

## THE GLABELLA PROMINENCE OF *SINANTHROPUS* SKULL. A COMPARATIVE STUDY

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### (ABSTRACT)

The purpose of the present note is to provide a more accurate method for determining the quantitative degree of the glabella projection of *Sinanthropus pekinensis* in comparison with other hominid skulls, fossil and recent.

Two new absolute measurements and an index are designed for the purpose in view. The materials dealt with consist of 4 specimens of male adult gorillas, 49 paleolithic skulls of different periods, as well as 3901 recent crania representing some principal races in the world.

It is evident from the figures that the chord-subtense index does offer a clear indication as to the course of evolution. According to the average values, there is a sharp distinction between different human groups: *Sinanthropus*, Neanderthal, the upper paleolithic man and recent one.

The average index of *Sinanthropus pekinensis* and *Pithecanthropus* is 27.3 which is significantly higher than that of Neanderthal group (20.5). It also distinguishes clearly the upper paleolithic man from recent races. The male mean of the former is 18.3 and that of the latter, 12.3.

The said index is of the same nature as measures of the flatness of the facial skeleton and certain measurements of the malar bones. Hence it is suggested that this index might be included advantageously in the routine description of the fossil as well as recent crania.

## ON THE RACIAL TYPE OF UPPER CAVE MAN OF CHOUKOUTIEN

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### (ABSTRACT)

The three skulls found from the Upper Cave of Choukoutien were considered by Weidenreich as Mongoloid, Melanesoid and Eskimoid respectively. The present author

## ГЕОМОРФОЛОГИЯ И ЧЕТВЕРТИЧНАЯ ГЕОЛОГИЯ РАЙОНА ПЕЩЕРЫ ГИГАНТОПИТЕКА БЛИЗ ГОРОДА ЛЮЧЕН В ГУАНСИСКОЙ АВТОНОМНОЙ ОБЛАСТИ НАЦИОНАЛЬ- НОГО МЕНЬШИНСТВА ЧЖУАН

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(Резюме)

Пещера гигантопитека расположена в изолированной горе из известняковых пород на юге от города Лючен. Относительная высота пещеры около 110 м. над уровнем реки Люцзян.

Этот район сложен доломитовыми известняками карбона. Рельеф данного района имеет вид поля, через которое протекает река Лю-цзян. На берегах реки распространены речные террасы различными высотами— 110—120, 85—90, 35—40 и 20 м. На террасах можно наблюдать гальки из кварца и красно-желтые суглинки. На более высоких террасах гальки цементированы в конгломерат. Кроме того, на периферии гор наблюдаются четырёхступенные пещеры, соответствующие вышеуказанным террасам по высоте. Пещера гигантопитека соответствует ступени высотой 110 м.

В отложениях в пещере гигантопитека можно встретить немногочисленные речные гальки из кварца и чёрные тонкие гумусовые слои с мощностью несколько сантиметров. Остатки гигантопитека и других ископаемых животных перемещиваются вместе. Таким образом, отложение в пещере напоминает нанос, принесенный сюда водой после образования пещеры.

В этом районе верхние пещеры—маленькие по объёму и плохие по сохранности, но низшие пещеры—большие по объёму и по численности. Они могут четко сопоставляться с террасами. В остальных районах провинции Гуанси автор также встречала пещеры над уровнем реки 5—40 м с фауной среднего плейстоцена. Их можно сопоставлять с низшими пещерами в данном районе. Таким образом, пещера гигантопитека образовалась раньше, чем низшие пещеры, примерно в нижний плейстоцен.

На основании изучения пещер и террас следует отметить, что данный район прерывисто поднимался. В связи с малой мощностью террасовых отложений и разрушением остатков в транспортировке на террасах трудно найти остатки ископаемых, но в пещерах прилежащих районов имеется возможность найти их.

analysed the different metrical and non-metrical characters of these skulls and concluded that they are all representatives of the primitive Mongoloid race.

