., as against the 1,500 c.cm. of the average European, was dolichocephalic, with markedly prominent superciliary ridges, receding brow, flattened vertex and projecting occiput, while the massive mandible sloped downwards and backwards anteriorly, and was, moreover, wholly destitute of a chin. It is an interesting fact that the Neanderthal type of skull is to this day occasionally observed among the inhabitants of Europe, a fact which seems to show that this ancient race still survives in some of ourselves; and if the contention be true that Neanderthaloid individuals show a marked leaning towards crime, they must be regarded as reversions to an earlier and more primitive type, incapable of adapting itself to the complex requirements of modern social life. But while it is certain that the Neanderthal race was much lower in the scale of evolution than are the present-day peoples of Europe, it is doubtful if we are justified in regarding it as having been so much inferior as some, for example, Mortillet, appear to do; seeing that the capacity of the Neanderthal skull was but little, if at all, below that of some primitive peoples still living.

Regarding other skeletal features of the Neanderthal race, the length of the bones of the extremities suggests a race of short stature, and the marked prominence for muscular attachments shows it to have been endowed with great muscularity. The femur was curved and the humerus twisted; there was a wide interspace between the radius and ulna while the hand bones were of large dimensions.

By the time the Magdalenian period was reached, considerable advance had been made, and the Neanderthal race had merged into a higher "Laugierian" race, so called from the station where the first bones belonging to it were discovered. Some speak of this as the Cromagnon race. Unfortunately only three Magdalenian skeletons have come to light, while the Solutrean has yielded no more than a single mandible.

The Laugierian cranium, though still dolichocephalic, no longer presents prominent supraorbital ridges, the receding forehead has become more prominent, and the flattened vertex higher, while the anterior surface of the still powerful mandible has become more or less vertical and presents a well-marked chin; the molars show a tendency to increase from before backwards, and the teeth as a whole are well worn. The remaining bones indicate smallness of stature and considerable muscularity, but otherwise an advance upon the Neanderthal type, the femur being less curved, the humerus less twisted, the radius and ulna nearer together, and the bones of the hands smaller, than in the case of the Neanderthal race. There can be little doubt, in fact, that the Laugierian race belonged to a higher type than most existing precibiculturists. The height of the cranial vault and the orthognathism alone testify to this, apart from the evidence of their superior culture. I have followed Mortillet in assuming that this race was the direct lineal descendant of the Neanderthal race, and that during the vast paleolithic age "Western Europe was occupied by one and the same human line without mixture from other groups."

Extinct Paleolithic Man as Evidenced by his Industrial Relics.

Much of the handiwork of paleolithic man—all such, for example, as was wrought in wood—has perished, but happily he employed in the making of his implements and weapons one of the most imperishable of materials—that is, stone, especially flint, also ivory, bone, and horn, all of which long resist the ravages of time. Thus it is that he has left a record of himself which enables us to gain no small insight into his industries and mode of life.

These relics are found in the ancient quaternary, and a comparison of those belonging to the lower, middle, and upper portions of it shows a progressive advance from the simple, rudely-fashioned stone implement known as the *coup de poing*, to a variety of highly-finished articles wrought out of stone, ivory, bone and horn. Here, indeed, we have an impressive record of man's intellectual and industrial advance through the vast paleolithic age. We can trace step by step the growth of the stone industry, slowly through the Chellian and Mousterian and more rapidly through the Solutrean, when it reached its acme; and we can in like manner follow through the Solutrean and Magdalenian the development of the art of working ivory, bone and horn; and, again, we can witness the growth during these latter periods of the artistic sense as shown by carvings and engravings on stone, ivory,

bone and horn, by paintings and carvings on the walls of caves, as well as by numerous finds of shells and teeth pierced for the purpose of being strung together and worn as ornaments.

Almost the sole stone implement in use during the Chellian period was the *coup de poing*, or punch,¹ which consists of a stone—generally a flint—chipped into the shape of an almond: adapted to be held in the hand, apparently the right one, it could be used at the point, side, or base, and serve as hatchet, knife, piercer, saw, or hammer, as occasion required. It was, in fact, an implement rather than a weapon. At first ponderous and rudely worked, this implement became, with the progress of the Chellian, smaller and more delicately worked, and so on during the Mousterian, towards the end of which it became triangular in shape, one side only being worked, and at the termination of this period it had disappeared altogether.

