

Research Items

South Indian Blood Groups

A STUDY of the blood groups of a jungle tribe (Pre-Dravidian), the Paniyans of Wynad, has been made by Mr. A. Aiyappan of the Government Museum, Madras (*Man*, November). This tribe was selected as being more isolated and in a purer state than most other Pre-Dravidians. No great degree of admixture with them has taken place, owing to the sexual jealousy of the tribal code. Until recently they were very wild. The Australians, Veddahs and Paniyans, notwithstanding close resemblances, are differentiated by several anatomical characters, especially of the face. The Paniyan is infantile and prognathous, whereas the Veddah is orthognathous; and the supraorbital ridges of the Paniyan are less prominent than in either Australian or Veddah. Nothing is known of the blood-typing of the Veddahs, and comparison is therefore restricted to the Australians. Two hundred and fifty Paniyans from three different settlements were tested. The following results were obtained: *O*, 20 per cent; *A*, 62.4 per cent; *B*, 7.6 per cent; *AB*, 10 per cent. The Australian figures are: *O*, 57 per cent; *A*, 38.5 per cent; *B*, 3 per cent; and *AB*, 1.5 per cent. Thus though there is no close resemblance between the two sets of data, they agree in having a low percentage of *B*. Von Eickstedt makes an interesting suggestion that the Pre-Dravidians may be regarded as the Palæ-Europid type, and this the blood grouping supports. In a correlation table the Paniyans will be placed very near the Lapps and other peoples of western Europe. The Paniyans show a much lower percentage of *O* than the Australians; but Cleland, typing a sample of central Australians, found 38.1 per cent *O* and 61.9 per cent *A*. If further research confirmed this bigger series, we should be able to say that serologically the Australians and Paniyans are closely linked.

Pawnee Archæology

THE Pawnee Indians of Nebraska and Kansas, who formerly occupied permanent villages in the Platte and Loup Valleys and on the Republican in the present State of Nebraska, have been known to the white man since 1541, when they may have been visited by Coronado, and certainly since 1673, when Marquette, the French Jesuit, noted them in his map at some distance north of the Kansa. They were the most numerous and powerful of the tribes constituting the Caddoan linguistic stock, and one of the most important in the Plains area. The tribal organization consisted of four endogamous bands, each functioning as an independent unit, but with the principal chief of the 'Grand' band acting as spokesman for the whole on occasion. One band, the Skidi or "Wolf" Pawnee, seems to have had a different ancestry, or to have been an earlier offshoot from the parent stock, as this branch was less closely bound to the others. A persistent tradition places their original habitat in the south or south-west, while another associates them with stone-built houses, although in fact there is no evidence of a Pueblo connexion. Archæological remains, surprisingly rich and numerous, have been discovered

at many of the village sites formerly occupied by the tribe. These, with the documentary history and traditions of the tribe, have been made the subject of detailed examination by Mr. Waldo Rudolph Wedel (Bull. 112, Bureau Amer. Ethnol.). The conclusion at which he arrives is that the material traits in Pawnee culture are drawn in large measure from the east and south-east. They formerly constituted part of the south-east Woodland culture area in its more western peripheral phase, retaining and disseminating many of the traits they acquired throughout the period of their northern residence, until Plains culture disappeared before the European contact.

Treatment of Cancer with an Enzyme Solution

BULLETINS will be issued from time to time by the Hendry-Connell Research Foundation, which will unite in one publication the laboratory and clinical aspects of medical research pursued there. In *Bulletin* No. 1, August, 1936 (Kingston, Ont., Canada), the results to date of the treatment of cases of cancer with a preparation named 'Ensol' are detailed. This is a solution of proteolytic enzymes obtained by digesting malignant tissue, removed at operation, with a pure culture of an anaerobic bacillus, *C. histolyticum*. After six days growth, the mixture is centrifuged and filtered through a Berkefeld filter candle to remove organisms, the filtrate obtained constituting the 'Ensol'. Experimentally, when placed upon carcinoma tissue, it produces rapid lysis or solution of the cancer cells. This preparation is injected into the patient, and appears to have no harmful effect. Dr. H. C. Connell contributes papers on the clinical results of 'Ensol' therapy. Patients to the number of 382—cases of inoperable cancer or who refused surgical interference—were treated with 'Ensol' alone. Of these, 180 (47 per cent) ultimately died, 106 (27.7 per cent) appeared to be permanently benefited, and of the remainder most were relieved, and only 13 showed no benefit. Other papers in the *Bulletin* deal with the reactions of 'Ensol', and with the cultural characters of *Clostridium histolyticum*.

