

## Research Items

**Peking Man.**—The skeletal remains other than the skull parts of Peking man, of which the announcement of the discovery was purposely delayed, have now been described by Dr. Davidson Black (*Bull. Geol. Soc. China*, 11, No. 4). The greater part of a left semi-lunar bone (os lunatum) was found by Dr. Bohler in material from Locus B of the Choukoutien cave. It is undoubtedly to be referred to the genus *Sinanthropus*. It differs in no important respect from that of modern man and confirms the inference from the stone implements, crude though they are, that the hands of Peking man were essentially like our own. In a culture stratum yielding quartz implements, from which came two adult jaw fragments and a parietal fragment of *Sinanthropus*, was also found a fragment of clavicle. It is the greater part of the shaft of a well-formed left clavicle lacking the external epiphyseal articular portion and the acromial fourth of the bone. It is moderately mineralised and a dark reddish-brown. The individual from whom it was derived was probably adult. The probable length, 15 cm., is about the average length of an adult modern North China male clavicle. A number of anomalous terminal phalanges have also been recovered, which could not well have belonged to any animal other than a hominid form. Expert opinion confirms this. In the first specimen recovered, the roughened area of the tuberositas unguicularis encroaches on the dorsal surface of the bone more widely, while ventrally it is much less developed, than in any known hominid. If it is the terminal phalanx of the hallux of *Sinanthropus*, it would seem probable that the morphology of the feet of this form and that of modern man differed much more widely from one another than that of their hands.

**Pueblos on Zuni Reservation.**—The excavation of an ancient Pueblo site on the Zuni Reservation, New Mexico, is described by Mr. F. H. H. Roberts, jr., in Bull. 111, of the Bureau of American Ethnology. When the site was excavated in 1930 it was found that the settlement consisted of three communal dwellings and two great kivas or ceremonial chambers. On account of the latter feature the site is to be known as the "Village of the Great Kivas". Two dwellings and one kiva were completely excavated. The larger dwelling consisted of three small ceremonial chambers, a great kiva and sixty-four rooms, of which four had constituted a second story. In addition there were four detached subterranean ceremonial chambers in front of the east end. The building had not been erected as one unit, but there had been several periods of constructive activity. The original structure was a rectangular block of thirteen rooms and two small ceremonial chambers. Up to the close of at least the first two of the periods of activity, the house type was predominantly that of the Chaco canyon, that is, of the northern Pueblo type. The character and size of later additions suggest an infiltration of other peoples, probably from the south. The kivas associated with the house are of two types. The smaller house contained twenty rooms. Originally a fairly small dwelling, it had been enlarged at various times. The material was more carefully worked than in house A. It had no kiva, another indication of its probably southern origin. Sixty burials were uncovered; but the remains were in poor condition. The skulls showed

pronounced occipital flattening and a large proportion of decayed teeth, the latter feature probably being due to a deficiency in diet. The village seems to have had a population of about 100. It belongs to Pueblo III and dates from about A.D. 1000-1030, the period of Pueblo expansion.

**Tuberculosis in Children.**—Our knowledge of the pathology and bacteriology of tuberculosis in children has been extended by the work of Dr. J. W. S. Blacklock, detailed in a report issued by the Medical Research Council (Special Report Series, No. 172. London: H.M. Stationery Office. 3s. net). It supplies additional evidence of the paths by which infection comes, based upon a study of the primary sites in which the disease developed in 283 children found at autopsy to be tuberculous. The ages of the subjects were from a few hours up to thirteen years. Of these 283 children with tuberculous damage, more than 90 per cent died as the result of the infection; the site of the primary damage was most frequently in the chest (173 cases, or 61 per cent). Evidence was sought of the pathway of infection to the lung and lymphatic glands. For this purpose, a characteristic lung lesion described by Parrot half a century ago and recognised as marking the primary site of infection was sought for; this was found in 148 of the 173 cases, and the tubercle bacillus was isolated in most of them and examined as to its type—human or bovine. Wherever the primary lung lesion of Parrot was found, only bacilli of human type were obtained either from the lesion itself or from the glands in direct relation to it. Dr. Blacklock concludes from all the evidence that the pathway of infection in these cases has been by the air—all these children were infected through the air-passages by bacilli derived from other human beings. Investigations were also made on primary abdominal and surgical tuberculosis, and upon the significance of tuberculin reactions.