## ANCIENT HUMAN SKELETAL REMAINS FROM LINCHIH VILLAGE, EASTERN TIBET

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(ABSTRACT)

The human skeletal remains including a skull cap, a piece of manubrium of sternum and a left calcaneus were found in a pit situated on the hill near Linchih village (E.  $94^{\circ}3'$ , N.  $29^{\circ}5'$ ) eastern Tibet in December, 1958. No artifact was found at the site. They belong to a young female individual and possess some primitive characters such as the more posterior position of bregma, thicker parietal bone, robust mandible and teeth etc. Judging from the morphological features, they seem comparatively closer to the Mongoloid skulls of the late Neolithic or Aeneolithic age. And they are probably related to the A-type of Tibetan skull by the brachycephalus, the lesser value of palatine breadth and the least frontal breadth.

## ON THE DISCOVERY OF THE PALAEOLITHES AT KULUNG, YANGCHENG, SHANSI

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(ABSTRACT)

The paleolithic locality is located at Pigaiting, Chaochenshan, Kulung Village in the district of Yangcheng. The implements were found in the sandy reddish loams. The materials are black flints. The stone artifacts include nuclei, flakes and tools.

The flakes are mostly long and thin. According to the retouching and the scars left by flaking, probably they were made by indirect flaking technique.

Two kinds of tools are known, the points and the scrapers. The points are made of flakes reworked uni-facially. The trace of retouching on the scrapers is rather straight, the scars are deep and long.

According to the characters of the nuclei and flakes, the writer provisionally considers the age of this locality as late Paleolithic or slightly earlier.

(Translated by M. Z.)

## THE STONE ARTIFACTS OF *SINANTHROPUS* AND ITS RELATIONSHIP WITH THE CONTEMPORARY CULTURES IN NORTH CHINA

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(ABSTRACT)

The Stone Artifacts in the cave deposits of *Sinanthropus* belong to the flake industries. Although the Core-tools are also present in our collection but quite few in number.

The classification is as follows:

### (1) **Pitted or bruised boulder**

A large number of this boulders were collected from the middle upper part of this deposits. These were used for crushing the Quartz "Bipolar" implements.

### (2) **Choppers**

Most of choppers are made on either flat, or rounded river pebbles of sandstone. Tools with alternately flaked edges are comparatively rare, and those flaked only uniaxially very common.

### (3) **Points**

Made of flake of quartz and chert retouched chiefly uniaxially. This is a rare type, only 67 pieces in our collection.

### (4) **Scrapers**

This is a common type, consisting of linear, concave, convex and disc forms of various size (3 to 5 cm in length).

### (5) **"Bipolar" Implements**

Bipolars are common also. They have been crushed by two boulders and splitted at two opposite short ends, possibly used for scraping or cutting.

After examining the typology of tools and its chipping work, my opinion is that the culture of *Sinanthropus* is a well-developed one, although it is still very primitive.

Fortunately, a great number of palaeolithic localities have been found in Southern Shansi and its adjoining parts in Shensi and Honan provinces. These Palaeoliths are dis-

covered in the deep part of Reddish Clay or in the fluvial deposits.

Although some Core-tools do occur, these industries are generally made up of flakes.

The flake is often large, with angle of striking generally larger than 100 degrees, and always using the natural flat surface of pebble as striking platform. Most of the choppers are re-worked only on one face of pebble and made of large flakes. Some of them are worked with hammer stone and sometimes are worked on the anvils. Pointed implement is roughly retouched on the dorsal surface. These characters are similar to that of *Sinanthropus* cultures.

It is probable that as early as Lower Palaeolithic times, cultures with flake industries were developed. Although the Core-tools occurred, but quite few in number. On the other hand, judging from the occurrence of similar type of tools, it shows that the culture of *Sinanthropus* might have a much wider distribution in North China.

## THE PALAEOOLITHS OF TUNGHSING, KWANTUNG

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(ABSTRACT)

From June to August in 1959 two paleolithic sites were discovered respectively at Yapushan, Shichiao Village and Malangchuan-shan, Malangchi Village, both in the district of Tunghsing, Kwantung Province.

