

*Sinanthropus.*

AT a joint meeting of the Sections of Geology and Anthropology of the British Association at Bristol, Prof. G. B. Barbour, of the Department of Geology, Yenching University, gave a very interesting lecture on "The Geological Background of Peking Man (*Sinanthropus*)."

Chou-kou-tien, where *Sinanthropus* was discovered in an abandoned limestone quarry, overlooking the re-entrant margin of the Yellow River delta plain, lies 37 miles south-west of Peiping (Peking), on a branch of the Peking-Hankow railway. The fossiliferous deposit was first reported by J. Gunnar Andersson in 1921, and in the following year Otto Zdansky discovered mammalian material, reporting in 1926 that it contained hominid teeth. In 1928 B. Bohlin, C. C. Young, and W. C. Pei found an adult right ramus, with three molars *in situ*, together with part of another jaw and many skull fragments. In 1929 W. C. Pei, a young geologist on the staff of Yenching University, discovered first fragments of a skull, since reconstructed, and later an uncrushed adult skull. This latter discovery occurred at 4 P.M. on Dec. 2, the last day on which it was possible to work because of the increasingly wintry weather. The skull was embedded in a travertine matrix, and Prof. Barbour described the infinite care and skill with which Dr. Davidson Black removed the matrix, taking repeated casts and photographs, in an effort to ensure that the fullest records should be available for future workers.

The skull is that of a young adult, for the sutures are deep and unfused. The lower face is apparently missing, but the ear-hole and the back of the skull are present; the jaw sockets are massive, suggesting marked biting capacity. Dr. Davidson Black considers that the length of the skull approximates to that of *Pithecanthropus*, which it also resembles in its massive brow-ridges, but the distinct frontal swelling and the development of slight parietal bosses mark it off from the Java skull. A feature of importance in the site is that remains of at least ten individuals have been found, and, curiously enough, all skeletal parts so far recognised belong to the head.

In addition to the richness of the *Sinanthropus* finds, the quantity and variety of the vertebrate remains form a striking feature at Chou-kou-tien.

More than fifty types of mammals, besides frogs, snakes, turtles, and birds, have been recorded. In the three seasons, 1927 to 1929, about 8800 cubic metres

have been excavated, and 1475 boxes of fossil material have been removed. The most characteristic types are *Sinanthropus*, *Euryceros* (flat-antlered deer), *Rhinoceros*, cf. *sinensis*, and *Hyæna sinensis*. *Trogontherium* (big beaver) and *Bubalus* (primitive buffalo) also occur. The fauna has suggestions of a southern affinity and is distinctly older than the Loess fauna of Middle Pleistocene date, which includes *Rhinoceros tichorinus*, *Hyæna crocuta*, and *Cervus elephas* in place of those mentioned above. It can be closely dated as very early Pleistocene in view of the absence of truly archaic types and the presence of modern types, including *Equus*, but it is definitely older than the Middle Pleistocene. The fossil material is found *in situ* at various level deposits, and is of essentially the same age from top to bottom.

The finds were made in deposits of breccia, gravel, sand, and clay filling fissures and caves in Ordovician limestone. With the aid of a series of remarkably clear photographs, sections, and block diagrams, Prof. Barbour demonstrated the origin, by dissection, of the various clefts or caves, which at one time must have formed shelters for animals and are now filled with the brecciated clayish or sandy fossiliferous formations, comprising the typical Chou-kou-tien deposits. The interest of the lecture was greatly enhanced by the exhibition of casts of *Sinanthropus* and of a tooth. Prof. Barbour concluded by pointing out that all new data are issued from the laboratory of Cenozoic Research, under the combined control of the Geological Survey of China and the Peking Union Medical College. He paid a tribute to the way in which work has been continuously carried on in spite of the grave difficulties due to the prolonged political crisis in China. Reference was made to the important paper by P. Teilhard de Chardin and C. C. Young in *Bull. Geol. Soc. China* (vol. 8, No. 3, 1929), which not only gives a clear and detailed account of the geological history of the Chou-kou-tien formations, but also has a bibliography of all publications on the subject up to December 1929. Vol. 9, No. 1, 1930, gives further data.

It had originally been planned that Prof. Elliot Smith should open a discussion on the characters and affinities of Peking man, but he decided in early August to go to China to study *Sinanthropus* on the spot. His report, and a further one from Dr. Davidson Black, will be awaited with keen interest.

## Staining Yeasts with Methylene Blue.

WORKERS who use the time-honoured method of staining yeasts with methylene blue are familiar with the untrustworthy results often obtained when an attempt is made to distinguish living from dead yeasts. It is now realised that apparently contradictory results may be due to differences in working conditions employed by various workers, and in this connexion a recent letter in NATURE (Brooks, 125, p. 599; April 19, 1930) may be cited, in which the importance of pH value, concentration and purity of the stain, and of the effects of light are indicated.

Fuchs also (*Woch. Brav.*, 46, p. 437; 1929: 47, pp. 171, 183; 1930) has pointed out that the concentration of methylene blue, which is usually 0.0001 per cent, may be increased to 0.001 per cent without any immediate marked change in the proportion of stained to unstained cells. After 15 minutes, however, this proportion may increase very rapidly. If this

result is correlated with the fact that granulated cells, which are usually considered dead, stain well, we have a certain amount of evidence that methylene blue is toxic to yeasts after a short period of contact.

Haehn and Glaubitz (*ibid.*, 315) actually showed, however, that preparations from which unstained yeasts were entirely absent grew in wort, and they therefore concluded that cells which take a weak stain are living, though impaired in vitality. The weak staining in the first instance may probably be attributed to adsorption by mucilage on the cell-walls. In both cases a 0.0001 per cent solution is favoured, and Fuchs adds this until the colour is blue-green and immediately counts the deeply stained dead cells. In the case of suspensions in wort the proportion of stain must be increased, as some is adsorbed by the wort-colloids.

Against this increase in stained cells on prolonged