

## Research Items.

**QUATERNARY MAN IN CHINA.**—An important addition to our knowledge of the distribution of man in the Pleistocene age is made by the researches of MM. Licent and Teilhard de Chardin, of which a preliminary account is given in Vol. 35, Pts. 3-4 of *L'Anthropologie*. While engaged in examining the quaternary deposits of southern China, they discovered three sites affording evidence of occupation by palaeolithic man. The first is situated in the basin of the Choei-tong-k'ou immediately to the south of the Ordos plateau and to the east of the Yellow River, where was found a sharply defined zone of occupation of about 20 m. in length with a deposit of 50 cm. thickness. Upon it was superimposed a bed of loess about 15 m. deep, and above this the gravels of a pre-neolithic river. No human remains were found, but a quantity of fossil bones of *Bos primigenius*, *Rhinoceros tichorhinus*, hyæna, and the tooth of, probably, *Ovis Ammon*. Stone implements were very numerous and of various forms, all being worked on one side only. They were rude in form and rough in workmanship, this being due to the coarse grain of the material employed. At the same time a few scrapers and points showed that, given suitable material such as flint, man here was capable of fine work. Five hearths were discovered in the neighbourhood within an area of about a square kilometre. The third site was found on the Sjarasso-gol, a tributary of the Hoang-ho, and has yielded the complete skull of a rhinoceros, and bones of a species of elephant, *Rhinoceros tichorhinus*, Equus, Cervus, *Bos primigenius*, *Hyæna spelæa*, etc. The lack of suitable material in this area has affected the character of the stone implements, which, with a few exceptions, are extraordinarily small. Notwithstanding this difference, this site and that at Choei-tong-k'ou may be regarded as contemporary. No traces of industry intermediate in date between this palaeolithic culture and the neolithic have been discovered. Although comparison with European cultures is difficult, these sites may be classed as Mousterian or early Aurignacian.

**OBSERVATIONS ON A COLLARED FLAGELLATE.**—Dr. G. Lapage (*Quart. Journ. Micr. Sci.*, June 1925), records observations upon living specimens of the choanoflagellate *Codosiga botrytis* made with the view of ascertaining the nature of the collar and its function as a food-catching apparatus. Study of the organism does not support the view put forward by some previous observers that the collar is a spiral; Dr. Lapage holds that it is, as earlier workers stated, a protoplasmic, flexible, retractile, conical membrane, closed on all sides except on its upper free surface. The flagellum which arises in the base of the cup and the currents it produces are carefully described. They cause food to be brought to the collar, by which it is caught and passed down the outside of that structure to be ingested at or below the middle of the body, and not at its upper end and never by the area enclosed by the collar. The method of ingesting the food is fully described. Defæcation invariably occurs from the area enclosed by the collar. There are normally two contractile vacuoles; one of these has been misinterpreted as a "gullet-vacuole" at which food was said to be ingested. Dr. Lapage has not met with any examples which exhibited division, encystment, or conjugation.

**RECOVERY FROM PLASMOLYSIS.**—It has been almost axiomatic amongst botanists to interpret recovery from plasmolysis, when a living cell is immersed in a hypertonic salt solution, as due to the gradual entry of the salt. When the plant cell is immersed in sugar

solution or in solutions of certain salts, no recovery takes place and the sugar or the salt in question is assumed not to penetrate the cell. This interpretation of recovery from plasmolysis will need reconsideration in the light of a recent paper by W. S. Iljin (Studies from the Plant Physiological Laboratory of Charles University, Prague, vol. 2, 1924). Iljin points out that the salts which have thus been assumed to penetrate the cell all appear to possess the property of facilitating the hydrolysis of polysaccharides such as starch. The result is the formation of soluble organic compounds within the cell, which raise its osmotic pressure in many cases to a value far higher than would be attained simply as a result of the entry of the salt itself. Salt solutions in which recovery from plasmolysis does not take place also fail to promote hydrolysis of starch. How the monovalent cations and organic anions thus found to be active in hydrolysis produce their effect is not apparent, but Iljin is emphatic that he sees no evidence of any considerable penetration of the cell by these ions.

