THE MOST ANCIENT OF HUMAN SKELETONS.

In February, 1909, the skull of one of our most ancient known ancestors was found at Chapelle aux Saints, in the French department of Corrèze. In September a nearly complete skeleton of approximately equal antiquity was exhumed at Ferrassie, in the department of Dordogne, by Dr. Capitan and M. Peyrony. The strata which covered the skeleton were absolutely intact and the exhumation was performed so carefully that the bones were revealed in the precise positions in which they had been laid to rest, at least 20,000 years ago. This is the first instance in which so ancient a skeleton, found in such well-marked and indisputable geological surroundings, has been photographed at the moment of exhumation and before it had been disturbed.

The region surrounding Ferrassie is peculiarly rich in prehistoric human remains and documents. Ten miles eastward are the famous caves of Eyzies, where the oldest known drawings on bone, ivory and horn were discovered nearly fifty years ago. In the neighboring cave of Cro Magnon, Lartet and Christy, in 1858, discovered portions of five skeletons and two skulls which have recently been determined to belong to the Aurignacian race, a less ancient race than the Neanderthal, to which the Corrèze skull and the Ferrassie skeleton appear to belong. The same region includes the terraces of Monstier where chipped flint tools of peculiar character were found in 1863. The name monsterian has been given to the period of these tools, which succeeded the acheulean and its predecessor, the chellean, the most ancient division of the quaternary. Relics of the cave dwellers have been found at various other points in the vicinity.

This region has yielded, and will continue to yield, more human documents than any other part of France, for the following reasons: During the monsterian period of the stone age the region was covered with prairies and forests and abounded in horses, cattle and deer, which, with the fish of the Vézère River and its tributaries, furnished a plentiful supply of food. Probably reindeer could also be found on the hills. Furthermore, the river valleys are bordered by chalk cliffs and terraces, often overhanging, and honeycombed with caves, hollows and fissures, which formed excellent shelters. The deeper caves seem to have been reserved for funereal and religious uses, while savages dwelt in the shallower caves and, especially, beneath overhanging cliffs in front of which screens of boughs were constructed. A region which offered such advantages in regard to food and shelter must have been very popular in a primitive age.

On the other hand, it is certain that the general topography of the region has undergone little change since the monsterian period. No geological convulsion has occurred. The principal change is a deepening of the valley by about 30 feet, and this has further isolated the land at the base of the cliff, which was already well protected from inundation. Men doubtless dwelt on the plains also, in those remote times, but all vestiges of them and their works have been destroyed or washed away by floods. Finally, all bodies buried in places distant from human habitations were quickly devoured by the hyenas which then abounded in France, and during the centuries that followed, the pick and the plowshare completed the destruction of the few bones that remained. This is the explanation of the exceedingly rare occurrences of very ancient human bones in most regions and their comparative abundance in Dordogne.

The Ferrassie skeleton was discovered in the course of exploring a mass of debris about 100 feet long, sloping upward from the road to a low chalk cliff rising a few yards above it. The width of the mass varied from 30 to 60 feet and its height, at the cliff, from 15 to 30 feet. The appearance of the superficial layer and the fissures of the cliff indicated the fall of an overhanging cliff, which should have formed an extensive shelter at a much earlier epoch. As this view was confirmed by the discovery of chipped flints where the edge of the mass was cut by the road, explorations were undertaken several years ago, but nothing of especial importance was unearthed until recently. The excavation was begun by digging a broad trench from the road to the cliff in order to allow the mass to be removed in successive horizontal layers. Last September two bones were seen slightly projecting from the wall of the trench, near the bottom. On removing a little earth the bones were recognized as a human tibia and femur. The earth over the bones was then removed, by horizontal layers, with extreme caution. When the greater part of the monsterian stratum had been removed, three flat stones, about eight inches square, covering the skull and parts of the arms, were discovered. The reddish brown sand which surrounded the skeleton contained many large splinters of bones of animals which showed marks of hammering. Very slowly and with infinite precaution the skeleton was laid bare without displacing a single bone. It lay on the back, with the trunk turned slightly to the left, and the legs sharply bent back under the thighs, which were half flexed on the pelvis. The knees were turned to the right. The left arm was extended beside the body, with the hand at the hip, while the right arm was bent, and the hand near the shoulder. The head was turned to the left, with the mouth wide open.

The bones, though broken in places by the great weight of the earth above them, remained firm and in their normal positions. Only the bones of the right hand and foot had been displaced, and in part removed, probably by rodents or small carnivora.