The Pine Shoot Moth

FORESTRY COMMISSION BULLETIN No. 16 (H.M. Stationery Office. 1s. net) on the pine shoot moth (*Evetria buoliana*) in England is of special significance in connexion with afforestation schemes where conifers are involved. The authors, the late Mr. C. C. Brooks and Mr. J. M. B. Brown, discuss the life-history and possible means of circumventing the ravages of this insect. During the past few years, the Forestry Commission's plantations in East Anglia have suffered severely from its ravages. An investigation of the pest was begun in August 1928 at the Imperial Forestry Institute, Oxford, most of the data being obtained from the Brecklands area. The larva destroys the leading buds or shoots, and unequal growth, or distortion, of the trees is a common effect of its activities. An encouraging factor in the situation is that the Corsican pine suffers notably less from this insect than the Scots pine, and its planting, under certain conditions, is advocated.

Helisoma corpulentum and its Relatives in Canada

THE freshwater mollusc *Planorbis corpulentus* Say, now known as *Helisoma*, is the subject of an extensive monograph by F. C. Baker (Canada Department of Mines, National Museum of Canada, Bulletin No. 79, Biological Series No. 21, 1936. Contributions from the Museum of Natural History, University of Illinois, No. 75). By studying a large number of specimens, it has been possible to clear up a great deal of confusion with regard to this mollusc, and it is shown that the species is a composite one embracing several varieties and at least one additional species, which have been previously referred to *corpulentum*. The large snails of the genus *Helisoma* divide into two well-defined groups, *corpulentum* and *trivolvis*, around which several species and races arrange themselves. In a previous paper (*Ecology*, 11, 469; 1930) the author directed attention to the significant geographical distribution of certain species of freshwater molluscs in relation to the moraines of the last glacial invasion, the Wisconsin, when the country was greatly changed, many new species being evolved. The study of the helisomas of the *corpulentum-trivolvis* groups illustrates this well, and it is suggested that the parent stock of the large helisomas is probably the widely distributed *H. trivolvis* of the central and eastern part of the United States.

Bacterial Flora of Blow-fly Larvæ

We have received from Dr. N. Balzam, ul. Nowolipki Nr. 21, m. 5, Warsaw, a short, preliminary communication on this subject. It appears that the larvæ of *Calliphora erythrocephala*, and also the young and older pupæ, contain numbers of bacteria—it is stated about two million per individual. In the course of metamorphosis they disappear from the larval alimentary canal and pass to the tissues of the nymph where they become localized, since they do not occur in the hæmolymp or the newly formed gut. On the last day of pupal development, rapid destruction of the bacteria takes place, and in the great majority of flies none is found several hours after hatching. Dr. Balzam supposes that a cellular or phagocytic activity explains the passage of the bacteria from the larval gut to the tissues of the nymph and their absence from the hæmolymp. The final result is that, owing to complete 'auto-sterilization', the young flies are free from bacteria, and, therefore, do not disseminate pathogenic germs derived from the larvæ. A full account of the work, it is stated, will appear in a coming issue of the *Annales de l'Institut Pasteur*.

Type Cultures of Micro-organisms

THE Medical Research Council has issued a fourth edition of the Catalogue of the National Collection of Type Cultures, maintained at the Lister Institute of Preventive Medicine, Chelsea Bridge Road, London, S.W.1. (*Special Rep. Series*, No. 214. London: H.M. Stationery Office. 2s. 6d. net). Five years have elapsed since the publication of the third edition of the Catalogue, and during this period a large number of species of bacteria and micro-fungi have been added to the Collection. In the present edition, the generic name *Bacillus* has been restricted to the spore-bearing rods, aerobic and anaerobic. Most of the non-sporing rod-forms are listed under *Bacterium* except where well-recognized generic names are in common use, for example, the diphtheroids (*Corynebacterium*) and the organisms of undulant and abortus fevers (*Brucella*). The typhoid

