

## RECENT RESEARCHES ON EARLY MAN IN CHINA. II

### 'MODERN MAN' IN EASTERN ASIA<sup>1</sup>

"THE Upper Cave" of Choukoutien, discovered in 1930, and excavated in 1933 by Mr. W. C. Pei, is situated at the top of the hill about 175 m. above sea-level, opening to the north and north-east side of the hill. It represents a dissolution cavity in the original limestone massif and is completely separated from the *Sinanthropus* beds except at the entrance and at the bottom of the so-called 'lower recess'. It seems, therefore, that at the time of *Sinanthropus*, the cave was not accessible, but was reopened later in Upper Palaeolithic times. The deposit is quite different from that of the *Sinanthropus* cave, being a grey loam intermixed with small angular limestone fragments. In it was discovered an unimaginable wealth of bones of fossil animals: hares, deer, tigers, bear, hyæna, ostrich and representatives of other genera.

The remains of at least seven human individuals were found with a very interesting series of archaeological objects. Both fauna and geological conditions assign the finds of the Upper Cave to the Upper Palaeolithic. With the exception of the finds in Palestine, no similar discovery has been made anywhere in Asia, and interest turns at once to the character of the human remains, which Prof. Franz Weidenreich considers "of the greatest importance for . . . the racial history of entire mankind".

Although seven individuals are represented, three skulls only afford evidence of physical appearance. The remainder are too fragmentary for that purpose, and the individuals, who it is presumed belonged to one family, had suffered a violent death; although the presence of hæmatite points to the ritual of burial, either the bodies were violently disturbed, or were dismembered before burial.

Analysis of the characteristics of the three skulls sufficiently complete for evidential value in this connexion leads Prof. Weidenreich to the conclusion that while the skull of the male adult, an old man more than sixty years of age, bears some resemblance to European skulls of the Upper Palaeolithic Cro-Magnon, Obercassel or Mecht, it is more primitive in the development of the supra-orbital region, and the lowness of the brain-case. Of the two females, however, one in its hypsacrocranial character and certain other features presents the appearance of Melanesian affinities, while the second is Eskimoid. Viewing the characters of the male skull in the light of these findings, it is possible to regard it as a primitive Mongoloid.

The occurrence of these three types among members of a single primitive group or family suggests that the mixture of types is not a consequence of the conditions of modern civilization, but that at an early stage of evolution individual variations appear which become fixed as a result of the dominance of certain features and of isolation. Hence the conclusion is reached that the tendency to breed and cultivate unitary groups corresponding to the suggestion of the theory of 'pure races' does not represent primary conditions, but a later acquisition.

### THE UPPER CAVE INDUSTRY OF CHOUKOUTIEN<sup>2</sup>

The cultural evidence of the existence of man of Upper Palaeolithic age on this site has been studied by Mr. W. C. Pei, who discusses the objects collected, the technique of workmanship, the character of the culture, and the relationship of the Upper Cave culture with that of Europe.

*Objects collected.* Among stone implements the choppers are remarkable. A great number of water-worn pebbles and boulders have been found, but only a few have been worked. A good example is a green stone which has been knocked into shape with a few heavy strokes, making a blunt edge on one part of the pebble, for use as a chopper or hammerstone. Other implements are mostly made of flint or quartz flakes. 'Bipolar' implements made of vein quartz are very similar to those associated with *Sinanthropus*, though geologically much later. Of bone artefacts, one bone needle, broken just at the eye, was unearthed; also a polished antler of a deer (*Cervus elaphus*), of which the surface is scratched all over and highly polished; it resembles the *bâton de commandement* but is without the perforation.

Of ornamental objects, the most important and characteristic are the beads, made of calcareous limestone, at present undetermined. One face is caused by grinding, and on the other side a hole has been made by drilling to complete the perforation; the part not reached by drilling has been struck off. The seven beads collected have all been painted red with hæmatite. They were found near one of the female skulls.

Four bone pendants were collected. They are made, apparently, of the bones of big birds, and are highly polished and hollow inside. On the surfaces of all are transverse grooves, at present not understood. A perforated pebble is of some igneous rock. It is water-rolled, but one surface seems to have been ground to a certain extent. The perforation was made by drilling from two sides. The perforated marine shells belong to a species of *Area* now found plentifully along the China coast. A large hole has been made near the beak of each shell by rubbing. The margin is also rubbed. The supra orbital bone of a very large fish, possibly more than three feet long, of the carp family, has a small perforation made from each side of the bone. It is a unique find on an Upper Palaeolithic site, whether in China or in Europe. All these evidently were elements of a necklace. Vertebrae of fish found in association with archaeological objects, though showing no trace of human handiwork, may also have been used as a necklace or ornament, as they have a natural perforation.

The most abundant and characteristic objects, however, are the canines of deer or small carnivores, with perforations. Of these, 125 have been found, among them some tens being painted red. The perforation was made by scratching from both sides, not by drilling. Often they were found in series, and obviously represent parts of necklaces or other ornament.



*Working techniques.* These comprise polishing, grinding, drilling, scratching, rubbing, and colouring. In reference to this last, pieces of hæmatite have been found showing traces of scratching.

