

## Research Items

### Craniology of African Pygmies

SKELETONS of four African pygmies, acquired for the Musée de Congo of Terveuren by Dr. P. Schebesta and J. Jadin in their expedition to the Ituri Forest in 1934-35, have been examined by Prof. J. Matejka and Prof. J. Maly. The first instalment of their report, dealing with the crania, appears in *L'Anthropologie* (48, 3-4; 1938). Of these skeletons, two are male and two female. Of the males, one was of about forty years of age; the female from the same locality was about fifty years of age. The skulls were well preserved, and the distinctive sexual characters well marked. There was a marked atrophy of the maxillaries, possibly due to the loss of the teeth, which may also have caused a certain facial asymmetry. Partial caries and alveolar pyorrhea were present. The sutures generally were simple. Head-length varied from 165 mm. to 176 mm., breadth from 128 mm. to 136 mm. This measurement in the male crania (135 mm. and 136 mm.) approaches the mean for Spanish skulls and exceeds that recorded for Australian, Vedda and Bushman. Head height 122-130 mm. is a minimum figure. The dimensions of the skull taken together, however, point to the classification of these pygmy skulls with other groups below the mean. The cephalic index of 73.56-80.47 ranges from dolichocephalic to brachycephalic. They may be classed generally as orthocephalic, with a tendency to metriocephaly. The horizontal circumference ranges from 475 mm. to 498 mm. This indicates that the pygmies do not touch the absolute minimum, as smaller dimensions are found among both primitive and white peoples.

### Undulant Fever in France

IN a recent *Bulletin of the Health Organization of the League of Nations* (7, Extract No. 9), R. M. Taylor, M. Lisbonne, L. F. Vidal and R. H. Hazemann, who made a study of 869 *Brucella* strains isolated from man and animals in France, came to the following conclusions. All the classified strains of *Brucella* fall into one of two types, namely, *Br. melitensis* and *Br. abortus*. Of 507 strains isolated from man, 477 (94 per cent) were *Br. melitensis*. While the *melitensis* type was definitely dangerous to man, *Br. abortus* was a relatively unimportant cause of undulant fever, and was essentially an economic and veterinary problem. Cases of undulant fever of the *melitensis* type were usually multiple and tended to occur in localized epidemics, while those of the *abortus* variety were almost invariably sporadic. The incidence of undulant fever in France reached a peak in the early spring, which is the period of parturition and abortion among domestic animals such as sheep and goats. As regards age and sex, clinical undulant fever was found to be rare below the ages of fifteen years and was two or three times more frequent in males than in females. Infections in goat and sheep were almost always of the *melitensis* type, whereas cows were the principal hosts of the *abortus* variety. The disease was found to occur chiefly among the rural population and in those who were brought in contact with the animals or their carcases. The writers' studies

indicated that the risk of infection through contact with animals was decidedly greater than through consumption of raw milk or fresh cheese. Sanitary conditions were of little importance in the transmission of the disease.

### Aerial Vision in Freshwater Grey Mullet

AERIAL vision in fishes, demanding a modification of the under-water eye, is a rare development, so that the notes by Dr. S. L. Hora upon the freshwater grey mullet of northern India and Burma (*Mugil corsula*) are welcome, although they do not carry the problem very far (*J. Bombay Nat. Hist. Soc.*, 40, 62, 1938). The species habitually moves at the surface of the waters in which it lives with both its eyes well elevated above the surface. That it can see in this position is indicated by its active capture of caddis-flies, the swarms of which it seems to follow at the surface. Yet the stomach contents of some consisted mostly of large numbers of copepods, and others devoured aquatic algae, so that the fish can apparently see under water as well as in the air. Hora also noted that in both media the eye-balls showed movements "in all directions", as if they were in active use. But no experiment has been made to test the efficiency of the organ in either medium; and except that the grey mullet has no structural adaptation like that of the South American "four-eyed fish", *Anableps*, with its bifocal vision, no information is given about the minute structure of the eye itself, to suggest the direction of the aerial modification. Information on these points would be of value.

### Genetics of Millet and Sorghum

MILLET (*Panicum miliaceum*) has been grown from the earliest times in India, Africa, southern Europe, China and Japan. Its home may have been in central Asia, where nomad peoples found it useful because of its short period of maturation. Mr. Rangaswami Ayyangar and his colleagues have studied its genetics (*Madras Agric. J.*, 26, 195; 1938) at Coimbatore. They find a dominant factor *P* for purple pigmentation, and an intensifier, *I*, which makes the purple darker. The hairiness is governed by at least three factors, *H*<sub>1</sub>, *H*<sub>2</sub>, *H*<sub>3</sub>, which are cumulative in effect. In grain colours of Madras varieties, a dominant factor *O* changes buff to olive grey. A dominant factor *L* lightens the glume colour. An inhibitor *I* lightens it further to ivory. A third grain colour, reddish-orange, is recessive to buff, while another dominant factor suppresses the red in reddish-orange, making it buff. A number of species of *Sorghum* are found (*Current Sci.*, 6, 556) to have varieties with green and others with blue-green seedlings, the latter tillering more. This colour disappears after forty days and behaves as a dominant to green. The African species of *Sorghum* and their hybrids appear to be the origin of the blue-green type, which is also found to occur in many other grasses. In broom-corn, a *Sorghum* with long stalks to the panicle branches, a form occurs with neither auricle nor ligule to the leaves. It is a simple recessive to the auriculate-ligulate condition (*Proc. Indian Acad. Sci.*, 7, 286),

and also differs in having no basal pulvini and a short spikelet-free area in the panicle branches. This makes the earhead very compact with many sterile seeds. It presumably represents a mutation from the ordinary broom-corn condition.

