

Research Items.

ETHNOLOGY OF MALTA AND GOZO.—In the Journal of the Royal Anthropological Institute (vol. lli., 1922) Mr. L. H. Dudley Buxton publishes an exhaustive essay on the ethnology of Malta and Gozo. The skulls discovered in the course of excavation and examination of the existing population lead to some interesting conclusions. The First Race, the Megalith builders, are certainly akin to the early and present inhabitants of North Africa, Sicily, Corsica, Sardinia, and Spain, all belonging to the Mediterranean races. Their successors, the Second Race, exhibit Armenoid characteristics, and were probably immigrants from the eastern Mediterranean. Their arrival probably occurred towards the end of the Bronze or in the Early Iron Age. Armenoids with an admixture of Mediterranean blood, they probably came to Malta from Carthage. They may have destroyed the previous inhabitants, or they may have pursued methods of peaceful penetration. At any rate, they established themselves firmly in Malta, and all later introduction of foreign blood has failed to raise the variation. In later times there have been local variations, but the differences between Malta and Gozo are not greater than the differences between the general population of Malta and at least one, and possibly more, of the more isolated villages.

TREATMENT OF LEPROSY.—In a recent lecture delivered to the Royal Society of Arts and published in the Journal of the Society for May 18, p. 452, Sir Leonard Rogers dealt with the problem of leprosy. He estimates that at least three million lepers exist. The disease is communicable, though its infectivity is very slight, and isolation of the infective cases is the only practical preventive measure. Hitherto no effective treatment has been known; but during the last few years, and largely through the researches of Sir Leonard Rogers, certain derivatives of chaulmoogra oil, an old Indian remedy for tuberculosis and leprosy, have been found to exert a beneficial action, and many of the treated cases have lost all signs of the disease and appear to be cured.

GIARDIAS LIVING IN MAN AND OTHER ANIMALS.—*Giardia Lamblia* is a well-known protozoan parasite of the human intestine, and other similar parasites are met with in the intestinal tract of the rabbit, dog, and tadpole. It has been supposed, therefore, that man may become infected from these lower animals. In order to throw some light on this question, the various species have been critically examined by R. W. Hegner (*American Journ. of Hygiene*, vol. ii., No. 4, pp. 435 and 442). *G. duodenalis* from the rabbit and *G. canis* from the dog are considered to exhibit such differences in size, form, and structural details as to constitute species distinct from each other and from *G. Lamblia*. *G. agilis* from the tadpole is more like *G. Lamblia* than the two others, but is sufficiently different to constitute a distinct species. *G. alata*, another giardia from the tadpole described by Kunstler and Gineste, is considered to be identical with *G. agilis*.

CANCER IN PLANTS.—The exhaustive researches of Erwin F. Smith, of Washington, in the pathology of crown gall in plants have led him repeatedly to emphasise the resemblances between the abnormal growths which may be produced in plants by the experimental inoculation of *Bacterium tumefaciens* and malignant tumours in animals. According to his view, which is shared by Jensen, the bacteria provide the stimulus at the beginning of the disease, which is then continued by the stimulated but

uninfected cells behaving as parasitic cells similar to cancer cells. A careful re-investigation of the facts by W. Robinson and H. Walkden in Manchester (*Annals of Botany*, vol. cxlvi., 1923, p. 299) does not, however, bear out this interpretation. They find that the careful examination of serial sections usually reveals the relatively close proximity of the causal bacteria to the proliferating tissues, and that there is no evidence that the cells continue to grow in an abnormal way when they are removed from the immediate influence of the bacterium. The analogy with animal cancer, in their view, wholly breaks down.