and para-typhoid bacilli and food-poisoning organisms are, however, placed under *Salmonella*, and the dysentery bacilli under *Bacterium*. It is pointed out that nomenclature is in a state of flux, and is now being considered by two or three committees. In respect of both bacteria and fungi, a number of synonyms is given for the convenience of those more familiar with the older systems of nomenclature. In addition to bacteria, yeasts, micro-fungi and *Actinomyces*, several strains of bacteriophage, and a few Protozoa and viruses are also stocked. Cultures may be obtained for a small fee on application to the Curator. In order to increase the services that may be rendered to microbiologists, it is requested that cultures be forwarded to the Curator, not only those of newly isolated species, but also fresh examples of types at present conserved in the Collection.

Role of Silicon in the Plant

A SERIES of papers upon this subject by A. Sreenivasan have recently appeared (*Proc. Indian Acad. Sci.*, 1, 2 and 3). The inquiry appears to have arisen out of the fact that the rice plant, which accumulates exceptionally large quantities of silicon in its ash, grows so satisfactorily under swamp conditions. This raised the question whether swamp conditions are particularly favourable for silicate supply and also raised anew the question as to the role of silicon in the plant. An extensive series of experiments with rice, grown both in swamp and dry soil conditions, showed that whilst both phosphate and silicate manurial treatments increase yield, silicate is particularly useful in raising the yield from manured arid soils to practically the same level as that in swamp soils. The conclusion is reached that the swamp conditions, therefore, are suited to the rice plants because thus large amounts of silica are supplied to the plant which would otherwise remain unavailable. The role of silicon still remains obscure; the author points out that its accumulation may be a secondary result of growth in swamp conditions which are otherwise favourable to the plant, for example, on account of the resultant presentation of nitrogen to the root system in ammoniacal form. The mode of entry of silicon into the plant also remains obscure; but this detailed examination has cleared up many points as to the behaviour of silicates in the soil, to which they contribute both an alkali and a silicate gel, and as to their significance in the manurial treatment of the rice crop.

Gravity Measurements in Sweden

PART 2 of vol. 25 of *Archives of Mathematics, Astronomy and Physics* of the Swedish Academy of Sciences contains two communications which show that progress is being made in the determination of the geophysics of Sweden. The first, by Drs. G. Ising and T. Eeg-Olofsson, gives an account of the measurements of the gravitational acceleration in the extreme south of the country by a modified form of the quartz fibre torsion method used by Threlfall in Sydney, forty years ago. The horizontal quartz fibre is supported at its ends by the lower forked end of a rod suspended like a pendulum from a support at its upper end. The centre of the fibre has attached to it one end of a small rod of quartz 1.6 cm. long, and the fibre is twisted until the rod is nearly horizontal, when a very small change of gravity makes a considerable change in the position of the free end observed by microscope. The torsional

constant of the fibre is kept constant by surrounding the apparatus with ice. The results show that the variations of gravity with latitude and height are nearly normal over chalk districts, but over the higher districts of Cambrian and Silurian rocks gravity exceeds the normal value by 0.04 or 0.05 c.g.s. units. The second communication, by Dr. G. S. Ljungdahl, on the magnetic anomalies, shows that they are much greater in Sweden than in France and that over the Baltic depression of 400 metres south-east of the island of Uto, the normal deviation of the compass to the west (about 5°) is reduced by 1°. The author hopes, as more results for gravity throughout Sweden become available, to trace further relations between regional anomalies of gravitation and the earth's magnetism.

Sound Insulation by Double Partitions

J. E. R. CONSTABLE, working in the National Physical Laboratory, has investigated the effect of introducing absorbent materials into the air space between light double partitions (*Proc. Phys. Soc.*, **48**, 690; 1936). Previous work had shown that the efficiency of a double partition for sound insulation was mainly dependent on the spacing between the panels. A calculation showed that the transmission would be considerably reduced by absorbing, inside the space between the panels, the sound which is reflected back and forth there. Experiments made by introducing acoustic felt into the space between double walls of thin iron or aluminium produced improvements in sound insulation which were in agreement with calculation and were of the order of 10 decibels.