Though the *coup de poing* is the only industrial relic which Chellian man appears to have left behind, we may be sure that he fashioned wood in various ways, making therefrom clubs and spears and possibly other things. The spears were evidently not tipped with stone or bone, as was the case at a later period, though their points may have been hardened by fire in the manner adopted by some existing tribes. The cudgel and the club were probably the very first weapons employed by man, and they continued to be used in civilized warfare till within quite recent times. It is remarkable that the truncheon still survives as the official weapon of our police, while the mace is to this very day a recognized emblem of power and authority—"the attribute to awe and majesty."

The question whether the Chellian man was provided with throwing weapons is of interest. We may be sure that man had from a very early period learned to throw stones, and in this way to kill—as the Fuegians still do—birds and other small game; it is possible that he may have used sticks in the same way, and thus shadowed forth the invention of such weapons as the boomerang. As to whether he hurled his untipped spear, or used it simply as a javelin, we can only surmise. In any case it is certain that the Chellian man was but poorly equipped with weapons of the chase, and that as a hunter he was at a great disadvantage compared with his later paleolithic successors, who had at their disposal such deadly weapons as the stone-tipped spear and harpoon, as well as the spear-thrower and probably also the sling.

With the Acheullian, which marks the transition between the Chellian and Mousterian, and still more with the latter period there appeared other stone implements. Foremost among these were the piercer and the scraper, the former of which was used to pierce skins and the latter to scrape and probably to cut them, and also to remove the bark from wood and smooth the surface. There is no evidence that any of the stone implements of this period were hafted with wooden handles: they all appear to have been grasped by the hand direct.

With the Solutrean came the discovery of an improved method of working flints, that is, by compression, and this gave a stimulus to the stone industry. The Solutrean workmanship is most characteristically displayed in the *laurel leaf* and *point au cran* which were used either as poignards or spearheads. Here we have the first indication of the employment of stone-tipped spears, an important advance in man's development, for by means of these deadly weapons he was able to strike his quarry at a distance; his efficiency as a hunter was thus greatly enhanced, and his supply of animal food correspondingly augmented.

This period is further remarkable for the fact that during it man began to fashion ivory, bone and horn, and to give expression to his artistic instinct by carving and engraving on them.

Coming now to the Magdalenian we find a great industrial advance, more especially in the working of ivory, bone, and horn. Bone was employed more than ivory, and reindeer horn more than either, especially in the manufacture of arrow heads, poignards, harpoons and spear throwers—that is, implements for launching spears and possibly harpoons. Needles and buttons were made from bone and whistles from the phalanges of the reindeer. The teeth, especially the canines, of such animals as the lion, boar, leopard, wolf and lynx, were pierced and worn as ornaments, and shells were pierced for the same purpose; the vertebrae of fish were also strung into ornamental chains.

¹ Mortillet speaks of this as the only stone implement in use at this time, but though it was certainly the most characteristic one, there can be little doubt that already in the colithic age man employed a variety of stone implements, or "coliths."

There is no evidence that man of this period employed either the bow and arrow or the blow-pipe. Presumably the harpoon was used with a cord, and possibly the bolas may have been employed.

Among the most refined stone implements of the Magdalenian were delicate awls for piercing the bone needles, and special engraving tools; stone mortars made of hard granite rock for pounding the red peroxide of iron (used as a pigment) and stone lamps have also been found.

Man had, as we have seen, begun already in the Solutrean period to give expression to his artistic feeling by carving and engraving. As might be expected he tried his skill at carving long before he thought of drawing; we can scarcely doubt that his first experiments in carving were made on wood, and those at a very early period of his history. Afterwards he learned to carve ivory, the canine teeth—for example, of bears—and the bones and horns of deer and other animals; on all of which he also engraved, often with consummate skill.

Paleolithic man was ignorant of pottery, the first making of which belongs to comparatively recent times.

Mode of Life of Paleolithic Man.

Paleolithic man neither cultivated plants nor domesticated animals—not even the dog—but lived on uncultivated roots, fruits and seeds, as well as by hunting and fishing.

Mortillet concludes, from the skeletal characters of early paleolithic man, that he was essentially an arboreal being, and adapted rather for climbing than for progression along the ground, finding in the trees a safe asylum for himself and his comparatively helpless young from the many fierce beasts which existed in those wild times; but while readily admitting that Chellian man was better adapted for tree-climbing than is modern man, I cannot doubt that he was much more a terrestrial than an arboreal being, and that he pursued his quarry and gathered most of his vegetable food on the firm and solid earth.