**Clyde Bivalves.**—Mr. A. C. Stephen (*J. Marine Biol. Ass. United Kingdom*, vol. 17, No. 1, 1932) has continued his investigations on the intertidal lamellibranchs of the Clyde, chiefly at Millport, and adds to his list certain forms living below low water mark, using the Robertson bucket dredge put through a 2 mm. sieve, with a check sample through a 1 mm. sieve. Four species are dealt with in the present paper—*Tellina tenuis*, *T. fabula*, *Abra alba* and *Cardium edule*. All these are important economically as fish food, *Cardium edule* (the common cockle) also as human food. *Tellina tenuis* extends to about 2½ fathoms but its growth is slower beyond low water mark than in any other part of its range, and the present results show that it is best adapted to life in the intertidal area. *T. fabula* extends from about low water mark to a depth of 10 fathoms. It grows rapidly, attaining a length of 4 mm. at the end of the first year, 8 mm. in the second and 10 mm. at the end of the third year. For both species the years 1926 and 1930 were exceptionally good for spat survival. It is found that after the disappearance or great thinning of any population, it is apparently renewed from spat, and the author is of the opinion that the clearing of the ground of adults as a result of high mortality after spawning or after unusual frost is the important factor for the survival of spat. Thus on the shore at the head of Loch Fyne, all the

cockles above low water mark were killed off by the severe winter of 1928-29, most of the present population being derived from the 1929 spat. The rate of growth in the cockle is greater at low water mark than farther up the beach. If it grows slowly in the first year it tends to lag behind always. Shells of the same length from higher levels are lighter than those from lower down.

**Cultivation of *Catenaria*.**—*Catenaria anguillulæ*, a chytridiacean fungus, has been found parasitic in the eggs of the liver-fluke of sheep (*Fasciola hepatica*), in the eggs of other helminthes and in small aquatic organisms. Evidence points to the tap-water in London and in Dublin as the source of infection of the eggs in the laboratory experiments. The cultivation of this *Catenaria* is recorded by J. B. Butler and A. Humphries (*Sci. Proc. Roy. Dublin Soc.*, vol. 20, No. 25, 1932) using various artificial media containing an aqueous extract of the eggs of the fluke with or without agar, and/or, egg albumen. In culture the development of mycelium was much more extensive than when the fungus was growing as a parasite. In one instance a single thallus produced more than twenty hyphal strands each bearing three to four sporangia. In another example more than 700 sporangia were present in a single outgrowth, possibly involving only one thallus. The more extensive development of the mycelium in artificial media supports the view that *Catenaria anguillulæ* is a form reduced through the influence of parasitism. Zoospores from the sporangia germinated on an artificial medium and produced a thallus, zoosporangia and zoospores. The variability of shape of the sporangia in culture and other points in the morphology are noted.

**Digestive Enzymes in the Animal Organism.**—As is well known, the digestive enzymes secreted in the animal organism pass into the urine, their presence therein furnishing a means of measuring the intensity of their formation and the activity of the digestive processes. In vol. 34 of the *Rendiconti della Reale Accademia delle Scienze dell' Istituto di Bologna* dated 1930 but only now just received, Prof. Pietro Albertoni describes experiments in which taka-diastase was injected into the blood of the dog. After the injection—into the jugular vein—the submaxillary saliva was examined and was found to be, as normally, devoid of diastatic properties. Stimulation of the chorda of the tympanum rendered the saliva denser but did not cause it to become diastatic. Hence the enzyme does not pass into the saliva, although it retains its physiological action since, injected into the blood, it determines mobilisation of the glycogen, producing hyperglucæmia. Thus, there is no question of a circulation of the digestive enzymes, which are absorbed but do not re-appear in the various secretions, and in all cases represent a specific product of the various glandular apparatus.

**A New Method in Plant Taxonomy.**—Kiichi Ohki appears to have given the 'spodogram' method of distinguishing species a very thorough examination in connexion with his studies of the Japanese *Bambusaceæ*, and does not appear dissatisfied with the method. The spodogram is obtained by taking a small piece of the leaf from the middle region and incinerating it carefully using a special apparatus first suggested by Werner (*Biologia Generalis*, 4, 1928). The ash when cool is mounted on a slide,

with xylol and Canada balsam. In this way the outlines in particular of the epidermal cells are retained because of the silica contained in their walls. At first sight it would appear more reasonable, if such microscopic characters are to be used in taxonomy, to examine the full leaf tissue without resort to incineration, when the same characters together with others will be available for study, but the method of incineration certainly reduces the salient microscopic characters to a limited group, recognisable after incineration, which may be more simply treated in systematic study. Ohki's paper will be found in the *Journal of the Faculty of Science* (Tokyo, Section 3, Botany vol. 4, Part I).