The Yapushan locality is located on a hill on the eastern side of the junction of two streams, the Shichiao and the Wangtso. The section of deposits are: (1) top soil; (2) shell bed with potteries and neoliths; (3) bed with shells and concretions with abundant paleoliths (?); (4) red sandstone basement rocks. The Malangchuan-shan locality is situated about 5 km from the former one and has similar stratigraphical section. But no cultural remains are found in the second bed, and the lithic remains in the third layer are not so abundant.

These two sites yield paleoliths of the same culture and probably of the same age. Their characteristic features are that both consist mainly of core implements including hand axes, chopper etc. Most of the implements retain the original surface of the pebbles. All the fossils found in association with the artifacts are living species including *Rusa*, *Bubalus* (2 spp.) and molluscs (*Cytherea*, *Arca*, *Ostrea*, *Viviparus*, *Semiculcoopica*, etc.)

The paleoliths as a whole differ from the culture of North China which is dominating by flake implements. They are probably closely related to paleoliths of Indo-China in which the core implements dominate.

(Translated by M. Z.)

## ON THE AGE OF THE CHIPPED STONE ARTIFACTS IN KWANGSI CAVES

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(ABSTRACT)

The Shell bearing cultural deposits in Kwangsi Caves described for the first time by Teilhard and others were encountered again abundantly in caves of the same region by the prospecting teams of 1955—1956 for cave deposits and fossils organized by the Institute of Vertebrate Paleontology of Academia Sinica. A fragmentary human skull was discovered in the deposits more or less of similar nature in a cave in Chilinshan of Laiping county.

The so-named deposits in caves of Kwangsi, grayish to yellowish in color and partly consolidated by calcareous crystals, contain flaked pebble artifacts, burnt bones, ashes and charcoal, and a great amount of fresh water gastropods shells left by ancient men after their soft parts being ate. In many caves the flaked pebble artifacts were found in association with polished stone axes, and rarely with pot-sherds so the age of these chipped artifacts can be ascertained as Neolithic. But in five caves, though we have searched thoroughly, no polished stone artifacts nor pot-sherds have been met. These five caves are: Kaitotung, Bailiantung, Siduoyan, Chenchiayan and Aitung.

After our careful studies of the chipped stone artifacts, it seems to us that the so-called the gray cultural deposits of Kwangsi caves were deposited probably in two different times: most of them Neolithic in archaeological age and those in the above mentioned five caves, late Palaeolithic in age. More detailed explorations of the caves and studies of the artifacts are necessary to solve this problem.

## AGE OBSERVATION ON THE MAMMALS OF GIGANTOPITHECUS CAVE OF LIU-CHENG

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(ABSTRACT)

A great deal of materials of Mammals have been discovered in the *Gigantopithecus* cave and the excavation of the locality is still in continuation. This paper is an age-observation of the fossils of the suids, rhinoceroses and elephants.

The fossils found in *Gigantopithecus* cave are, for the most part, isolated teeth and incomplete mandibles. Our observation concerns mainly with the growth and wearing

of the teeth. According to the stage of growth and degree of wearing of the teeth five different stages or age groups are recognized.

The preliminary result is that the teeth of the suids for the most part belong to the young individuals and those of the rhinoceroses and elephants are of the juvenile.

Therefore, it is inferred that the fossil remains found in the cave were those of the animals killed by the large Carnivores predators and brought into the cave.

## PRESERVATION OF THE FOSSILS IN THE GIGANTOPITHECUS CAVE, LIUCHENG, KWANGSI

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(ABSTRACT)

All the fossils collected from the cave in 1957, 1958, 1959, were carefully examined with regard to their mode of preservation and occurrence in the deposits.

The fossils from the cave include many living orders of mammals, mostly represented only by isolated teeth, skulls, lower jaws, and limb bones are extremely rare.

The factors which are responsible for the various modes of preservation of the fossils are: (1) destroying agents of the animals, (2) those of the plants, (3) action of the ground water, and (4) diagenetic processes. Among the destroying agents of the animals the gnawing of the bony material by the rodents played the predominating part as the case seen in all the cave deposits of South China.

The so-called "degree of fossilization" indicated by the specific gravity of the fossils and its reliability in determining the relative age of the fossils are discussed. The fossils of the *Gigantopithecus* Cave is as a whole of a higher degree of fossilization.

