

## Research Items

### Early Man in Palestine

EARLY man in Palestine was the subject of a report and of communications from Miss D. A. E. Garrod, Sir Arthur Keith and Mr. T. D. McCown in Section H (Anthropology) at the Norwich meeting of the British Association. Miss Garrod's excavations in caves on Mt. Carmel on behalf of the Association's committee in 1934 carried further the excavation of Tabun ("The Oven") with the object of exposing bed-rock over as large an area as possible. Further finds of animal bones now give a very good idea of the fauna of the Acheuleo-Mousterian period. Both rhinoceros and hippopotamus confirm previous indications of a warm, damp period. A new and important find was a large portion of the tusk of an elephant, the first Pleistocene elephant to be discovered in the Near East. In the artefacts the typological divisions noted in the previous year were much less marked. A steep slope of the rock and its overlying deposits complicated excavation. It became clear that this slope ended in a swallow-hole, into which the deposits had subsided. As complete excavation of the swallow-hole would be costly and lengthy, further examination was abandoned, and the excavation of the Tabun may now be regarded as complete. In the report on the remains of Mousterian man in Palestine, Miss Garrod, dealing with the culture of the people of the caves of Wady Mughara, concluded that the association of skeletal remains with implements of Levallois type and the fauna of a warm, moist climate, as contrasted with the temperate woodland fauna of later Mousterian levels, indicated that they belonged to the end of the Riss-Wurm interglacial, approximately contemporary with the Ehringsdorf and Tauback remains. Sir Arthur Keith and Mr. McCown dealing with the skeletal material, both complete and fragmentary, concluded that their anatomy pointed to a variant form of Neanderthal man, which exhibits features comparable with those of the more primitive races of modern man.

### Psychology of Attention

THE *Human Factor* (9, Nos. 7 and 8) has an article by Mr. Ivor Benson on attention problems in the judging of newspaper literary competitions. The author describes the work of the adjudicators, and points to it as an open field of research for industrial psychologists. It offers what is perhaps a unique opportunity for studying the problem of attention among intelligent, imaginative workers. The circumstances of adjudicating necessitate the close control of material and output which is essential to psychological investigation, but can seldom be imposed upon workers of this kind. In performing a given task, the greatest possible sensitiveness, speed and accuracy must be maintained by the adjudicator at a constant level for as long as 7½ hours. The degree of efficiency varies from day to day, both collectively and among the individual workers. In the office tested, it was found that the root cause of inefficiency was emotional disturbance. Sensory distractions were unnoticed so long as the adjudicators were in a cheerful mood, but when they were gloomy they

exaggerated sounds and movements and were disturbed by them. Fear and the sense of insecurity that followed a reprimand had also an inhibiting effect, and caused them to slacken their speed in over-anxious concentration.

### Sperms of Freshwater Ostracods

THE remarkable spermatozoa of certain small freshwater ostracods are known to attain a length of 6 mm., that is, ten times the length of the adult ostracod. A. G. Lowndes (*Proc. Zool. Soc.*, London, Part 1, 1935) records the results of his observations on the spermatozoa of certain British ostracods with particular reference to their motility. He points out that motile sperms can be obtained only from the spermatheca of a female specimen, and that comparatively few females ever contain sperms, because parthenogenetic reproduction is prevalent. All attempts to obtain motile sperms from males were unsuccessful. Each sperm consists of a long thin pointed part which the author has observed to be anterior in movement, and a thicker cylindrical portion—the flagellum; Retzius and other previous observers regarded the thicker portion as anterior. Mr. Lowndes states that ripe eggs placed in a drop of fluid containing sperms are not attractive to the sperms; the entry of the sperm into the egg has never been described in ostracods. The thin anterior part of the sperm appears as a long central rod with a thin hyaline band twisted round it, and at its tip a small rounded knob, suggesting an acrosome. The flagellum has the appearance of a twisted cable, as there are two spiral bands. Throughout the entire length of the sperm is a central spiral thread, which in the flagellum is twisted round an axial strand. The sperm is enveloped in a thin hyaline membrane. Definite information as to the nature of the nucleus is lacking. Three kinds of movement of the sperm are described—rotation, undulation and ripple movement. The author points out that in many species of ostracods males are unknown, but the spermathecal ducts are present in the females, and there is no evidence that they are undergoing reduction. He regards the highly complicated copulatory apparatus and the abnormal sperms as having ceased to have any real function.

### Watermark Disease of the Cricket-Bat Willow

DR. W. J. DOWSON described a serious disease of *Salix caerulea*, the cricket-bat willow, to the members of Section K (Botany) at the Norwich meeting of the British Association. The malady causes death of the tops, induces a greyish stain or watermark in the wood, and in all is responsible for a loss of something like £150,000 to the growers in Essex. Mr. Day, of Oxford, originally named the causal organism *Bacterium salicis*, but Miss Lindeijer, working in Holland, obtained a slightly different pathogen, which she named *Pseudomonas saliciperda*. Dr. Dowson now confirms Day's naming, so far as the disease in Essex is concerned, though a harmless organism with all the characters of *P. saliciperda* has also been found. Control measures suggested were mainly concerned with the extension of legislation to prevent spread of the disease.