**British Basidiomycetæ.**—Mr. Carleton Rea has re-published Appendix 2 to his book "British Basidiomycetæ" (*Trans. Brit. Mycol. Soc.*, vol. 17, Parts 1 and 2, pp. 35-50, 1932). The newly-described species belong to the genera *Pluteus*, *Lepiota*, *Psaliota*, *Amanita*, *Stropharia*, *Cortinarius*, *Inocybe*, *Tricholoma*, *Entoloma*, *Clitocybe*, *Hygrophorus*, *Flammula*, *Collybia*, *Leptonia*, *Mycena*, *Russula* and others. Many are uncommon or rare, but a few are common. Four new species and one new variety are described. These are *Psaliota floccosa* Rea, *P. impudica* Rea, *Leptonia acuta* Rea, *Clavaria griseola* Rea and *P. campestris* var. *squamulosa* Rea. Diagnoses of the five are given in Latin and English and they are illustrated upon an excellent coloured plate. Mr. Rea's "British Basidiomycetæ" is the most complete work which has appeared on the subject and it is most useful that the author should keep it up-to-date by the periodical descriptions of new species and varieties.

**Heat Excluding Roofs.**—In a paper on "Radiant Heat" read before the Institution of Heating and Ventilating Engineers on November 2, Mr. A. F. Dufton summarised the results which have been obtained at the Building Research Station on the relative merits of various forms of thin roofs as excluders of heat due to sunshine from the buildings they cover. Most roofing materials absorb about three-fourths of the sunlight that falls on them; for example, red tiles 67 per cent, blue slates 85 per cent, red asbestos tiles 74 per cent, old roofing lead 77 per cent, bituminised felt 89 per cent, galvanised iron when new 65 per cent, and when old and dirty 91 per cent. Whitewashing the upper surface of any one of these reduces the absorption considerably, for example, that of the dirty iron to 26 per cent. A glass roof under which the temperature was 188° F. when the temperature outside was 70° F. in the shade, when given two coats of whitewash on its top surface showed a temperature underneath of only 103° F. Mr. Dufton has not been able to detect that the rays from an incandescent electric light relieve the congestion of the nose produced by the radiation from an electric fire, although Sir Leonard Hill stated some time ago (*Times*, August 13) that they have this property.

**Cosmic Radiation.**—The issue of the *Physikalische Zeitschrift* for September 1 contains a valuable summary of our present knowledge of cosmic radiation with a long list of references, by Prof. Hoffmann of Halle. Systematic observations are now being made at Abisko, Königsberg, Potsdam, Innsbruck, Amsterdam, Dublin, Bandoeng and Cape Town, and each month new facts are discovered and new questions raised. After describing the electrometer, tube counter and Wilson chamber methods of

measurement, the author gives the principal results obtained. Curves of increase of the radiation with height in the atmosphere and of decrease with depth below the surface of water are given. With increase of barometric pressure the radiation decreases. It appears to come equally from all parts of the sky. The harder part of the radiation appears not to vary in amount with time but the softer part appears to be influenced by meteorological conditions in the atmosphere. The absorption of the radiation as it passes through matter is complicated by the production of corpuscular radiation. The question of variation of the radiation with position on the earth's surface is still unsettled, and much of the theory as to the origin of the radiation is speculative. (See also NATURE, 130, 570, Oct. 15, 1932.)

**The Green Salt of Magnus.**—The green compound of bivalent platinum obtained by Magnus in 1828 by the action of ammonia on platinum chloride is usually considered to be a complex salt  $[\text{Pt}(\text{NH}_3)_4][\text{PtCl}_4]$ , and a detailed X-ray examination published

by Cox, Pinkard, Wardlaw and Preston (*J. Chem. Soc.*, Oct.) shows that this is the case, the four ammonia and chloride groups being arranged in a square about the platinum atom. A pink form also obtained is generally a different substance, namely, Cleve's salt,  $[\text{Pt}(\text{NH}_3)_3\text{Cl}]_2[\text{PtCl}_4]$ , although in exceptional cases a pink orthorhombic form which is the true analogue of Magnus's salt is formed. It is suggested that, since the true pink salt of Magnus and Cleve's salt are convertible into the green salt, the transformation of Cleve's salt to Magnus's salt may take place by interchange of co-ordinated groups between anions and cations, and the ions of the Magnus salt would temporarily have a non-planar configuration. The pink salt may be this unstable form intermediate between the other two. The planar arrangement in the green salt of Magnus is analogous to that in  $\text{K}_2\text{PtCl}_4$  and  $[\text{Pt}(\text{NH}_3)_4]\text{Cl}_2$ , but in the latter the ammonia groups are rotating, whereas in Magnus's salt the evidence shows that they are not. This is no doubt due to the lower symmetry in the structure of the latter.