Fossils representing animal types of different habitats are included in the fauna. Their sources are rather complex. Besides those that are originally cave dwellers, most of these were brought by the beasts of preys.

## THE LIVING ENVIRONMENT OF THE CHINESE PRIMITIVE MEN

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(RESUMÉ)

In the present article, the author is attempting to figure the living environment of the fossil men of different ages so far known in China, basing mainly upon the general results

obtained from the studies of the accompanied mammalian fauna and the conditions of the geological formation in which the human fossils were unearthed.

According to the opinion of the author during the Age of Man or Quarternary epoch, China could be divided into two main areas more or less by the mountain range, Tsingling.

In the area south of Tsingling, generally called South China or sometimes South of the Yangtze, the Pleistocene deposits are known chiefly in caves. More than twenty years ago it was known that in the South China caves one mammalian fauna, generally named as the *Ailuropoda-Stegodon* fauna was recognized and usually regarded as one single geological age, Middle Pleistocene.

After the Liberation of China, exploration of the South China caves has made a rapid progress and many important fossils of primitive men, as well as of man-like ape, were discovered. According to the new studies of the mammalian fossils found in association with the remains of primitive men, it seems the so-called *Ailuropoda-Stegodon* fauna already came to exist as early as at Early Pleistocene and survived with certain modification to middle Pleistocene and even as late as to Late Pleistocene. The living mammals in this part of China, especially in Yunnan, Kwangsi, also in a great part are the descendants of the members of the *Ailuropoda-Stegodon* fauna and very much related with the Malayan fauna of the present day. As shown by the mammalian fauna, in South China, during the whole Quarternary time, it seems that it has little been changed, so far as the climate and geography are concerned. In other words, this is meant that during the entire Quarternary age, the climate and geography of South China were scarcely different from those of to-day in Malaya or the provinces Yunnan and Kwangsi.

The oldest *Ailuropoda-Stegodon* fauna discovered in South China is now known as that found together with Kwangsi giant ape, or *Gigantopithecus*. By the recent studies of the *Gigantopithecus* fauna, it comes to the opinion that the Kwangsi Giant Apes were lived in a warm and wet climate and in a region where forests flourished in the low land, which furnished the surplus nourishment as the fruits and nuts for the apes and the bare land and grass-land existed in the hilly areas, where Bovidae and Ovidae lived. Possibly due to the favourable living condition the Kwangsi apes involved into gigantism primarily in Villafranchian time of South China but at last, coming to the Middle Pleistocene, they become extinct, on account of that the forests were greatly destroyed by the ignorance of the apes and gave no sufficient supply of the nourishments for them and as well as they did not develop into omnivorous diet and work by two hands as the human beings.

However, a certain group of the cousins of *Gigantopithecus* in a favourable environment developed along the evolutionary line of hominid. Firstly it came to the stage of Ape-man which is only known by a certain isolated teeth at the present time, but his presence in South China, as the correspondings of *Sinanthropus* in North China, is beyond any doubt.



Equivalent to the Neanderthal man of Europe, it is known in South China as "the Maba Man" from a cave of Kwangtung Province. The skull of Maba Man was found also in association with the mammalian fossils almost identical with the so-called *Ailuropoda-Stegodon* fauna and its age is supposed to be Late Pleistocene. The Ch'angyang Man is discovered in a cave in Hupeh province together with also *Ailuropods-Stegodon* fauna. Both the Liukiang Man and the Tzuyang Man are grouped into *Homo sapiens fossilis* but they were found also associated with *Ailuropoda* and *Stegodon*.

As indicated by the characters of the Mammalian fossils, it seems during the life times of the various kinds of the primitive men in South China, the climate was always warm and wet almost similar to the modern time. Such a living environments is quite different as compared with the fossil men known in North China.

In North China, the known earliest fossil man is the celebrate "Peking Man" or *Sinanthropus* who lived in the Choukoutien cave near Peking in Middle Pleistocene or about half million years ago.