*Culture: (1) Burial customs.* The Upper Cave was evidently a burial cave in which the remains were disturbed by animals. Of the mode of burial nothing is known beyond the fact that a quantity of hæmatite powder was scattered around the dead.

*(2) Communications.* Upper Palæolithic man of Choukoutien had relations over a wide area extending 150 kilometres to the north, 350 kilometres to the south and 200 kilometres to the south-east. The indications are marine shells from a sea-coast, of which the nearest point is now 200 km. to the south-east; hæmatite, large-grained and oolitic in structure, iron ore of this nature being known only in the district of Lungkuan, about 150 km. to the north, with high mountain ranges intervening; the big lincoid shell found at the present day only on the south bank of the Yellow River, 350 km. or more to the south.

*(3) Clothing.* The suggestion of the bone needle is the sewing of cloth, while perforated objects point to the passing of string for a necklace ornament. The inference is that some type of clothing with ornaments was in use.

*(4) Other elements.* Though of the daily life nothing is known, pieces of charcoal and layers of ashes full of free carbon imply the use of fire, while fish vertebræ point to the practice of fishing, though no harpoon or hook has been found. The presence of teeth of deer, fox, badger, and pendants of the bones of a big bird suggest that these animals may have been hunted.

*Comparison with Europe.* As there is no material in China for comparison, no chronological succession can be established. Geologically, the culture is contemporary with the Grand Loess of North China, that is, late Pleistocene, and as such comparable with the Upper Palæolithic of Europe. The technique of scratching instead of drilling in perforation is more primitive than either Magdalenian or Aurignacian; but at the same time, the technique of fashioning beads, the grinding, drilling, polishing, show that the culture could scarcely be more primitive than Magdalenian. Hence, though geologically contemporary with either of these cultures, the cultural relation remains an open question.

<sup>1</sup> Weidenreich, Franz, "On the Earliest Representatives of Modern Mankind recovered on the Soil of East Asia", *Peking Natural History Bull.*, 13, 3 (1939).

<sup>2</sup> Pei, W. C., "On the Upper Cave Industry." *Peking Natural History Bull.*, 13, 3 (1939).

## THE VICTORIA FALLS HYDRO-ELECTRIC SCHEME

THE Victoria Falls and Transvaal Power Company has recently completed a very successful hydro-electric scheme at the Victoria Falls on the Zambezi River. About thirty years ago a proposal for supplying the Rand with power from the Victoria Falls was projected. The overhead transmission line was to be 700 miles long and the pressure 150,000 volts. Although owing to technical difficulties this project could not be realized at that time, yet the Power Company retained its right to develop the power at the Falls, so that if methods of transmission were improved and developed it might become commercially feasible at a later date. The scheme that has just been completed is the first outcome of that arrangement. It is especially interesting owing to the fact that it is completely automatic.

An article by Mr. H. L. Bazalgette giving a full description of the station is published in the October-December issue of the *English Electric Journal*, the contractors being the English Electric Co., London. The generating station is situated in the third gorge, known as the 'Silent Pool', at a hairpin bend in the river about two miles downstream from the Falls. It contains two 1,000 kilowatt, automatically controlled units, the purpose of which is to generate power for transmission over a distance of about seven miles to the town of Livingstone, until recently the capital of Northern Rhodesia, and also over a distance of about two miles to the Falls Hotel which, with the generating station itself, is in Southern Rhodesia.

In 1936 a comprehensive contract was placed with the English Electric Company for the power station and substation equipment. On March 17, 1938, the new power station was opened by the Governor of Northern Rhodesia, who by simply pressing a button started up the first unit under automatic control. In addition to the two purposes mentioned above, the

plant will be able to supply any small industries arising around the town of Livingstone, which may eventually become the centre of an active industrial area.

The climatic conditions are damp and tropical and were exceptionally trying for the erecting staff, the engine room temperature rising at times to 110° F. Owing to the fact that the site is a famous beauty spot, great care was taken by the Power Company in South Africa to obviate disfigurement, and this has been done so successfully that the power station and penstock are practically hidden by vegetation from passers-by. Beyond a daily visit of inspection, the station runs automatically and is unattended. From the point of view of health the situation of the station would be unsuitable for the prolonged attendance of an operating staff.

Automatic devices are introduced which give protection from sustained over-current, over-voltage, over-speed, alternator field failure, internal faults, overheated bearings, oil failure and if it takes longer than the normal starting time. Any of these would automatically cause the unit to shut down and the main oil switch to 'trip'.

The erection and placing into service of the plant was carried out by C. G. T. Clarke, who spent fifteen months on the site. A very interesting and scientific account of the Victoria Falls, written by him, is quoted in the *Journal*. It was carried out in co-operation with the Survey Department of the Northern Rhodesia Government. Between the Main Falls and the Devil's Cataract there exists a small valley hitherto unseen by man which presents a splendid spectacle of beauty with its carpet of maidenhair fern and overhung by evergreen trees. The spray from Devil's Cataract there serves the glade as a natural water-can, and the water drops