

Research Items.

THE "SHRUNKEN HEADS" OF THE JIBAROS.—In "Blood Revenge, War and Victory Feasts of the Jibaro Indians of Eastern Ecuador," by Rafael Karsten, which has been issued as Bulletin 79 of the Bureau of American Ethnology, a section deals with the methods of preparation of, and beliefs attaching to, the shrunken heads which form the war trophies of these tribes. Much attention was attracted to this subject by Sir John Bland-Sutton's lecture before the Royal Society of Medicine in November last (see the *Lancet*, November 11, 1922, p. 995; *Brit. Med. J.*, November 11, 1922, p. 932). These heads, which have been made familiar by a number of specimens in our museums, are usually about the size of an orange, the skin, with the hair attached, having been stripped from the skull by an incision at the back. Three strands of twisted red-painted cotton hang from the lips, and the whole head is dyed with charcoal. The hair, which is held to be the seat of the soul, is the most essential part of the trophy. The head is regarded as charged with supernatural power, and is never that of an enemy belonging to the same tribe as that of the slayer, with whom blood relationship might be claimed, as the process of reduction is a deadly insult to the whole tribe. Each stage of the process has its appropriate ritual. The reduction is begun by the use of three stones heated in a fire, this being obviously ceremonial, as the actual reduction is afterwards effected by the use of hot sand introduced through the opening of the neck. Heads of certain animals such as the sloth and the jaguar, are prepared by the same method and with identical ceremonial, because at one time all animals were men who fought among themselves and took one another's heads as trophies.

POLYNESIAN TYPES.—In vol. xxii., No. 2, of the *Journal of the Polynesian Society*, Dr. Louis R. Sullivan discusses some of the anthropometric data obtained in the Pacific by the Bayard Dominick Expedition of the Bernice Pauahi Bishop Museum of Honolulu and the American Museum of Natural History. From material collected in Samoa, Tonga, the Marquesas, and Hawaii, Dr. Sullivan has isolated two types which he calls tentatively Polynesian and Indonesian. The characteristics of the Polynesian type are light-brown skin colour, wavy hair, medium development of beard and body hair, lips of average thickness, moderately long head (cephalic index 77-78), high face, high but broad nose, and tall stature; of the Indonesian type, medium to dark-brown skin, wavy hair, scant beard and body hair, thick lips, short heads (cephalic index 81-82), stature shorter than the Polynesian, very low broad face and very low broad nose. This hitherto unsuspected Indonesian element, Dr. Sullivan thinks, explains the often-expressed opinion that the Polynesian and Indonesian are closely related types. When the Indonesian traits are removed, the Polynesian appears to be strikingly Caucasoid, and the available data seem to indicate a type intermediate between Caucasian and Mongol. On the other hand, the Indonesian type seems to be a somewhat doubtful Mongoloid diverging toward the Negrito. This type is most important as an element of the population in Tonga and the North-Western Marquesas. In addition, there is a Melanesian element in the south and west of Polynesia—in Tonga, New Zealand, and Easter Island; but Dr. Sullivan is of the opinion that Melanesian influence has been slightly exaggerated. The group exhibiting a high degree of brachycephaly (cranial index frequently 90 and over), occurring notably in Tonga, Samoa, Tahiti,

and to a lesser degree in the Marquesas, to which Prof. Elliot Smith has referred as Proto-Armenoid, he regards as Polynesian with an artificially deformed head.

THE UNKNOWABLE.—It is rather curious to reflect on the completely different aspect which Spencer's theory assumes to us to-day, by reason of the change which has come over our mathematical and physical conceptions. Spencer thought of positive science as a realm of clear and transparent light surrounded by a murky realm of metaphysical darkness, and he expressed this firmly-held conviction by describing the outer darkness as the unknowable. To mathematicians and physicists to-day it is, on the contrary, these outer limits, this beyond of the world of sense-perception, of which they feel most confident that they possess sure and precise knowledge. The electron theory and the principle of relativity, which concern fundamental concepts, seem to us more secure scientifically than the sense-perceived objects of practical life. It is these which have sunk back into the mystery of the unknowable. This is not, however, the line of Mr. Santayana's thought expressed in his Herbert Spencer lecture, "The Unknowable," delivered at Oxford on October 24 and now published (Clarendon Press). For him Spencer's unknowable is a doctrine of substance, and he thinks that when the self-contradictoriness of Spencer's statement is corrected it can be brought into line as a sound Spinozistic conception. "Calling substance unknowable," he says, "is like calling a drum inaudible, for the shrewd reason that what you hear is the sound and not the drum. It is a play on words, and little better than a pun."