When *Sinanthropus* lived in the Choukoutien region the forests were not very densely scattered on the mountainous regions, north of Choukoutien. In the forests the Tertiary survivor, the saber tooth tiger (*Machairodus*) roared and the robust maccaques (*Maccacus robustus*) jumped from trees to trees. Wild bear and sika deers wondered under the big trees.

On the south-east of Choukoutien, there is the present Hopei alluvial plain which began to accumulate as early as in the time of Peking Man. At Middle Pleistocene time Sanmen horse and a certain *Gazella* galloped there. And a kind of Deer ornamented by large, flat and beautiful antlers came to the plain seasonally. Near the *Sinanthropus* cave there was one small river with clear and running water through the whole seasons of a year. Near by the river, water buffalo and merck's rhnioceros lived on the water grass and hided in the dense forests near the water.

Most of these animals came to the river for drinking, where the Peking Man hunted them, mainly depending upon his collective force and wisdom. As well known to scientists, *Sinanthropus* was already able to control and use of fire and capable to work and utilize stone artifacts. This is the reason to explain why he could start a hunting life, in addition to his fruit collecting life, and overcome the difficulties which the nature loaded upon him. Therefore, the *Sinanthropus* could lived in the same Choukoutien cave for a long time and survived.

After a long time, the *Sinanthropus* migrated probably to some other place such as along a certain river in the Taihang mountain range. When he inhabited in the new territory, it is expected that, his morphological feature might have changed and advanced to the Palae-anthropus stage.

In North China, the "Tingsun Man", next to and much more advanced than the *Sinanthropus* was discovered along the Fenho River in Shansi Province and west of

the Taihang Range. As learned from the Mammalian fossils found together with the Ting-Tsun man, his living environment was not much different from that of the Peking Man. When the Ting Tsun Man lived along the Fenho River, the climate was somewhat warm for the presence of many species of elephants, including that survived from older age (Middle and Early Pleistocene) and the very advanced type as that approaching the living Indian species. Many Late Pleistocene and living forms as *Bos primigenius*, and wild horses lived in the vicinity. The water in the Fenho River of that time, unlike that of present time, was deep and relatively calm, so that it enabled fishes of large size and mollusks of Southern type living in the deep part and shallow water near the river bank, while *Planorbis* floating on the surface.

The Ting Tsun Man worked heavy flake-tools from the black hornfels and fashioned by better workmanship and into better shapes than the Peking Man did. Very probably the Ting Tsun Man hunted also on river bank of the Fen River when the animals came for water.

Shortly after, or contemporary to, the Ting Tsun Man the world of North China had have a great change. The climate became cold and dry and high altitude wind blowed from the Mongolian Plateau. Fine and yellow materials coming from a remote distance precipitated in North China. This was resulting the formation of the well known "Loess" of North China.

Such a climate was certainly very hard for many animals and also for human beings to live. The relatively abundant animals found in Loess are the ostrich and a certain species of elephant (*Elephas namadicus*). However, a certain amount of water falling in rain and snow was certainly not possible to be deprived. The falling water would accumulated in some low land and ran into rivers. So along the river bank and near the swampy area, most of the animals would gathered and become a favored hunting ground for primitive man. In North China, this is known as the Ordos man who lived along the Sjara-osso-gol River in the present Mongolian desert and is regarded as contemporary to the Loessic time.

After the Ordos man being disappeared, in the Choukoutien region, another type of human, *Homo sapiens*, came out and lived in the Upper Cave on the top of Choukoutien Loc. 1. Hill. As indicates by the fossils found together with the Upper Cave Man, the climate of Choukoutien region became again a little warm. Because we found several forms of mammals which are now restrictly living in the south, such as the hunting leopard in India and the chivet-cat in South China. The humidity of climate of that time is indicated by the occurrence of bones in this cave of the large sized grass-carp, which was swimming in the deep water in the near-by ponds or lakes.

Due to the advancement of the technique of the tool-making (chiefly by bones and antler) and the increase of productions, the Upper Cave Man was possibly coming to a stage of necessity to have a certain form of social organization, that is the so-named "primitive society".