### Dating of Scottish Varved Clays

MEASUREMENTS made by Dr. J. B. Simpson of fifty-nine varves in a deposit near Dunning in the Earn valley south-west of Perth form the basis of an attempt by Baron De Geer to fix their absolute age (*Proc. Roy. Soc. Edin.*, 55, 23; 1935). After a systematic comparison, De Geer has succeeded in matching the thickness-variation diagram of the varves with that of a series from the neighbourhood of Copenhagen. This indicates that the Dunning varves represent the years 4313-4371 before the zero year of the Ice Age, which itself occurred about 8,700 years before our century. Thus the measured varves were deposited during the earlier part of the Goti-glacial sub-epoch when the Scandinavian land-ice still filled the whole of the Baltic depression. That the varved clays near Perth are often moraine-covered may be explained by oscillations of the ice-border during its recession. Further measurements are necessary to determine whether varve-deposition was going on during the extension or the recession of the ice-border.

### Natural Gas Conservation

THE trend of chemical research to-day indicates that, quite apart from its particular and well-known function in the production of oil, there is a wide field of usefulness for natural gas as a basic raw material in the manufacture of dyestuffs, solvents, anaesthetics, etc. Its conservation, therefore, is of paramount importance. Gas found in intimate association with commercial accumulations of oil has for some time past been conserved, so far as economically practicable, and a wealth of literature has emanated on this aspect of the subject. Mr. C. T. Barber, in his work on "The Natural Gas Resources of Burma" (*Mem. Geol. Surv. India*, 66, part 1, 1935), takes a less familiar point of view, and stresses the importance of conservation of gas not found in association with oil. Of the vast natural gas resources of Burma, he points out, a considerable proportion is not in intimate association with commercial accumulations of oil. Some of this actually occurs in structures not containing, or not known to contain, oil, while some is found either as free gas in the crestal portions of oil-bearing sands or in non-oil-bearing beds in structures yielding oil from other horizons. In addition to problems of gas conservation, Mr. Barber's work includes a brief outline of the Tertiary geology of Burma, and detailed accounts of the principal natural gas fields, their geographical situation, stratigraphy, and approximate production. Useful maps and an up-to-date bibliography complete this latest work on natural gas in Burma.

### Magnetic Testing of 'Work-Hardening' Steel Wires

THE testing of the steel wires used in colliery 'winding' and 'haulage' is of great importance. It is well known that the so-called 'work-hardening' of a wire rope is as great a menace to its safety as the actual mechanical fracture of a group of the component wires of a rope. In a paper which appeared in the *Engineer* of September 13, Dr. T. F. Wall, of the University of Sheffield, points out that only to measure the elasticity of the wires is not a sufficient criterion of their condition. Another characteristic quantity of the greatest importance is the viscosity of the metal forming the wires. There appears to be two kinds of viscosity, one associated with simple longitudinal stresses and the other type associated

with a travelling surge of stress in the wire. Dr. Wall describes two electromagnetic methods. The first uses the magnetostriction effect for measuring Young's modulus for a wire by means of longitudinal vibrations. The other is to measure directly the speed at which a surge of stress travels along the wire. Experiments show that the former method provides a very sensitive means for detecting small effects of magnetic loading which cannot be detected in any other way. Work-hardening results in a relatively greater magnetic response to small stresses and a relatively smaller magnetic response to large stresses. The second method measures the velocity of a surge stress by passing the wire through several solenoids connected in series and at the centre of each of which is a search coil connected with an oscillograph. Oscillograms are taken with different magnetising forces and the one which shows that the magnitude of the induced E.M.F. in the search coils varies logarithmically gives the rate of decay of the surge itself. Knowing the velocity of the surge, Young's modulus can be found.

### Activity Coefficients from Electromotive Forces

THE electromotive force of a cell containing two solutions of a uni-univalent salt at different concentrations is given by the equation  $E = - (2tRT/F) \log(a_1/a_2)$ , where  $t$  is the transport number and  $a$  activity. When, as is usually the case,  $t$  is a function of concentration, this must be replaced by  $E = - (2RT/F) \int t.d \log a$ , the integration being over the range of concentrations used. This equation has been used to find transport numbers, but now that accurate values of the latter are known, it can, as A. S. Brown and D. A. MacInnes (*J. Amer. Chem. Soc.*, 57, 1356; 1935) show, be used in the determination of activities. The potential is known to be very reproducible and independent of the method of formation of the liquid junction, and this has been further confirmed by measurements with sodium chloride solutions. The electrodes were of silver and silver chloride. If the activity is expressed as the product of concentration ( $c$ ) and activity coefficient ( $f$ ), the values of the latter can be very well represented by Hückel's equation:  $\log f = - \alpha\sqrt{c}/(1 + \beta\sqrt{c}) + Dc$ , where  $\alpha$ ,  $\beta$  and  $D$  are constants. It was, however, necessary to change the theoretical value of  $\beta$  from 1.463, as obtained by extrapolation at high dilutions, to 1.315. The value 1.463 corresponds with a 'distance of closest approach' of the ions of 4.45 Å., which is sufficiently large to make the higher terms in the extended theory of Gronwall, La Mer and Sandved negligible. The equation proposed by Hitchcock,  $-\log f = \alpha\sqrt{c} - Bc$ , did not give satisfactory results. Harned and Nims have published results for activity coefficients of sodium chloride obtained with amalgam cells not involving liquid junctions, and these fall on the same curve as the present ones if they are adjusted so as to coincide at 0.1 N concentration. The values of the Hückel constants found by Harned and Nims for the more concentrated solutions used do not, however, agree with those found with dilute solutions by Brown and MacInnes, whose results extend to 0.05 N.

ERRATUM. In the paragraph entitled "Structure of Keratin" (*NATURE*, Oct. 5, p. 557, lines 21 and 22), for "were respectively normal and parallel to the flat surface" read "were respectively parallel and normal to the flat surface".