#### Constitution of the Great Barrier Reef

THE Reports of the Great Barrier Reef Committee, 4, Pt. 3, Nos. 7, 8, 9 (Brisbane: Gov. Printer, 1938) contain a preliminary account by Prof. H. C. Richards on the boring made in 1937 on Heron Island (lat.  $23^{\circ} 26' S.$ , long.  $151^{\circ} 57' E.$ ) at the southern end of the Great Barrier Reef. This bore followed on a previous boring made in 1927 on Michaelmas Cay some 700 miles farther north-west along the reef. The Michaelmas Cay boring failed to reach the underlying old rock platform after a depth of 600 ft. It was hoped to bore to 1,200 ft. on Heron Island. Unfortunately, layers of rock were encountered below 510 ft. which necessitated reductions in the size of the casing, and the extreme depth reached was 732 ft. Once again the bed rock was not reached. Comparison of the two borings shows a remarkable similarity. In both it was found that loosely coherent coralline material extends to a depth of approximately 450 ft. In both this was succeeded by non-coralline material of loosely coherent quartz sand with abundant foraminifera and littoral shell fragments. In the Heron Island bore eight siliceous foraminiferal limestone bands were met below the coral, of which the thickest was 78 inches, four were of the order of 18 inches to 2 feet, and the others quite thin.

#### Oxidation and Reduction

IN an article in *Scientia* of September 1938, Prof. J. R. Partington reviews the early history and modern outlook upon the processes of oxidation and reduction, and in particular the application of the oxidation-reduction potentials, now generally known as 'redox' potentials, to modern problems. Incidentally, he points out the curious resemblance between the electronic theory of oxidation and the ancient theory of phlogiston. Metals are now believed to be combinations of positively charged ions and negative electrons, of which the former persist in oxides and cations. The process of oxidation involves then the removal of electrons instead of phlogiston. It may be noted in this connexion that those metals which are most readily oxidized are those which most readily emit electrons when exposed to light of short wave-length. In applying the well-known thermodynamic equation to the evaluation of the redox potential of an electrode of the quinhydrone type, it was assumed by Ostwald that every reducing or oxidizing agent could be replaced theoretically by hydrogen or oxygen under an appropriate pressure, and Nernst obtained some experimental support for this supposition by pumping hydrogen gas from a thin bulb of palladium immersed in a solution of a reducing agent. But since reversible cells giving redox potentials can be set up with solutions of metallic salts in anhydrous solvents like pyridine or acetonitrile, which are unable to furnish hydrogen, some other mechanism must be found, and it is reasonable to postulate the presence of low concentrations of free electrons not only in these but also in all cases, to establish the potential. Increasing use of redox indicators is being made with marked success in analytical chemistry, since they undergo reversible

changes which are very similar in type to those of the quinhydrone electrode and are accompanied by colour changes at definite potentials, corresponding with definite electron concentrations in the redox system. Even more interesting is the field opening up in the study of biological processes, which involve oxidation and reduction and are catalysed by specific enzymes. It is hoped that it may be possible to extend the use of 'potential mediators' in order to overcome the difficulty presented by the thermodynamic irreversibility of many of these important reactions. Much remains to be done in developing the study of one of the oldest known types of chemical reaction.

#### Search for Super-Novæ

F. ZWICKY (*Phys. Rev.*, 53, 1019) has published a preliminary account of a systematic study of super-novæ. The basis of the work was a photographic survey with an 18-in. telescope of aperture  $f/2$ . Three super-novæ were discovered, corresponding to a frequency of occurrence of one nova per galaxy per six hundred years. It was shown that the spectra are distinct from those of all other stellar objects and that the absolute brightness may often be far higher than that of any other star. It is concluded that the existence of two classes of temporary stars, the ordinary- and super-novæ, is established beyond doubt.

#### Draining the Cambridge Fens

THE greater part of the fenlands of northern Cambridgeshire were drained during the first half of the seventeenth century. The enterprise was very successful at first; but difficulties soon began to become evident, some of which have continued to be prominent right up to the present day, as was shown in a paper read at Cambridge before Section E (Geography) of the British Association by Dr. H. C. Darby. These permanent difficulties are associated with the lowering of the peat-level and with the out-falls of the fen rivers. As the peat was drained, it rapidly sank in level partly owing to shrinkage and partly to the wasting away of its surface by bacterial action, so that in time its level became lower than that of the drainage channels. This difference of level may be seen to-day along many of the fen rivers, which are now higher than the land through which they flow. In the eighteenth century, windmills were introduced; but as the surface-level continued to subside, their limitations made them inadequate to the requirements. In 1800 steam pumping was discussed, but it was not until 1820 that a steam engine by Watt was set up to work a scoop wheel at Bottisham. Thirty years later it is estimated that sixty-four steam plants were in operation. Difficulties have also arisen at the estuaries of the fenland rivers, which have not a sufficient current to carry their silt out to sea. The most recent effort to deal with this problem is the large-scale working model of the Wash and its estuaries constructed by the Great Ouse Catchment Board. Another type of problem is presented by the sluices which are necessary to prevent the tidal waters from passing up the rivers. A case in point is Denver Sluice, immediately below which the Hundred Foot River drains directly into the tidal Ouse. When there is much upland water passing down this river, the level in the Ouse does not fall sufficiently to admit of the sluice gates being opened, with consequent risk of flooding.