Probably at the same time, in North East of China, the climate was cold and snow had fallen frequently, therefore, there and at that time, cold loving animals such as the woolly rhinoceros and mammoth became populated. Of course many steppe animals, such as the wild horse, bovine, might also come to this cold area in warm and temperate seasons of a year. The advanced types of man might have lived here but so far we did not discover yet any human fossils of doubtless origin in this part of China.

In Inner Mongolian, during the last two years, numerous well fashioned quartzite implements were discovered and by their characters of workmanship, certainly they are late Palaeolithic in age. This proves that in the middle-south part of Inner Mongolia, during the late Palaeolithic time, human was also densely populated and lived under more or less the same environment as the Ordos Man.

## DISTRIBUTION OF FOSSIL PRIMATES IN CHINA

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(ABSTRACT)

The geographical and stratigraphical distribution of some of the more important fossil primates in the Holarctic region are briefly reviewed. Based on the data obtained from an analysis of the Mammalian faunas and the paleogeographical factors involved, the writer points out the area and geological horizons in which primate fossils can be searched for with good prospect.

## SOME NEW LOCALITIES OF PLEISTOCENE MAMMALS IN SHENSI

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(ABSTRACT)

In the recent years Pleistocene mammalian fossils were found at many places in the province of Shensi. Some of these which have been identified by the writer include:

- (1) *Rhinoceros* cf. *sinensis*, cf. *Bubalus* sp. from the cave deposit of Shanyang;
- (2) *Stegodon orientalis* from Fenghsien;
- (3) *Rusa* sp., *Gazella* sp. from Chenku;
- (4) *Rusa* sp., cf. *Bubalus* sp. from Yanghsieh;

(5) *Caelodonta antiquitatis* from the lower sands at Toutaoyuan, Yenyang.

All these fossils are known to occur for the first time in these districts. With the exception of the woolly rhinoceros of Yenyang all the others are the elements belonging generally to the middle Pleistocene *Ailuropoda-Stegodon* fauna of South China, therefore, it is interesting to find them in the Tsingling Mountains.

(Translated by M. Z.)

## THE DISCOVERY OF NEOGENE MAMMALS AT LINGTONG, SHENSI

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(ABSTRACT)

Some molar teeth of *Hipparion* were found recently in the white sandy gravel beds underlying the red sandy clays outcropped at the foot of Lishan in Lingtong, Shensi. This gives evidence that the beds under consideration is of Neogene age instead of Cretaceous or early Tertiary as was thought before by the geologists.

(Translated by M. Z.)

## RE STUDY OF THE CKT *SINANTHROPUS* DEPOSITS

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(ABSTRACT)

In the year 1959, the author was entrusted by the Institute for re-studying the CKT *Sinanthropus* deposits, when he made a survey of Quaternary geology in the CKT region. After he has studied the profiles left on the eastern and western parts of the deposits and compared with the works done by the previous investigators, he comes to a new idea of the subdivisions of the stratigraphy of the CKT Loc. 1 deposits. His opinion is summed up as the following and subjected to discuss.

According to the opinion of the present author, the fossiliferous deposits of CKT Loc. 1 better be subdivided into six main geological layers which are distinguished both

in lithological characters and in the condition of deposition. The layers are counted from the bottom upward, instead of from the top downward, as did the previous authors.

Layer I includes the basal gravels of the CKT Loc. 1 cave and their equivalent red clay and coarse sand layer. This layer corresponds to the basal gravel divided by Prof. Chia Lan-po, when he led the excavation in 1949, 1951 and 1958.

Layer II or the Lower Breccia consists of red sandy clay and strongly weathered limestone fragments. It is equivalent to the Layer 10 subdivided by the early investigators and to the "group 3" proposed by Chia in 1958.

Layer III or the Middle Breccia includes several thin layers of ashes and calcium cemented sandy clay layers. It was named previously as Layers 8 and 9 and the lower part of group 2 of Chia.

Layer IV Sand and Breccia layer of coarse sands and breccia. It was called as Layers 6—7 before the Liberation and the middle part of group 2 of Chia in 1958.

