RECENT RESEARCHES ON EARLY MAN IN CHINA. I

LATE CENOZOIC HISTORY OF NORTH CHINA

PTEILHARD DE CHARDIN opens a review[1] of the geological and palæontological evidence bearing on the late Tertiary and early Quaternary epochs in northern China by pointing out that, in the course of the past ten years, a continuous outpouring of new facts has necessitated a constant readjustment of number and relative importance of the successive physiographic stages recognizable in that part of the world, which has to be explained periodically.

Thus, the original conception of the Late Cenozoic of China as a massive and continuous formation, in which the lower and uppermost terms only (Pontian Hipparion red clays and the Pleistocene loess) were explicitly distinguished as two separate horizons, was modified through a succession of discoveries by the conception of the "Sanmenian", an intervening polymorphous complex rather vaguely referred either to the Late Pliocene or to the Lower Pleistocene. It soon became more and more clear, however, that several marked differences in species and genera were separating in the so-called Sanmenian the faunas of Nihowan and of Choukoutien, representing a definite faunal and physiographic break, the former being left in the final Pliocene and the latter representing the true Lower Pleistocene of China. The evidence has now become overwhelming that fundamental changes separate the upper (Choukoutien) and lower (Nihowan) parts of the former "Sanmenian".

Although views are still far from definite, they may be expressed provisionally as follows. Notwithstanding physiographic changes, the Equus-Camelus beds of Nihowan and the underlying pre-Nihowan (Middle Pliocene) have lithological and faunistic affinities. Both are lacustrine in facies and both are characterized by the same 'sub-tropical Asiatic' fauna. By this term it is intended to indicate that in the Middle Pliocene two different faunistic blocks were mixing in the forested steppes of north China—one of south-eastern affinities, including an abundance of Cervulids, and another, a peculiar Central Asiatic block, characterized by a harvest of beautiful, mostly strepticere, antelopes, apparently a special antelope province, parallelizing the modern African province, but separate from it since the base of the Pliocene.

The bearing on the present point is that these two blocks were still thriving in North China after the appearance of such forms (horse, bison, camel) as characterize the Villafranchian of Europe. In spite of many important differences in their respective faunas, the Middle Pliocene and Villafranchian (Nihowan) of North China are marked by the same general topography, the same climate, and the same fundamental types of deer and antelope.

These conditions being realized, it is difficult to escape the conviction that a change of the first magnitude occurred between the end of the Sanmenian (Nihowan) stage of deposition and the beginning of the following 'Choukoutien sedimentation', and that this change corresponds to a positive epeirogenic movement rejuvenating the entire Pliocene topography. Supposing that at the end of the Pliocene the whole of the Asiatic plateau has been moving upward, while a few compartments only—Ordos (?), Fenhotrough, Peking plain—sink between the rising blocks of Mongolia, Shansi, Tsinling, etc., then an increasing number of facts, so far overlooked or unexplained, find a natural connexion and easy explanation, among those mentioned being the desiccation of the Pliocene lakes drained by new-cut gorges, the replacement of the lacustrine tilted or faulted sediments by thick loamy fans sloping down in the basins from rejuvenated ranges, the enormous accumulations of Pleistocene sands and silts (Tientsin, 800 metres; Taiyuan, 300 metres), the first appearance of the modern Hwang-ho, and probably the final separation of Japan from the continent.

As a natural consequence the antelopes die, the Malayan deer and Stegodon retreat southward, a western or northern wave brings new types of deer (Euryceroids, Pseudaxis, etc.), and probably from the south with the water-buffalo, man (Sinanthropus) appears.

Still somewhat African-looking up to the end of Nihowan times, Asia was essentially our present Asia at the dawn of the Choukoutien cycle. This proves the positive reality and gives the measure of the post-Villafranchian break in North China.