FRUIT-GROWING IN NORTH CAROLINA.—Supplement No. 19 to the U.S. *Monthly Weather Review* contains a discussion by Mr. Henry J. Cox, meteorologist, on "Thermal Belts and Fruit-growing in North Carolina," and an Appendix by Mr. W. N. Hutt, former State Horticulturist, on "Thermal Belts from the Horticultural View-point." The whole subject is treated with minute detail, specially screened temperature observations having been taken at several fruit orchards and at different positions on the slopes of the same orchard. The subject is well illustrated by plates and diagrams, and the results obtained are scientifically manipulated. Minimum temperature and its duration are the chief factors involved in the growing of fruit. Valley floors must in nearly all cases be avoided unless means are available for orchard heating, since on critical nights of temperature inversion the thermometer at the bottom of valleys often falls 15° or 20° F., and sometimes even 25° or 30° F., lower than higher up on the slope. Dense vegetation is responsible for great loss of heat through radiation, and a cultivated orchard is therefore warmer than one planted in grass. The topography of a region is paramount. The Appendix shows the differences of temperature at 16 stations, and a summary of the horticultural data, such as first bloom, full bloom, and bloom all shed, of apples and peaches, with the cause and date of injury where experienced, and the yield. Much of the damage sustained is due to cold-air traps or frost pockets. In some years a heavy yield of grapes is secured, while apples are a failure, this being due to the later blooming period of grapes. The apple tree is normally an alternate bearer, and the heavy drain on the energies of the trees one year is usually followed by a weaker bud development and lighter crop the following season.

MIOCENE CICHLID FISH FROM HAITI.—Prof. T. D. A. Cockerell describes and figures under the name of *Cichlasoma woodringi*, n. sp., an interesting fossil fish from the Miocene of Haiti (Proc. U.S. Nat. Mus., vol. lxxiii. art. 7). Cichlid fish abound in South and Central America and in tropical Africa, while fossil representatives have been found in Algeria (Palæochromis) and in the Eocene of Wyoming (Priscacara). Six species or races of Cichlasoma are living to-day in Cuba, and the question arises whether these last are an invasion from the south or the remains of a once widely distributed Antillean fauna. Prof. Cockerell is inclined to hold the latter view.

THE FORMATION OF VITAMIN-A.—It has been known for some time that the only source of vitamin-A is the plant, and that the green parts are richer in it than the colourless parts are. Dr. Katharine H. Coward has carried the investigation further, and her results are given in two papers in the *Biochemical*

Journal (vol. 17, No. 1, 1923). She shows, first, that light is necessary for the formation of vitamin-A, although neither chlorophyll, carbon dioxide nor oxygen need be present. It can also be formed in the almost complete absence of calcium. A further clue was given by the apparent close association of the lipochrome pigments (carotene, etc.) with vitamin-A in various articles of diet. It had indeed been suggested that the two substances might be identical. But this was disproved by Drummond. The orange-yellow pigment, carotene, is well known as giving the colour to carrots. Dr. Coward found, however, that flowers, or parts of flowers, exposed to light, if they contained carotene, also contained vitamin-A, and that absence of the pigment meant absence of the vitamin. But both may be present in tissues not exposed to light, as in the root of the carrot. Evidence is given that the vitamin has been transported to the root from the leaves. Although the investigator ventures no hypothesis on the matter, it seems highly probable, from the necessity of both light and carotene for the production of vitamin-A, that the pigment acts as an optical sensitiser, similar to chlorophyll for the formation of formaldehyde. It would be of interest to know whether the rays absorbed by carotene are the most effective.

STRUCTURE OF CARBON MONOXIDE AND NITROGEN.

—In an interesting paper in the Proceedings of the Physico-Mathematical Society of Japan for April, H. Nagaoka discusses the band spectra of nitrogen and carbon monoxide. He starts with the assumption put forward by Langmuir, that the external electron configurations of the two gases are very similar. The band spectra, which are presumably due to the external electrons of the molecule, should therefore be in close agreement. This is shown to be the case, with small differences indicating slight peculiarities of structure. The author then remarks that the ratio of the specific heats of the two gases cannot be accounted for on the assumption of Langmuir that the two nuclei are in the same cube (a difficulty pointed out by Partington in 1921), and he therefore proposes another model for the gases, in which two cubes are joined at an edge. This would give the correct value of 1.40. The two connecting electrons in the edge are pulled together by the nuclei, so that the resulting external electronic arrangement is that of two tapering six-faced figures connected by a narrow neck. The author points out that the values of the ratio of the specific heats can serve as a useful criterion in differentiating between possible and impossible electron configurations.