**NORTH-EAST LAND, SPITSBERGEN.**—Mr. F. G. Binney gives an account of the Oxford expedition to North-East Land in the *Geographical Journal* for July. This is followed in the August issue by summaries of the scientific results by various members of the expedition. Some additions to the topography and geology have been made. On the east coast a low-lying spit of granitic and metamorphic rock was discovered and named Isis Point. Its position was found to be lat. 79° 42' N., long. 26° 40' E. No islands, such as had previously been reported, were found off the east coast. Soundings showed that the ice cap along this coast is aground and not floating and there is evidence that it is receding at no mean rate. In the interior of North-East Land no features exactly tallying with A. E. Nordenskjöld's "ice-canals" were found but wide crevasses with parallel vertical sides were numerous. They were of great depths and often partly choked with snow, but a definite floor such as Nordenskjöld described was never seen. It is probable, however, that these crevasses were of the same nature as the features discovered by Nordenskjöld.

**RAINFALL VARIATIONS OF GREAT BRITAIN.**—The *Meteorological Magazine* for June contains an article by Mr. C. E. P. Brooks, of the Meteorological Office, on "Long Period Variations in the Rainfall of Great Britain." The author makes a praiseworthy attempt at grouping past records of rainfall and associating with them the earlier historical records of weather such as storms, floods, and droughts. With the aid of previous work done by G. J. Symons, E. J. Lowe, and Sir Richard Gregory, an approximation is made of the variations of rainfall in Britain since A.D. 1000. Approval is expressed of conclusions obtained by Symons, which is a satisfaction to those who knew Symons' work, and the scrupulous care with which he originated and handled rainfall results. A diagram is given to show the fluctuations of rainfall since A.D. 1000. Prior to 1700 the results are based on generalisations by old chroniclers, and it is only claimed that a rough approximation is obtained; but from 1700 onwards the results are based on actual measurements. There is probably no one who can better claim respect in this research than Mr. Brooks, and the article is of especial interest.

**INSTANTANEOUS COLOURED PHOTOGRAPHY.**—A method of obtaining coloured photographs by means

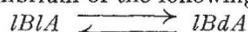
of a single very short exposure is described by M. G. A. Rousseau in the *Comptes rendus Acad. Sci. Paris*, July 20. Three films are employed, the first of which has an ordinary slow emulsion, the second is coloured yellow with auramine on the side towards the lens, and pale rose with fuchsine on the other side, and has an emulsion which is sensitive to yellow and green, while the third film is coated with an emulsion which is sensitive to yellow and red. The three films are cemented together along one edge, and pressed together in the camera by means of springs between a thin metal plate and a glass plate. The photograph is taken in the same way as an ordinary one, no screen being required. The blue-violet radiations act on the first film, and are largely absorbed by it. When this is developed it serves as a yellow positive. The radiations which pass through the first film are further filtered by the yellow dye on the outside of the second film, so that no blue-violet radiations pass to the sensitive layer, which is acted on by the yellow and green radiations giving a red positive. Finally, the remaining yellow and green is filtered out by the fuchsine on the back of the second film, so that only the orange group passes to the third film, which gives a positive in which the bright parts correspond to the blue in the object photographed. Monochromes can then be printed in the proper colours from the three films, and when these are superposed, the object photographed is seen with its natural colours.

**POLARISATION OF THE ATOM TRUNK.**—The observed differences between the spectra due to a photo-electron, which circulates in orbits at a distance from the nucleus considerably greater than those of the remaining  $n-1$  electrons, and the spectrum calculated from the Balmer formula of hydrogen, have been ascribed to the fact that the photo-electron polarises the atom trunk, so that the configuration of the trunk, to a certain extent, follows the radius vector of the electron in synchronism. The result may be to introduce a term into the law of the force field in which the electron moves, depending on  $1/r^3$  or some higher inverse power of  $r$ , the distance from the centre of the nucleus. In the *Annalen der Physik* for June, Dr. E. Schrödinger calculates the capacity for polarisation,  $P$ , of the "neon" trunk for the  $d$  terms ( $k=3$ ), and the  $f$  terms ( $k=4$ ) of Na I, Mg II, Al III and Si IV, and finds that  $P$  is nearly constant in each series when  $n$  varies from 3 to 7. A table based on the arc spectra of the alkali metals (inert gas trunks) shows some regularities and some irregularities in the values of  $P$ . A remarkable irregularity discovered by Paschen in the Bergmann series of Al II is explained by assuming that, for frequencies a little smaller than the resonance frequency of the trunk,  $P$  is large, and for higher frequencies is negative; this depends on the loosening of the structure of the trunk at the resonance frequency. The relations for the arc spectra of the alkaline earths are not very clear, and the explanation given in the case of Al II is to be taken with a certain amount of reserve in consequence.

