Research Items

Classification of Races in India

A FURTHER contribution to the discussion of the ethnological problems presented by the peoples of India was made by Mr. H. C. Chakladar in his presidential address to the Anthropological Section of the Indian Science Congress held at Indore on January 2–8 (Calcutta: Asiatic Society of Bengal). Mr. Chakladar agrees with other modern investigators that little value is attached to the conclusions of Risley and others of his day, owing to the unscientific character or the insufficiency of the data on which they were based. He also agrees with the views of Dr. B. S. Guha in the recent Census Report (see NATURE, Feb. 29, p. 368) that the classification of Predravidian and Dravidian in the form in which it has generally been accepted is no longer tenable, though he finds himself unable to agree with the views put forward in the report as to Australoid affinities or evidence of Mesopotamian origins to be found among the jungle peoples or in the skeletal remains of the early inhabitants of India respectively. Dr. Chakladar's own investigations in Bengal have definitely established for the first time the existence of the 'Brown Race' in that province in the low caste leptorrhine mesocephalics, who are contrasted with the brachycephalic Brahmins. In an examination of the problem of the physical characters of the people by whom the Vedic culture and Aryan language was introduced into India, an ingenious use is made of Vedic literature and its cultural evidence to show that the original Aryans in India were not the dolichocephalic Proto-Nordics of the Punjab, as held hitherto, but a brachycephalic people or peoples from Central Asia, who came to be widely distributed over a great part of India and possibly suffered some modification by contact with non-Aryan peoples. Through these a wedge of later arrivals in the north, cruder dolichocephalic nomads, probably of strongly conservative tendencies, was driven, thus accounting for the present eastern and western distribution of the brachycephals.

A Rock-Boring Barnacle

PROF. H. GRAHAM CANNON makes some very interesting observations on the rock-boring barnacle *Lithotrya valentiana* from the Great Barrier Reef (British Museum (Natural History) Great Barrier Reef Expedition 1928–29. Scientific Reports, 5, No. 1; 1935) by which he clears up a complex mass of errors relating to the two species *Lithotrya truncata*, Quoy et Gaimard, and *L. valentiana*, Gray (as Conchotrya), showing that the two names should be regarded as synonymous. The Great Barrier Reef collection consists of thirty complete specimens, all from the Boulder Zone of Low Island Reefs. In general shape, they show every gradation, from forms which closely resemble the original specimens of *C. valentiana* and the original figure of *A. truncata* to those which are similar to the form described by Darwin in his cirripede monograph as *L. truncata*. The text figures are drawn with the author's usual skill, and these and the excellent photographic reproductions show clearly that there is a large range of variation in all the characters previously taken as diagnostic. Even in this small collection it is possible to copy any of the published figures of either species, and also to produce a complete series of intermediate forms. By very careful dissections and clear drawings, Prof. Cannon shows that the sublateral styles, the so-called latera, are not true lateral plates in *L. valentiana*, but are almost certainly modified scales of the girdle; that they may be absent or that there may be more than one pair; and that their presence or absence probably depends on the cuticular split on the moulting of the peduncular covering.

Vitamin D in New Zealand Fish Oils

FISH-LIVER oils are, as a class, the most potent of all known natural sources of vitamin D, and Dr. Marion M. Cunningham has analysed the potencies in this respect of representative New Zealand fishes (*N.Z. J. Sci. Tech.*, 17, 563, Dec. 1935). The liver of the groper (*Polyprion oxygeneios*) has the high potency of 2,250 international units per gram; ling-liver (*Genypterus blacodes*) 500; and skate (*Raiia nasuta*) only 15 units per gram. This agrees with Schmidt-Nielsen's finding that elasmobranchs are inferior to teleosts in vitamin D potency, and compares with a halibut liver oil potency of 900–1,400 international units, varying according to season. An oil obtained from the whole body of an eel (*Anguilla australis*) had a potency of 47 units per gram; and two samples of mammalian oil from the blubber of hump-backed whales were practically devoid of any anti-rachitic potency. The author adduces evidence of the reliability of the prophylactic method of biological assay of vitamin D.

Nitrification in Acid Soils

THE nitrifying power of soils in the Philippine Islands has been studied by M. M. Alicante, and has led him to repeat certain investigations on the process of nitrification in acid soils (*Phil. J. Sci.*, 58, No. 2, 163–170, Oct. 1935). Micro-organisms with nitrifying properties can only perform that function in artificial media of neutral or alkaline reaction; but in the soil, they may be active under quite acid conditions, if there are sufficient carbonates present. It is shown that both acid and carbonate radicals can exist at the same time in soil, and the occurrence of nitrification is due to the presence of carbonates, rather than to the absence of acid.