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The skeleton was photographed as it lay and the leg and arm bones were carefully removed. The pelvis was then covered with tinfoil and a large plaster cast was formed around it, so that it could be taken up without injury. The thorax and the skull were treated in the same way. Hence these parts can be mounted without the loss of a single fragment, as the earth in which they lay will surround them, inside the plaster casts, until the casts are opened in the preparing room. This method is commonly employed by palæontologists, but this is its first application to human remains.

The age of the skeleton is indicated, with certainty and precision, by the regularity and very characteristic appearance of the successive strata of the mass in which it was found. (Age, in prehistoric chronology, refers, not to a definite number of years, but to a period of more or less hypothetical duration.) The quaternary geological period, in which man appeared on earth, began with the comparatively warm chellean age, which has left remains of the rhinoceros, hippopotamus, and elephant, and flint tools scarcely modified by man. Then came the cold acheulean age, the age of the mammoth, marked by crudely chipped flints. The ensuing monsterian age, at first cold but subsequently mild, represents a higher civilization possessing a variety of more elaborate flint tools—daggers and picks, knives and scrapers, and disks of unknown use, very characteristic of the age. Flints of all of these types were found around and above the skeleton, while ruder acheulean flints were found beneath it. Hence the skeleton is monsterian.

The stratum containing the skeleton was covered by two strata containing flint tools of the aurignacian age. The overhanging cliff then fell, and its debris subsequently became covered by a layer of earth and stones, five feet in depth, which has effectually protected the human relics beneath.

Dr. Capitan believes that the skeleton is that of a corpse regularly prepared for sepulture, which may have been covered with earth, but was not buried in a grave. Protected by the vicinity of the living inhabitants of the shelter, the skeleton escaped the hyenas and was only nibbled by small animals. This unique skeleton, which is at least 20,000 years old, will probably be mounted and exhibited in the Museum of Natural History at Paris.

A New Substitute for Cotton.

The busy town of Chemnitz, the largest manufacturing center in the kingdom of Saxony and one of the largest factory towns of the German empire, has just witnessed the birth of a new invention which will doubtless cause considerable changes in the price of cotton and which, furthermore, will be of interest and importance to our readers in kapok-growing countries.

For some considerable time past the German textile world has been devoting unflagging attention to the discovery of fibrous plants which might in any way be rendered available as a substitute for cotton, and great interest has been given to the different more or less successful experiments made. Trials made with ramie and caravonica have been fairly successful, but have not met with that meed of success, nor attracted so much attention, which has fallen to the share of the experiments made with the fiber of the kapok tree (the so-called "silk-wool tree") which flourishes in America, Asia, and Africa. The fruit of this tree contains a seed which, like that of the cotton plant, is enveloped in soft silky hairs. These hairs, however, are so short that they have hitherto been useless to cotton spinners and have been used chiefly for upholstery and mattress-making purposes. Most kapok trees grow wild, and only recently have a few Europeans begun to cultivate them systematically in New Guinea and East Africa. Steps are also being taken to grow these trees properly in the German protectorates.

This new industry will be greatly favored by the process just discovered by a large German spinning mill, whereby it is now possible to render kapok fiber easily spinnable. So far, as an absolute matter of fact, the veritable fiber of the kapok tree has not been dealt with, but only the fibers of the *Calotropis procera* (a plant growing wild in East Africa); however, it is exactly the same as kapok fiber in character, appearance, and qualities. Hence, if the one can be spun, so can the other—a point on which not the slightest doubt is entertained. By means of a process evolved by Prof. Goldberg of Chemnitz, the brittle and fragile fiber of the kapok tree is treated in such a way as to render it easily spinnable, and yarn up to No. 12 English is now being spun from it. A sample, both of the raw material and of the yarn, may be seen at the offices. As will be seen, the yarn is of fine quality and of a very soft, silky, and tenacious character. The process in question does not necessitate the employment of any new machinery, but is based entirely upon a novel and somewhat complicated system of preliminary preparation and spinning. What the actual process is cannot yet be divulged.

In the German African colonies fiber stuffs of all kinds are now being grown and, as Dr. Hindorf recently pointed out in a report to the Kolonial-Wirtschaftliche Komité, the new plantations of sisal in German East Africa have now attained such dimensions that in a few years time the annual output will exceed 10,000 tons, and Germany will be able to meet her own requirements. Togo appears highly suitable for the cultivation of sisal, and trial plantations are also being laid down there. Kapok is also grown in

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