Entropy of Deuterium Oxide

THE calorimetric entropy of ordinary water does not agree with entropies calculated from band spectrum and reaction data. An explanation recently given by Pauling assumes a random orientation of hydrogen bonds in the crystal. The entropy of deuterium oxide ('heavy water') shows a similar discrepancy (E. A. Long and J. D. Kemp, *J. Amer. Chem. Soc.*, **58**, 1829; 1936). The specimen had a density of 1.10781, corresponding with 99.92 atomic per cent, and a melting point of 276.92° K. The latent heat of fusion is 1,501 gm. cal. per mol. The calorimetric entropy of the liquid at 298.1° K. is 17.27 E.U.; the value which should be used in thermodynamical calculations is 0.806 E.U. higher on the basis of Pauling's theory. From the measured heat capacities and the known heat of sublimation, the calorimetric entropy of D₂O gas at 273.1° K. is 45.89 U.E. at 1 atm. pressure. The value from spectroscopic data is 46.66 E.U., giving a discrepancy of 0.77 E.U. between calorimetric and spectroscopic values. This is in good agreement with the theoretical value of 0.806, which is evidence for the correctness of Pauling's theory.

Indium

THE metal indium, belonging to Group III of the Periodic Table, has been very scarce. It is found in small amounts in certain zinc blendes, in zinc carbonate minerals, and in various ores of iron (including chalcopyrite, Cu₂Fe₂S₄), manganese and tin. It has also been found with cadmium and has been detected in all specimens of metallic tin examined by two investigators. F. M. Brewer and E. Baker (*J. Chem. Soc.*, 1286; 1936) now report that two rare tin minerals, cylindrite and franckeite, sulphides of lead, antimony and tin, have an indium content (0.1-1.0

per cent) much larger than any source yet reported. These minerals are confined to the Bolivian tin belt, where argentiferous thioannates are found. Indium was also found in some silver minerals not containing tin. The same authors in a second paper (p. 1290) describe methods for the extraction of indium from cylindrite, chalcopyrite and metallic tin. Indium is coprecipitated with stannous sulphide. Since the boiling point of indium chloride is much higher than that of stannic chloride, they can be separated by distillation. Details of other methods are given.

High-Frequency Modulation of Ultra-Short Waves

THE development of television transmissions on ultra-short waves has necessitated the study of methods of modulating carrier waves of a few metres in length with modulation frequencies of the order of one megacycle per second. The usual methods of amplitude modulation employed for sound broadcasting at moderate carrier frequencies are not satisfactory, owing to the undesirable frequency modulation and vision distortion which accompany their use. Messrs. S. S. Banerjee and B. N. Singh, of the Physics Department, Benares Hindu University, state, in a communication addressed to the Editor, that they have recently been studying the use of short parallel-wire transmission lines in the modulation of ultra-short waves (wave-lengths 4-5 metres) by high frequencies of 1.5-3 megacycles per second. From the general equations applicable to such transmission lines, it can be shown that amplitude modulation free from frequency modulation is obtained when the length of the line is an integral multiple of a quarter of the length of the carrier wave. This condition, which is fairly critical, has been verified experimentally by the above investigators with the aid of a modified Lecher wire system previously adopted by Banerjee (*Phil. Mag.*, **19**, 787; 1935) in connexion with the measurement of the radiation resistance of transmission lines. At the high modulation frequency employed, the effects of the carrier wave and side bands are adequately separated on the Lecher wire system. The detailed results of these investigations will be published elsewhere shortly.

Colours of Globular Clusters

THE problem of the absorption of light in space, with the consequent 'reddening' effect of great distances, has been investigated by Stebbins and Whitford (*Astrophys. J.*, **84**, 132) through a study of globular clusters. They have used a photo-electric cell attached to the 100-inch telescope at Mount Wilson, and determined the colours of 68 clusters by means of the integrated light intensities of each cluster through filters transmitting light of effective wave-length 4340Å. and 4670Å. The colour excesses show a marked correlation with space absorption as deduced from the number of extra-galactic nebulae in the field, and also with galactic latitude; being, of course, redder near the galactic equator where the absorption is greatest. The absorption was not found to be uniform, and the greatest measured colour-excess was + 0.82 mag., corresponding to a photographic space absorption of about 3 magnitudes. One effect of this absorption is that distances inferred from apparent magnitudes in clusters must be divided by four. When this correction is made, the diameter of our galaxy is found to be about 30,000 parsecs, which is of the same order as that of the Andromeda nebula.