### Astronomical Topics

**Astronomical Notes for December.**—Venus is still observable as a morning star, rising about  $2\frac{1}{2}$  hours before sunrise, with five-sixths of its disc illuminated. Mercury is about  $7^\circ$  east of Venus in the latter half of December. Mars and Jupiter are observable after midnight; they are only  $4^\circ$  apart at the end of the month. This will be the last opposition of Jupiter in north declination for some years, so advantage should be taken of it. Mars is  $1\frac{1}{2}^\circ$  north of Neptune on December 5. Uranus is still well placed for observation, in Pisces. It is stationary on December 28.

The winter solstice occurs at 1 A.M. on December 22. The following are the times of the disappearances of stars occulted by the moon (as seen from London).  $\iota$  Aquarii, December 3, 6<sup>h</sup>21<sup>m</sup> P.M.;  $\mu$  Arietis, December 9, 11<sup>h</sup>7<sup>m</sup> P.M.;  $\rho$  Leonis, December 19, 0<sup>h</sup>29<sup>m</sup> A.M. (bright limb); the last star re-appears at the dark limb at 1<sup>h</sup>25<sup>m</sup> A.M., angle  $331^\circ$ .

A meteor radiant in the north of Gemini is sometimes active in the first half of December. Denning gave December 11 and 12 as the dates of maximum, but owing to moonlight, there would be a better chance some days earlier.

The most conveniently observable minima of Algol occur about 9 P.M. on December 16, and 6 P.M. on December 19.

**The Leonid Meteors.**—The weather in the London district was very unfavourable for observation on all the nights when meteors were expected. The only success reported in England is that of Mr. J. P. M. Prentice, the director of the meteor section of the British Astronomical Association, at Stowmarket; he recorded 20 Leonids between 5 and 6 A.M. on November 16; one of them was of magnitude  $-3$ . The moon was so near that faint meteors would have been missed; moreover, there was a slight haze. Still, it is clear that if the earth had entered the dense part of the stream the number seen would have been much larger; if a great shower was seen anywhere, it was probably in the region of the Pacific Ocean, from which reports might be slow in reaching us. There is still a prospect of a rich shower next November; the great shower of 1866

was ten months after the perihelion passage of Tempel's comet. The moon will then be new.

**Accelerations of Sun, Moon and Planets.**—Dr. J. K. Fotheringham contributes a paper on this subject to the *Observatory* for November. He notes that it is now established that the solar and planetary fluctuations are correlated with the whole lunar fluctuation, not merely with the part that remains when the great empirical lunar term is excluded. The establishment of this fact facilitates the determination both of the individual fluctuations and of the secular accelerations, which cannot be deduced from modern observations until the fluctuations are known. The establishment of these preliminaries makes Mercury, on account of its rapid angular motion, the most suitable body for determining the solar and planetary accelerations. This and other lines of evidence lead to secular accelerations of  $1.4''$  and  $4.8''$  for the sun and moon respectively, the latter being in addition to  $6.0''$  for the La Place term (revised). The accelerations are proportional to the mean motions, except in the case of the moon. The value for the sun is confirmed, within narrow limits, by the independent researches of Prof. de Sitter, Herr C. Schoch, and Dr. Fotheringham. Thus results that were formerly the subject of much controversy may now be considered as fairly well established.

The ancient eclipses of sun and moon give the excess of the lunar acceleration over that of the sun, so that when either of these is found the other is deducible. Dr. Fotheringham announced at the meeting of the Royal Astronomical Society on November 11 that a portion of a tablet from Nineveh, which has been in the British Museum for many years, has now been deciphered with the aid of hints supplied by him. It proves to be a table indicating the manner in which the hours of day and night were reckoned. The day and night were each separately divided into six double hours, which consequently were not equal for day and night, but varied with the seasons. This clue will make it possible to improve the time determinations for the recorded eclipses of sun and moon, which may lead to a small revision of the values of the accelerations.