METABOLISM IN DIABETES.—A vast mass of data relating to the metabolism of diabetics has been accumulated since 1908 by Dr. E. P. Joslin, of Boston, working in association with Dr. F. G. Benedict, of the Nutrition Laboratory, and these are analysed and discussed in Publication 323 of the Carnegie Institution of Washington. In all, 113 patients have been examined in greater and less detail, partly in the period when the prevalent treatment was overfeeding with a low carbohydrate and high protein-fat diet, and partly since the introduction of fasting and under-nutrition as the general regime in 1914. The figures provide a great quantity of accurate measurements which will be examined with profit by those interested in the subjects.

EFFECT OF MANGANESE ON PLANT GROWTH.—Certain elements that occur only in very small amounts in plant tissues would appear to play some definite part in the economy of the plant. J. S. McHargue (*Journ. Agric. Research*, xxiv, pp. 781-794) has investigated the effect of manganese sulphate on the growth of plants in water cultures with specially purified nutrient salts, and his results indicate that at least for the plants tested, a very small quantity of manganese is essential to produce normal growth. Such plants as radish, soy bean, cow-pea, field pea, and maize do not contain sufficient manganese for growth to maturity, though some have sufficient to maintain a normal development for the first few weeks. In the latter case experiments carried on for too short a time fail to reveal the essential nature of manganese. The lack of manganese affects the production of dry matter and brings about an etiolated condition of the young leaves and buds, suggesting that the element has a function in photosynthesis and in chlorophyll formation. Experiments carried on in soil showed that manganese

sulphate applied to acid soil caused a decrease in crop, whereas if calcium carbonate was applied in addition to neutralise the acidity, increased yields were obtained. Soluble salts of manganese in acid soils may therefore be one of the causes of toxicity in such soils as exhibit toxic effects, an excess of manganese sulphate rendering a soil more or less sterile with respect to the growth of plants.

SILVER-LEAF DISEASE.—The fourth of the series of papers on this subject by Mr. F. T. Brooks and his co-workers appears in the *Journal of Pomology*, Vol. iii., No. 3, September. With financial aid from the Ministry of Agriculture, these important investigations are extending in scope, and besides experiments at Cambridge and at the John Innes Horticultural Institution, Merton, work has been done upon orchard trees at the East Malling Fruit Research Station and at Heston, Middlesex. The parasitic fungus *Stereum purpureum* is responsible for the typical silver-leaf disease, and in this fourth report, Brooks and H. H. Storey criticise Bintner's recent attempt to distinguish a false "silver-leaf" disease due to other physiological causes while pointing out that the silvery appearance, due usually to the optical effects produced by an air gap between leaf epidermis and mesophyll, may frequently arise from accidental disturbances quite unconnected with the entry of *Stereum purpureum*. The experiments now recorded show that the fungus readily infects the living wood at any exposed surface, penetrating such tissues more readily than shoots previously killed in the autoclave, in which it seems to be less active than many saprophytic moulds. A very interesting description is given of the conditions found in Pershore plums which had been infected by the disease and then "grew out" of it. On examination the dead fungus patches could be seen in the wood sharply delimited from the healthy tissues by a band of gum excreted from the tissues. The accumulation of these gum-like substances both in diseased tissues and at the surface of a healthy wound are obviously profitable subjects for further study. Brooks and Storey record many observations on natural wound protection in fruit trees and upon the usual dressings applied to protect such wounds; in their experience gas tar has been the most valuable dressing, Stockholm tar proving very disappointing as a means of protecting wounds against fungal attack.