Among conclusions which follow, it would appear that in North China, as in France and North India, the first appearance of horse (more and more generally accepted by palæontologists as indicating the base of the Pleistocene in the Old World) antecedes clearly the major diastrophisms which would be the best limit between the Tertiary and Quaternary from a geological point of view; and, therefore, the advantage of keeping the Villafranchian in the Pliocene instead of the Pleistocene should be reconsidered. So far as North China is concerned, the most natural base of the Quaternary is given by the appearance of man on a modernized topography after the Villafranchian.

ORIGIN OF MANKIND[2]

As a result of his researches on the skeletal remains of fossil man found in the cave of Choukoutien, Prof. Franz Weidenreich maintains that the important body of knowledge gained from the numerous specimens of Sinanthropus (structure of the teeth, cranial capacity, variability of type, etc.) call for a radical transformation of our conceptions of the problem of the origin of mankind. The true Anthropoidea on one hand, and the Hominidæ and Australo-Pithecoidea on the other hand, have been derived from a common primitive anthropoid stock. Sinanthropus and Pithecanthropus, representing a pre-human stage of development, belong to the second group. The different specimens of the Neanderthal group represent a higher, and recent man yet a third stage.

Development has been decidedly orthogenetic, and has come about as a combination of primitive and progressive characters. The diversion of mankind into geographic varieties (races) is an old phenomenon

and is traceable so far back as the early stages of development of the Hominidæ. It would be wrong to suppose a polygenetic development of the Hominidæ, as the development of the common group took place only once. But the development has been polycentric, and four centres of the genesis of the Hominidæ can be distinguished—European–Western Asiatic, Middle East African, North Chinese, South-East Asiatic–Sundaic. As the development in these centres took place not at the same time and at different speeds, young and old races are to be found in every stage.

The developmental factors of Lamarckian and Darwinian conception are considered to be of no importance, the essence of evolution being an independent progressive differentiation of the type itself. The phylogenetic development is the result of internal causes, and is, like the ontogeny, an evolution of innate character.

FORERUNNER OF *Sinanthropus Pekinensis*[3]

Certain deductions as to the character of a hypothetical forerunner of *Sinanthropus Pekinensis* are drawn by Prof. Franz Weidenreich from the skeletal material from Choukoutien. The line of argument followed is that Sinanthropus, representing the most primitive hominid known hitherto, and it being possible to connect it with recent man by a continuous line of characteristic types such as Javanthropus, Neanderthal man and the man of Mount Carmel, we may trace a picture, imaginary, but based on ascertained fact, of the forerunner of Sinanthropus in a complete and uninterrupted line of evolution, by attributing to it those specialities which, as we know, have gradually disappeared in the course of human evolution.

Thus, taking the evidence of the brain-case, its main peculiarities in Sinanthropus are the extraordinary lowness, the greatest breadth coinciding with the bi-auricular breadth, thick and far projecting supraorbital tori separated from the receding forehead by a broad and relatively deep furrow, a strong and rounded occipital torus combined with a low inion angle, and finally the location of the foramen magnum in a rather posterior level. The persistence of this bulkiness of superstructure, which in all great apes is a direct and indirect result of the misproportion of the size of the brain-case affording insufficient space for attachment of powerful nuchal and masticatory muscles, but is reduced in extent and bulkiness as the brain-case is enlarged in the course of the evolution of more advanced human types, indicates that in regard to this feature the forerunner of Sinanthropus could not have been very different from the great apes of to-day.

As to the general configuration of the brain-case, neither the relation between length and breadth, nor that between length and height, could have been considerably different from that of Sinanthropus, in whom these ratios are about the same as in the great apes.

The character of the forerunner is also suggested by the teeth, in which Sinanthropus has several features in common with the apes, but differs completely from recent man. As human evolution proceeds, the teeth undergo a reduction in size, height, length proportions and a simplification of their patterns. It is probable, therefore, that the characteristics of the teeth were still more developed in the forerunner. The canines, however, require special consideration, and there are indications that the crowns of both upper and lower canines may have been much higher in the forerunner, as is characteristic of the anthropoids of to-day. Further, the dental arcade of Sinanthropus suggests that in the forerunner the jaws were more salient.