PHOTO-ELECTRIC CONDUCTIVITY OF CRYSTALS.—

A number of contributions to our knowledge of this subject have been made during the past three years by Drs. B. Gudden and B. Pohl, of the University of Göttingen, in communications to the *Zeitschrift für Physik* and the *Physikalische Zeitschrift*, and a short summary of these is given in the issue of *Die Naturwissenschaften* for May 11. They find that all crystals with high refractive indices possess this conductivity, and that if, when withdrawn from the influence of light, they are insulators, when exposed to it they show an initial conductivity which is relatively large and proportional to the energy of the incident light. When the wave-length of the light is altered, the quotient of the quantity of electricity transmitted divided by the energy of the light incident shows the usual maximum at the wave-length of greatest absorption, but when it is calculated for the energy of the light absorbed, it continues to increase towards the longer waves and eventually

becomes a linear function of the wave-length. Over this region the authors consider that the observations justify the conclusion that one quantum of light energy absorbed gives rise to one electron in the crystal.

AMMONIUM SULPHIDES.—Although a solution of ammonium sulphide has been in use in the laboratory for many years, the anhydrous substances are not well known. The solid compounds NH_4HS and $(\text{NH}_4)_2\text{S}$ were said to have been obtained by Bineau in 1838-39 by the interaction of gaseous ammonia and hydrogen sulphide in the required proportions by volume, but doubt was thrown on the formation of the second compound by experiments of Bloxam in 1895. The matter has been reinvestigated by Thomas and Riding, whose experiments are described in the May issue of the *Journal of the Chemical Society*. Anhydrous NH_4HS is best prepared by alternately passing ammonia and hydrogen sulphide into dry ether. Attempts to prepare $(\text{NH}_4)_2\text{S}$ were not very successful. The prolonged action of ammonia on the hydrosulphide in ether produced no sulphide, but on the addition of alcohol a yellow oil separated, which on standing gave some transparent cubic crystals, believed to be $(\text{NH}_4)_2\text{S}$. The research throws very little light on the formation of the latter substance, but the method of preparation of NH_4HS is a convenient one.

ABSORPTION SPECTRA AND ATOMIC STRUCTURE.—

In the *Comptes rendus* of the Paris Academy of Sciences for April 23, M. Victor Henri derives from the study of the absorption spectra of a large number of substances, both in solution and in the state of vapour, some important conclusions bearing on Bohr's theory of atomic structure. He shows that the absorption spectrum of a solution may be either one composed of narrow bands (10-30 Å) disposed in regular series, or one of broad bands (200-500 Å); in a few cases both types of bands are present, but the narrow ones then occur only in the less refrangible regions. When the vapour of the substance is examined, the narrow bands of the solution are replaced by fine lines, while the broad bands of the solution appear also in the vapour as unresolved bands. He explains the narrow bands by the theory of quanta, the molecule being supposed to possess a series of stationary states, of which the energy is determined by the movements of the electrons, atoms, and the molecule. He distinguishes four cases. When the molecule contains only a single double bond, such as $\text{C}=\text{C}$, $\text{C}=\text{O}$, $\text{C}=\text{N}$, $\text{N}=\text{O}$, the other atomic groups in the molecule being all saturated, only broad bands are afforded either by the solution or the vapour. When the molecule is as simple as possible, but contains two or more groups with double bonds, narrow bands are given by the solution and fine lines by the vapour, distributed in series conformably to the theory of quanta. When the two double bonds are removed by the introduction of CH_2 , the narrow bands run together and form wide bands both in the solution and the vapour. When the molecule is rendered more complex by the substitution of more and more complicated groups of atoms, the narrow bands of the solution enlarge and the fine lines of the vapour fuse together, so that eventually a complicated molecule shows only broad continuous bands. He therefore finally concludes that for molecules containing only one double bond, the first postulate of Bohr is inapplicable, only the second postulate being valid; whereas for molecules with two adjacent double bonds both postulates apply, the first being determined by the existence of an electric polarity in the molecule.