Layer V Ash and stalagmitic crust Layer. It is composed of a thick layer of ash (3—5 m) above and a hard stalagmitic crust below. It is the subdivision as Layer 4 and 5 of earlier publications and the upper part of group 2 of Chia.

Layer VI the Upper Breccia consists of unweathered limestone blocks and fragments cemented by yellowish clay. Ash layers occur from place to place. It corresponds to Layers 1—3 including Locus H of earlier publications and the group 1 of Chia.

It seems to the present author that the above mentioned six layers were formed under quite different conditions, for example, either under cold and dry or under hot and wet climate, and even at the time when the cave was flooded by underground water.

The geological ages of these layers may be explained by the following table:

Layer VI } Layer V } — Late Middle Pleistocene ( $Q_2^3$ ) Layer IV }
Layer III } Layer II } — Early Middle Pleistocene ( $Q_2^1$ )
Layer I — Early Pleistocene ( $Q_1$ )

## ON THE AGE OF BASAL GRAVEL OF CKT *SINANTHROPUS* SITE, OF THE "UPPER GRAVEL" AND THE "LOWER GRAVEL" OF THE CKT REGION

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(ABSTRACT)

The Upper Gravel is found on the top of CKT Loc. 1 hill and about 70—75 m above the present stream bed; the Lower Gravel is situated about  $\frac{1}{2}$  km north east of Loc. 1, on the west side of the railway and about 12 m above the lowest level of the present stream bed; the Basal Gravel is a layer of deposits in the Loc. 1 cave. When the author worked in CKT for making a Quarternary study in the vicinity, he comes to a certain idea concerning the age and the origin of the above mentioned three Gravels. The author's idea is summarized as in the followings:—

### (I) The Lithographical Character and the Origin of the Gravels

#### (1) The Upper Gravel

The upper part of the Upper Gravel consists of coarse sands strongly consolidated by calcareous crystals; the middle part contents weathered medium sized pebbles, and the lower part is composed of yellow fine sands and intercalated by thin clay layers. According to the fossils found from the upper part it seems to be deposited in a big cave now already eroded away and not by running water of an ancient river.

#### (2) The Lower Gravel

Its upper part is composed of unweathered pebbles and gravels filled by sands and red clay; while its lower part of strongly weathered gravels, cemented by soft matrix. It was formed by river water.

#### (3) The Basal Gravel

The Basal Gravel of CKT Loc. 1 cave consists blocks of weathered gravels, gravels, sand and red clay. The gravels and a part of the red clay were coming from the outside of the cave and a part of the red clay was formed in the cave under warm and wet condition.

### (II) The Age of the Gravels

The chronology of the three Gravels, according the Quarternary studies of the CKT regions, can be arranged in the following table:

Horizon		Geological Age	Lithography
Lower Gravel	upper part	$Q_3$	Sand, red clay and gravels
	lower part	$Q_1$ or older	Weathered gravels
Basal Gravel		$Q_1$	Weathered gravels sands and red clay
Upper Gravel		$N_2$	Calcareous sandstone, gravels and yellow sands and clay

## NEW MATERIALS OF PALEOLITHS FROM INNER MONGOLIA

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### (ABSTRACT)

Sixty-eight localities in central part of southern Inner Mongolia with paleoliths investigated in 1959 were discussed. They were found in the second terrace of the Huangho and comparatively rude and primitive in technique. The age of these lithic remains is preliminarily considered to be Late Pleistocene, but no paleontological or other evidences are available.

From forty-one of these localities the lithic implements were collected from the ground surface. The characters of the implements are comparatively advanced. As no neoliths were found in association with them, they can probably be regarded as remains of the late paleolithic age.

From the rest of the localities large quantity of finely made points, scrapers and chopping tools made of large pebbles with definite types were collected, but they were present in mixture with microliths. Many of these points, choppers and scrapers are unknown in the Neolithic cultures, and resemble in certain aspects those of the middle late paleolithic age. Besides, most of these implements are crusted with a coat of calcareous material which is, on the other hand, absent on the microliths. Therefore, it seems to be more reasonable to believe that they belong to different ages and that the points, scrapers and larger chopping tools are remains of the late paleolithic age.

(Translated by M. Z.)