Seeing that the relics of Chellian and Mousterian man are chiefly found in river drift gravels and strewn upon the surface of plains, while they are never met with at high elevations, we must assume that early paleolithic man lived on the plains, and preferably on the banks of rivers. The absence during the Chellian period of any accumulations of man's relics in so-called "stations" suggests that Chellian man went about in small groups rather than in tribes. Such stations are not met with before the summit of the Acheullian. They increase in number and size during the Mousterian, and reach their chief development at the Solutrean and Magdalenian, clearly showing that with the progress of the paleolithic age man became increasingly gregarious.

Again, the fact that the stones from which early paleolithic man made his implements were always of local origin, coupled with the further fact that the implements themselves were large and heavy, shows that he did not wander long distances. The absence during the Chellian period of any implement suitable for flaying animals, and for preparing their skins, suggests that Chellian man did not clothe himself, but went about naked, and this might well have been the case, for not only was the climate of Europe at that time warm and dry, but the paleolithic European was much more hairy than his descendants of to-day, as shown by engravings belonging to a period as late as the Magdalenian.

The mild climate of the Chellian probably afforded the European of that time an abundant supply of vegetable food. From analogy with existing precibiculturists we may safely conclude that he gathered fruits, nuts and possibly also the smaller seeds, and that he dug up roots with a pointed stick; but whether he had already begun to subject his vegetable food to special modes of preparation we cannot say. Very probably he had, but if so he has left no evidence of the fact—no stone implements, for instance, such as might have been employed for pounding seeds or roots, nor any evidence of his having cooked his food.

The strata which furnish industrial relics of early paleolithic man yield no bones of animals which served him as food. Bones of the elephant, rhinoceros, hippopotamus, wolf, bear, hyena, machairdotus and of various kinds of oxen are found, but they evidently belonged to animals which succumbed naturally. It is not till the later quaternary that bones broken for the purpose of securing marrow are discovered. How far Chellian man was able to procure the larger game it is impossible to say. Mortillet thinks he may have hunted the elephant.

Owing to the absence of throwing weapons, we must con-

clude that during the Chellian period hunting was in a rudimentary stage, and that the hunter had to rely chiefly upon trapping, as, for example, by means of the concealed pit. Whatever game Chellian man may have procured with the help of his primitive club and spear must have required very skilful stalking, and this, it goes without saying, implied an intimate acquaintance with the habits of animals, long watching, stealthy movement and great resourcefulness, such as the imitation of the appearance and calls of bird and beast. Hunting as we understand it—that is, with horses and dogs—was, of course, unknown to paleolithic man. Indeed, right down to the beginning of the cibicultural period, man depended solely upon trapping and stalking for procuring the larger game, though towards the approach of this period he was assisted in his hunting expeditions by that most faithful of animals, the dog.

Chellian man was probably able to secure small quantities of fresh-water fish, and we may be sure that throughout the entire paleolithic period insects, grubs, caterpillars and vermin of all kinds were eagerly sought after, as they are to this day among the surviving precibiculturists.

With the arrival of the cold Mousterian period man began to clothe himself in skins, as shown by the appearance in Mousterian strata of piercers and scrapers; and Mortillet assumes that it was during this period that he gradually changed from an arboreal to a terrestrial being.

With the arrival of the cold Mousterian period and the southward extension of the glaciers the supply of vegetable food grew steadily less, so that the Western European of this time was compelled to depend for his food mainly upon the hunt. Judging by the remains found in Mousterian stations, oxen appear to have constituted the staple food. That elephants were hunted seems to be proved by the large collections of their teeth met both in Acheullian and Mousterian stations. Deposits belonging to the late Solutrean period show that even at that time these animals were still actively hunted.

Coming now to the latter part of the paleolithic age, we find a great advance in culture in regard to which the Laugeriean man was equal, if not superior, to any existing precibicultural tribe.

He smeared his body with pigments and decorated it with strings of shells, teeth and vertebrae. Like the Mousterian man, he wore skin garments, but of a more finished kind. The skins were sewn together with bone needles, the threads consisting in the first instance of strips of skin and later of reindeer tendon softened with marrow.

The large accumulation of relics found in Solutrean and Magdalenian strata shows that late paleolithic man lived in tribes rather than in families. The remains of 3,000 deer have been found in a single cave (Gourdan), and at Solutre the bones of upwards of 10,000 horses. He also differed from his predecessors in that he ranged wider in his wanderings, as shown by the fact that certain shells and vertebrae of fish which he used for personal ornaments must have been brought many hundreds of miles.