All these facts thus outlined lead to the conclusion that the immediate forerunner of Sinanthropus was an anthropoid primate the general appearance of which with regard to skull, jaws and teeth did not differ in principle from that of female anthropoids of to-day. To know the special relations of this anthropoid-like hominid to the ancestor of recent anthropoids, we must compare Dryopithecus or Sivapithecus with Sinanthropus; but in actual fact the closest resemblance is found in neither of these, but in Australopithecus, which, therefore, must be regarded as representing an anthropoid with some relation to the anthropoid forerunner of Sinanthropus.

Such other parts of the skeletal structure of Sinanthropus as are known—or rather the collar-bone and the humerus fragment specifically—indicate that his immediate forerunner probably had abandoned the arboreal mode of living; and judging from the size of brain-case, jaws and teeth, could not have been a pygmy.

The question as to which of the anthropoids of to-day Sinanthropus bears the closest resemblance is not so easily answered as may be imagined. In some peculiarities of the teeth he approaches the gorilla (cingulum), in others (for example, wrinkles) the chimpanzee, and then again the female orang in 'taurodontism'. But when reviewed in general among all anthropoids, recent and fossil, known hitherto, Australopithecus seems to be the closest relative of Sinanthropus and his assumed forerunner.

DURATION OF LIFE IN FOSSIL MAN IN CHINA[4]

Investigation of the evidence of individual age in the remains of fossil man discovered at Choukoutien corroborates the conclusion at which Prof. H. Vallois arrived in his study of similar evidence relating to Neanderthal man, that only rarely, if ever, was death due to natural causes, and that in consequence the duration of life was not prolonged. In the Sinanthropus population, now numbering approximately thirty-eight individuals, fifteen, or 39·5 per cent, were children up to the age of fourteen years old, three skulls may have belonged to individuals aged less than thirty years old, three may range between forty and fifty years, and only one skull, that of a woman, unfortunately in a fragmentary condition, may have been that of a really old individual of more than fifty years, or even sixty years of age.

It is interesting to note that in the Pithecanthropus group, the nearest relatives to Sinanthropus, complete fusion of the sutures of the skull cap points to an age of more than fifty years, while the recently discovered third skull (1938) belongs to a juvenile.

It must be remembered that these conclusions as to age are subject to the reservation that it is assumed that the eruption of the teeth and the fusion of the sutures correspond in time to the respective processes in modern man, though it is known that in the anthropoids they take place at a much earlier age than in man. This, however, would only serve to confirm the conviction that the actual duration of life in Sinanthropus was shorter than in modern man.

With regard to late palæolithic man of the Upper Cave, of the seven individuals there were three

juveniles, a fœtus or new-born infant, a child of about five years, and one of an age of fifteen to twenty years. Of the four adults, two, probably women, may have been slightly more than twenty years of age; the third is indeterminate, but probably not advanced in years, and the fourth was an old man of at least sixty years. Thus in the late palæolithic population also old age was seldom reached.

In both groups, Sinanthropus and late palæolithic man, the brevity of duration is to be attributed to the conditions of primitive life. In both groups, also, the cause of death is clear. It was due to violence—wounds inflicted by club and axe or spear as the case may be—whereas the members of the Pithecanthropus group died by accident as the consequence of a volcanic eruption.

Neither bones nor teeth show evidence of disease, while the repair of fractures and the ready formation of secondary dentine points to greater powers of recuperation than in modern man. Further, the absence of decay in the teeth suggests a resistance to bacterial infection which may account for the absence of disease, with the doubtful exception of an arthritic affection in the vertebræ of the old man of the Upper Cave. In undomesticated animals a natural power of resistance to disease and influences of a detrimental character destroying the efficiency of the organs apparently compensates for the dangers of attack and extermination by their enemies, and the same may hold good of primitive man.