Practical Applications of Vernalisation

THE Imperial Bureaux of Plant Genetics, Aberystwyth and Cambridge, have recently brought out a new joint publication entitled "Vernalisation and Phasic Development of Plants" (Bull. 17, price 10s.). The issue of their earlier bulletin in 1933 ("Vernalization or Lysenko's Method for the Pre-Treatment of Seed") aroused widespread interest in the subject, as previously little was known of this method or theory, largely owing to the fact that the original papers were available in Russian only. Since then, research workers in practically every European country and also in countries so far apart as Canada, Australia, Ceylon, Brazil and China have been stimulated to investigate the matter for themselves and have

either confirmed or challenged the results or theory. Many of these observations have been communicated to the Bureaux direct, and close touch has also been maintained with the Russian workers. The present publication sets out in full the theories of Lysenko and other schools of thought and provides an up-to-date summary of the results obtained in all parts of the world. The practical application of vernalisation, so far as it has been tried, is discussed, with special reference to breeding, drought and frost resistance and the possibility of extending crops farther north than has hitherto been practicable. In some countries and with certain crops, notably cereals, practical success seems evident, but under other climatic conditions and with other crops the results are less encouraging. The subject, however, is still in the experimental stage, and although much headway has already been made, notably as to the effect of factors such as light and temperature, the physiological processes involved are still far from clear. The publication of this documented review will be welcomed by all plant physiologists and geneticists, particularly as its arrangement permits of easy reference, whether information is required regarding crops, countries or physiological aspects.

Rock Compressibilities

THE observed speeds of propagation of seismic disturbances through the interior of the earth allow the elastic properties of the materials through which they are propagated to be estimated. The results have as a rule been higher than would have been expected for materials at the high temperatures and pressures which exist in the earth's interior. Observations made in the laboratory have generally shown that the compressibility of material increases as the temperature and pressure increase, and the speed of propagation of elastic waves through it should therefore decrease. Vol. 46 of the *Bulletin of the Geological Society of America* contains an account of the experiments on lead, aluminium, silica glass, obsidian and diabase up to temperatures of 300° C. and pressures of 10,000 atmospheres made by F. Birch and R. R. Law in the Dunbar Laboratory at Harvard with apparatus and methods due mainly to Prof. P. W. Bridgman. They find that while for the metals the compressibilities increase with rise of temperature and pressure, for the rocks and the glass they begin to decrease again in an unexpected way at temperatures above 150° C., which would imply higher elasticities and higher speeds of propagation of seismic waves. The observations are to be pushed to higher temperatures.

Electrostatic Energy

IN the supplementary issue of the *Philosophical Magazine* of February, Prof. Taylor Jones examines the possibility of explaining the electrostatic energy of two neighbouring equally charged particles as due to the train of waves of frequency ν determined by the quantum equation $h\nu = mc^2$ which accompanies each particle (h is Planck's constant, m the rest mass of the particle and c the velocity of light). Regarding the particle itself as a vibrator having this free frequency, he assumes that when two are in the same neighbourhood each is acted on by an additional force directed towards its mean position, which is proportional to the distance of the other from *its* mean position and inversely proportional to the mean distance of the particles apart. In these circumstances, the possible oscillations of each are of two frequencies, one above and the other below their free frequency. If the frequency is the higher, the two move in the same phase, and if the lower they move in opposite phases. In the former case, if the particles approach each other their frequency and energy increase; if they recede both decrease, according to the electrostatic law. For several other simple arrangements of particles the same result follows and Prof. Taylor Jones is investigating whether the law holds for more complex systems.

Experiments on Piston Rings

IN a paper read before the North-East Coast Institution of Engineers and Shipbuilders on February 7, Eng.-Comm. C. J. Hawkes and Mr. G. F. Hardy gave the results of their experiments, made during the last five years at Armstrong College, on the extent of frictional resistance and leakage occurring at piston rings. In the apparatus, specially constructed for this purpose, a reciprocating sleeve, driven by a crank having a speed range of 120–650 r.p.m., gave mean 'piston' speeds of 2–11 ft. per second. The small movements of the stationary piston against calibrated springs were recorded on a diagram and showed the value of the frictional resistance encountered. Measurements were made of this resistance as affected, separately, by viscosity (inferred from piston temperature), gas pressure, piston speed, and the number of rings in use. The authors conclude that the resistance F varies as the square root of the viscosity Z, but the curves given appear rather to show that F varies as Z^n where n, which is approximately 0·5, is, for a given gas pressure, a function of the speed. From their tests on the influence of gas pressure, the authors deduce that ring resistance is proportional to the sum of the square roots of the net radial ring loads, and they incline to the view that it also varies as the square root of the speed. The tests on leakage showed that it is controlled mainly by the sealing capacity of the last ring and that, in any event, greater losses occurred than could be accounted for by ring gaps alone, thus pointing to leakage past the ring faces.

A Very Remote Globular Cluster

THE globular cluster N.G.C. 2419 is of special interest owing to its unusually great distance. This distance is particularly surprising on account of the position of the cluster, which lies in a direction opposite to that of the centre of our galaxy in a region where only nearby clusters would be expected. An attempt to obtain a more accurate value of the distance of this object has been made by W. Baade (*Astrophys. J.*, **82**, 396) who has been able to photograph thirty-one short-period Cepheids, the maxima and minima of twenty-five of which lead to a fairly reliable result. No selective absorption of light was found from the colour-index and spectrum of the cluster, nor was there any sign of local obscuration, but a correction had to be applied for the general absorption of light within our galaxy. The final results indicate a distance of 56,000 parsecs, which is considerably larger than that previously suggested by Shapley. The possibility is discussed of N.G.C. 2419 being an independent intergalactic object, but the observations at present leave this matter indeterminate. If it is supported by later results, then such a case of a globular cluster occurring in intergalactic space must be very exceptional.