**SULPHUR SESQUIOXIDE.**—The *Journal of the Chemical Society* for July 1925 contains an interesting paper by J. R. Partington and I. Vogel on sulphur sesquioxide. There has always been some doubt as to whether the blue substance formed by the interaction of sulphur and sulphur trioxide was a definite compound or a colloidal solution. The present authors have proved that it is a compound,  $S_2O_3$ , analogous to the well-known  $SSeO_3$  and  $STeO_3$ , which are formed in a similar way. The properties of the oxide are described as well as futile attempts to isolate sulphur monoxide.

**NICKEL.**—Dr. M. Cook contributes an interesting article on nickel to the *Chemical Age* for August 1. Copper-nickel alloy was in use so early as 235 B.C., but nickel itself was not isolated until 1751, by Cronstedt. The chief sources are the ores of Sudbury (Canada) and New Caledonia. Pure nickel cannot, in general, be worked; it is made malleable by the addition of about 0.1 per cent. of magnesium, a discovery due to Fleitmann. The function of the magnesium is to break down the nickel sulphide which occurs as films around the nickel crystals and so renders the metal brittle. Magnesium sulphide, insoluble in molten nickel, is produced and occurs disseminated throughout the solid metal. The influence of various impurities on the properties of the metal is discussed. The mechanical properties of the metal are listed and the numerous methods of working are briefly described. Some of the toughest non-ferrous alloys known contain nickel. The metal is finding numerous uses, and more than seventy countries utilise it or its alloys for coinage purposes.

**DIAGNOSING POTENTIAL OPTICAL ACTIVITY.**—An important article on the detection of potential optical activity, by Prof. John Read and Miss A. M. M'Math, appears in the July number of the *Journal of the Chemical Society*. Until 1914 no one-carbon molecule had been obtained in optically active modifications. In that year, however, Sir William Pope and Prof. Read succeeded in resolving chloro-iodomethanesulphonic acid, and found that the active forms showed pronounced optical activity. This rendered the lack of success which was experienced in attempting to resolve chloro-bromomethanesulphonic acid all the more remarkable. Prof. Read and Miss M'Math have now found that by salt-formation between this acid and *l*-hydroxyhydrindamine in organic solvents, and subsequent recrystallisation from acetone containing a little methyl alcohol, two salts are produced which differ widely in crystalline form and solubility. Their specific rotatory powers are different in organic solvents, but identical in water, and both salts show a remarkable mutarotation in certain organic solvents. The authors adduce evidence to show that these salts are to be represented as *lBIA* and *lBdIA* respectively, and that in pure dry acetone either of them rapidly attains an equilibrium of the following kind:



81 per cent.                      19 per cent.

The diastereoisomeric salts thus exist in dynamic equilibrium, and the whole of the original acid may be removed in the form of the less soluble salt, *lBIA*. This salt changes instantaneously into the partial racemate, *lBdIA*, in contact with water, which apparently exerts a potent catalytic racemising effect even when added in small amounts to solutions of *lBIA* in organic solvents. The authors advance the view that asymmetric carbon compounds of simple molecular constitution are as a rule exceedingly susceptible to racemisation, owing to the mobility of the groups attached to the asymmetric atom. Easy racemisation involves the complementary possibility of easy optical stabilisation under an appropriate asymmetric influence, and the new method of diagnosing potential optical activity is based upon this principle. The authors "anticipate that asymmetric compounds containing two carbon atoms in the molecule will also display phenomena of the kind now described, and thus lend themselves to preparation for the first time in optically pure combinations by treatment with optically active bases in organic solvents. Through a systematic application of the method to asymmetric compounds of simple molecular constitution, it is hoped to gather much new information respecting the comparative mobility of groups in systems of the kind."