[1] Teilhard de Chardin, P., "The Post-Villafranchian Interval in North China", *Bull. Geol. Survey, China*, **17**, 1 (1937).
[2] Weidenreich, Franz, "Tatsachen und Probleme der Menschheitsentwicklung", *Bio-Morphosis*, **1**, 1 (1938).
[3] Weidenreich, Franz, "The Forerunner of Sinanthropus Pekinensis", *Bull. Geol. Soc. China*, **17**, 2 (1937).
[4] Weidenreich, Franz, "The Duration of Life of Fossil Man in China and the Pathological Lesions found in his Skeleton", *Chinese Medical J.*, **55** (1939).

EIGHTH AMERICAN SCIENTIFIC CONGRESS

THE Eighth American Scientific Congress will be held in Washington, D.C., during May 10–18, 1940, under the auspices of the Government of the United States of America. Invitations on behalf of the President have been extended to the Governments of the American republics members of the Pan American Union to participate in the meeting, and scientific institutions and organizations are being invited to send representatives.

On April 14, 1940, the Pan American Union will celebrate its fiftieth anniversary. Although the Eighth American Scientific Congress will meet a few weeks after the anniversary date, the Congress will be one of the important phases of that celebration. It is hoped that the presence in Washington of many distinguished scientific workers of all of the American republics as participants in this Congress will serve as one of the many tributes to the Pan American Union for its work in the fostering of goodwill and better understanding among the republics of the western hemisphere.

This series of inter-American meetings, serving as a medium for the exchange of scientific information of particular interest and importance to the Governments and peoples of the Americas, dates from the first Latin American Scientific Congress held at Buenos Aires in April 1898 in commemoration of the silver jubilee of the Argentine Scientific Congress. The Second Latin American Scientific Congress was held at Montevideo in 1901 and the Third at Rio de Janeiro in 1905.

In 1908 the Government of Chile, which had offered to act as host to the Fourth Latin American Scientific Congress, enlarged the scope of the meeting and invited the Government of the United States of America to participate. At the same time, the name of the meeting was changed to the First Pan American Scientific Congress.

The Second Pan American Scientific Congress was in session in Washington, D.C., during December 27, 1915–January 8, 1916, and inspired a wide interest on the part of the Governments and scientific workers of the other American republics. A total of 2,566 participated in the sessions, including ninety official delegates of twenty Governments and a hundred and thirty representatives of scientific organizations and institutions in the other American republics.

The Third Pan American Scientific Congress was held at Lima, Peru, in December 1924 and January 1925. The fourth meeting in this second series of scientific congresses was held in Mexico City in September 1935, and in recognition of the continuity of the preceding conferences was designated as the Seventh American Scientific Congress. A resolution adopted at the Seventh Congress reposed in the governing board of the Pan American Union the responsibility for the selection of the date and place of the next meeting. In due course it was decided that the necessary steps would be taken to arrange for the convening of the Eighth Congress in Washington in connexion with the celebration of the fiftieth anniversary of the founding of the Union.

An organizing committee has been set up including the Hon. Sumner Welles, Under Secretary of State (*chairman*), Dr. Warren Kelchner, acting chief, Division of International Conferences, Department of State (*vice-chairman*), and Dr. Alexander Wetmore, assistant secretary of the Smithsonian Institution (*secretary*), to collaborate with the Department of State in formulating definite plans for the Congress. Dr. Wetmore has been appointed also as Secretary General of the Congress.

It has been decided that the Congress will be divided into the following sections, each to be in charge of a chairman, assisted by a vice-chairman, secretary and section committee: I, Anthropological Sciences; II, Biological Sciences; III, Geological Sciences; IV, Agriculture and Conservation; V, Public Health and Medicine; VI, Physical and Chemical Sciences; VII, Statistics; VIII, History and Geography; IX, International Law, Public Law and Jurisprudence; X, Economics and Sociology; XI, Education.

In accordance with established precedent at inter-American conferences, the official languages of the Congress will be English, Spanish, Portuguese and French. Papers may be submitted in any one of the official languages and appropriate arrangements will be made for the presentation of these papers, or résumés thereof, in the other official languages of the Congress.