DISSECTING A DEVONIAN FISH.—A palæontologist of our acquaintance is wont to dream of finding a palæozoic fossil with all its soft parts so beautifully preserved that he can dissect them. Our friend will be envious when he reads in the annual report of the Field Museum of Natural History (Chicago, 1923) how Dr. Erik Stensiö, the new head of the Palæontological Department of the Swedish State Museum, spent ten days at Chicago dissecting the head of a Devonian fish, *Macropetalichthys*. This specimen, it is said, allowed Dr. Stensiö to obtain an exact knowledge of the shape of the brain and details of the nervous and circulatory system of the head. These facts might possibly have been inferred from the petrified skeletal tissues; but the report says precisely: "The preservation of these soft parts was so perfect that they could be studied almost as well as if it were a fresh specimen." The specimen has been mounted for museum exhibition in such a way as to make a complete whole with all the dissected parts visible, and with every portion removable for close study. Zoologists will await with interest the publication of Dr. Stensiö's memoir.

FREE RADICLES.—J. B. Conant and A. W. Sloan have recently published a preliminary paper on the

formation of free radicles (J. Amer. Chem. Soc., vol. 45, p. 2466). The reduction of triphenylpyrylium chloride with vanadous chloride yields a reddish substance which is insoluble in water and behaves as a free radicle. The same reducing agent reduces triphenylcarbinol in concentrated hydrochloric or sulphuric acid solution to free triphenylmethyl.

CELLULOSE DERIVATIVES.—The technology of cellulose derivatives is discussed in an article in the *Chemical Trade Journal* for October 19, which is mainly devoted to the newer ethers and esters. The preparation of cellulose butyrates is receiving attention, because by introducing more complex acid radicals it is hoped to prepare esters with useful solubility properties. The interest in the cellulose ethers has directed attention to improvements in the manufacture of diethyl sulphate, these being discussed in the article. The properties of the various esters and ethers are given.

PRESERVATION OF WOOD.—The *Chemical Trade Journal* for Oct. 5 contains an article on wood preservatives. The art of wood preservation dates back from very early times; it was practised by the Egyptians, who used antiseptic oils for the purpose. Burnett in 1838 introduced the use of zinc chloride; Wolman in 1906 patented the use of certain fluorides in conjunction with other salts, and from this date hundreds of patents on the subject have been taken out. In recent times the creosoting process has been introduced, but it confers odour and inflammability on the timber. The methods of impregnation are discussed in the article, and the results obtained from the uses of various salts are described. A note is also added on the preservation of wood pulp.

MAGNETIC DECLINATION AT KEW.—A careful detailed study by Dr. C. Chree, of the "Absolute daily range of magnetic declination at Kew Observatory, Richmond, 1858 to 1900," has just been published in the *Geophysical Memoirs* (vol. iii. No. 22) of the Meteorological Office. The annual variation of the daily range is examined by subdividing the year into 73 five-day periods; for each group of five days the 42-year mean daily range is given, also the largest and least values; smoothed means are given also for years of sunspot maximum and minimum. The ranges are, of course, distinctly less in minimum than in maximum sunspot years. The daily range undergoes a double oscillation in the course of a year, with maxima at the equinoxes and minima near the solstices. Again, Wolf's linear relation, $R = a + bS$, connecting the range R with the sunspot number S , is examined; a and b are found to vary quite considerably both throughout the year and from one year to another. The determination of a and b does not in itself give a measure of the degree of correlation between R and S , and this question is separately investigated. The mean correlation coefficient for the whole period is 0.86, but in the mean of the winters it is only 0.53, while there are conspicuous variations in the results for the four groups of years, each roughly comprising one sunspot period, into which the whole series is divided. Interesting frequency tables are also given (a) showing the distribution of ranges of different sizes, in each individual year, for the said four groups of years, for sunspot maximum and minimum years, and for each month of the year; and (b) showing the distribution of the hour of daily maximum and minimum declination for similar groups of the data. The paper contains a large amount of important though technical information; the results would be more readily comprehended if they had been indicated by graphs based on the numerous tables.