During the warm summer months the Laugerieans were probably well provided with vegetable food, but both summer and winter they subsisted mainly on the products of the chase. That they were skilled hunters is shown by the deadliness of their hunting weapons, which, as we have seen, included poignards, spears tipped with stone, bone and horn, spear-throwers and harpoons with movable heads, the latter as well as their spear points being laden with poison¹; also by the enormous accumulations in their stations of the bones of such animals as the horse, reindeer and white hare; and, finally, by the engravings of hunting scenes, which they have left behind on stone, bone, ivory and horn. Among the animals thus represented are the reindeer, mammoth, bison, horse, chamois and goat; birds and fish are also represented. The harpoon was used both for procuring fish and game.

The horse and the reindeer were the chief objects of the hunt, but the carnivora were also slain, as shown by the large number of canine teeth of the lion, bear, hyena and wolf which have been discovered in late paleolithic stations. From the fact of their being pierced at the root, it is evident that they were worn as trophies or ornaments.

It has been suggested that the reindeer was domesticated by man of the paleolithic period; but the fact that only certain of the bones of this animal, and not the complete skeletons, are found in the stations containing them seems to show that the animal was killed in the chase, only certain

portions being brought home for consumption. The case for the domestication of the horse is stronger because the skeletons of this animal are found entire; but against this Mortillet argues that, unlike the reindeer, the horse when captured submits to be led away, and that the captured animal was led to the home of its captor and there slaughtered. There is no evidence that paleolithic man was cannibalistic.

Whether paleolithic man built himself temporary dwellings after the manner of some existing savages we cannot say. The early paleolithic men of Western Europe visited caves from time to time, and the men of the Solutrean and Magdalenian periods occasionally lived in them, for which reason they are sometimes known as the European cave men, though on insufficient grounds, as there is no evidence that more than a small proportion of them inhabited caves; there can be little doubt that most of them lived either in rock shelters or out in the open plains. It is an interesting fact that, while many of the once inhabited caves contain vast accumulations of weapons, implements and animal remains, they have furnished but very few skeletons of their human inhabitants. At a later period, that is, towards the end of the Tourassian period, caves came to be used as sepulchres, and it was apparently not until then that European man deposited his dead in special burying places. This helps to explain why so few skeletons of paleolithic man have come to light, and suggests that the man of those times had not yet formed any conception of a future existence.

Whether early paleolithic man cooked his food it is impossible to say. That the late paleolithic man did is certain, for not only have large quantities of ashes and charred wood been found in the Vézère deposit, but in more than one Magdalenian station stone ovens, more elaborate in construction than the underground ovens employed by existing precibiculturists, have been observed. There can, as I have said, be little doubt that Magdalenian man had attained to a higher culture than most of the surviving precibicultural peoples. His culture was certainly not behind that of the existing Australian aborigines. Now these people are expert cooks, able to convert many inedible vegetable substances into wholesome and palatable foods; and we may, I think, safely conclude that Magdalenian man was as skilful in the art of cookery as are these Australians; from which I would argue that cooking had been in vogue long before the Magdalenian period. It is even possible that Chellian man may have cooked his food. Some indeed contend that our hominid ancestors understood the use of fire.

Distribution of Paleolithic Man.—Whether the Chellian culture was shared by the entire population of the world living during Chellian times, or by a section of it only, and similarly in regard to the Chellian, Mousterian, Solutrean and Magdalenian cultures we cannot at present say, inasmuch as we are not yet able to determine the exact distributions of these cultures during the periods belonging to them. It is certain that Chellian man occupied south-west Europe, including the south-west portions of England. Southern Europe and Asia, as well as northern Africa; because in all these regions the *coup de poing* has been found in the lower quaternary. There can be no doubt that he also inhabited the lands which once occupied the site of the present English Channel, the Mediterranean and the submerged Indo-African continent. It is very probable that he ranged over a still wider area, because the Chellian *coup de poing* has been found in several other parts of the world—for example, North and South America, Southern Africa, Siberia and Borneo, but in these places it has not been possible definitely to assign it to the lower quaternary.

Man of the Mousterian period, owing to the southward extension of the ice-zone which then took place, had a more limited range than his predecessors. Nevertheless his relics are found scattered over an area extending from France to Siberia and from England (Suffolk, Derbyshire, Middlesex, Kent) to the confines of Sahara. Switzerland being during the whole of this period under ice was not inhabited by Mousterian man.

The Solutrean culture was at once the shortest in time and the most limited in area. Solutrean relics have been discovered in France principally, but they have been met with also in England, Poland, Italy and North Africa.

Magdalenian man seems to have flourished chiefly in France—where the largest number of Magdalenian stations have been found. Similar stations have also been met with in England (Derbyshire and Devonshire), Germany, Austria, Switzerland, Russia, Spain, Italy and Syria.

¹ Many of the spear-points and harpoons bear grooves and hollows for the reception of poison.