

## Research Items.

**THE DALLEBURRA TRIBE, NORTH QUEENSLAND.**—Mr. M. Bennett has published in the *Journal of the Royal Anthropological Institute*, vol. 57, pt. 2, an account of the Dalleburra, a tribe virtually extinct, from notes made by Robert Christison, who settled among them in 1863, and whose collection of Dalleburra weapons, with a series of fine photographs of members of the tribe, is now in the British Museum. It is probable that the Dalleburra had never seen a white man before. Christison got into touch with them only with extreme difficulty, but secured great influence through healing the broken leg of a small boy whom the tribe expected to die. The incident revealed the existence of a custom by which on occasions of both extreme sorrow and great joy the women gashed themselves with stone knives. He could not discover that they believed in one supreme being, though they did believe in supernatural beings. Tribal government was in the hands of headmen, and the chief offences were marrying within the prohibited degrees, abduction, and encroaching on others' hunting grounds. Message-sticks and smoke signals were the chief means of communication. The headmen pretended to be able to call down rain and to cure disease. They determined the distribution of food, getting the best for themselves, and indeed some of the tribe had never tasted emu. There was a regular marriage system, for which purpose the tribe was divided into four divisions, classified in pairs. The children belonged to different sections from their parents. Members of the same section of the same generation were brothers and sisters. All members of the Ko-bro section had the first joint of one forefinger cut off. Incest was punished by the death of the guilty parties, but the child was abandoned. Indicative of their intense feeling on the point is the fact that one case was still regarded with the greatest shame by a member of the tribe thirty years after the event. The youths of the tribe had to go through various trials and courses of instruction before they were regarded as grown-up men and qualified to marry; but no account of the initiation ceremony could be obtained.

**THE COFFEE MEALY-BUG IN KENYA.**—The common coffee mealy-bug (*Pseudococcus lilacinus* CK11) is prevalent in the most important coffee-producing area in Kenya Colony. It is very easily confused with the closely allied species *Pseudococcus citri* Risso, and it is probable that some of the records relative to the latter insect may really refer to *P. lilacinus*. In *Bulletin 18* of the Colony and Protectorate of Kenya, Nairobi (1927), Mr. T. W. Kirkpatrick provides an interesting and very practical study of this insect. In addition to coffee, it affects a wide range of other host-plants and is largely spread by the whirlwinds or 'dust devils,' especially prevalent in the warmer seasons. A whole complex of other insects live in association with the mealy-bug, including ants which attend that insect for the honey-dew it yields, together with various parasites and predators. The damage entailed to coffee by mealy-bug was estimated to amount to £100,000 during the first six months of 1927: the flower buds and young berries form an ideal food and in severe attacks all the leaves may be shed, the crop being ruined. One of the most important factors concerned in the life of the mealy-bug is the ant *Pheidole punctulata*, which attends and protects it in various ways, besides destroying large numbers of other insects which normally prey upon it. Since the presence of this ant involves grave risk of rapid spread and severe injury by the mealy-bug, and in its absence it is unlikely much damage will occur, control measures

aim at excluding the ant from the coffee plants. It was found that if the *Pheidole* is kept off the trees, the mealy-bug is always almost completely destroyed by its natural enemies. Various methods of exclusion are discussed, and the most feasible is the use of paper cones soaked with a high boiling-point tar oil. The cones are fastened round the stems, where they should require no attention for two or three months, and they act as effective barriers to the progress of ants up the trees.

**LIVER FLUKE DISEASE OF SHEEP.**—The Ministry of Agriculture and Fisheries has issued a revised edition (January 1928) of *Leaflet No. 89* on this subject. A brief account in simple language is given of the life history of the fluke and of the symptoms of the disease. The destruction of the snail (*Limnæa truncatula*), which is the intermediate host of the fluke, is the obvious preventive, and this may be accomplished by drainage or by dressing the land and treating the water of ditches, ponds, etc., with copper sulphate. Dykes should be cleaned out and their sides made vertical, so as to do away with dead water under the banks in which the snail is commonly found. The details of treatment with copper sulphate are clearly set forth in the leaflet. The sheep should be kept on good, well-drained land during the autumn and winter months, the period when infection is likely to be acquired. Curative treatment with extract of male fern and with carbon tetrachloride is advocated and described. The last serious outbreak of liver fluke disease occurred during the winter of 1920–21, when in four counties in North Wales alone 60,000 sheep died or were killed. In a pamphlet on liver fluke disease recently issued by the Council for Scientific and Industrial Research of the Commonwealth of Australia, the loss directly attributable to this disease in Australia is estimated at £100,000 per annum. Treatment by carbon tetrachloride is strongly advocated, and various methods of administration are briefly described.

**HAWAIIAN BARNACLES.**—Mr. Henry A. Pilsbry ("Littoral Barnacles of the Hawaiian Islands and Japan," *Proceedings of the Academy of Natural Sciences of Philadelphia*, vol. 79; 1927) describes some collections of littoral barnacles from the small islets and reefs strewn over the Pacific for two thousand miles between the Hawaiian group proper and Japan, and also some species from the larger Hawaiian Islands. As these regions, particularly the smaller islands, are practically unexplored for cirripedes, there is here a fertile field for naturalists. Among the many interesting species recorded is a new form, probably belonging to Darwin's *Pœcilasma fissa*, which is named *Trilasmis fissum hawaiiense*, the genus *Trilasmis* having priority over *Pœcilasma*. Darwin's species, based on a single individual attached to a spinose crab from Bohol, Philippines, is much larger than the Hawaiian form which was found frequently on the mouth parts of the crab *Dromia dromia*, and differs in other respects also. It is a question, however, whether these small specimens may be the young of a larger barnacle not yet found.

**BURMESE MYXOPHYCEÆ.**—In the *Journal of the Burma Research Society*, vol. 15, pt. 3, vol. 16, pt. 3, and vol. 17, pt. 3, Dr. S. L. Ghose makes considerable contributions to our knowledge of the Indo-Malayan Myxophyceæ. At the present time, identification of the various genera and species of the group can only be carried on with the expenditure of a large amount of labour on account of the rather rare and much

scattered condition of the literature. Dr. Ghose has taken upon himself the laborious task of making as complete a descriptive record as possible of the blue-green algæ of his region, so that the work of future systematic and ecological investigators will be considerably lightened. The species are listed according to locality, those treated so far being, Myxophyceæ from Rangoon 1, 2, and 3, Myxophyceæ from Maymyo, and Myxophyceæ from Mergui and some neighbouring islands. Genera and species are described critically, and illustrated by means of good plates with line drawings. A few new species and several new varieties are included in the lists.

AGRICULTURAL RESEARCH IN CONNECTICUT.—The fiftieth Report of the Connecticut Agricultural Experiment Station (for the year 1926) is a volume of more than 600 pages dealing with the various activities of that Institution. A large part of this publication is occupied by the report of the State Entomologist. The Asiatic beetle which appeared in 1925 in New Haven has received a good deal of attention as it is a new pest in the United States. Up to the present, its injury to plants is confined to grass lawns, where the larvæ live. Many experiments have been conducted with the view of finding a method of control of the oriental peach moth, while the birch leaf skeletoniser is the subject of a long and detailed paper on its biology. On the botanical side one of the most interesting facts brought to light is the discovery that tobacco leaves dried and preserved for twenty-four years still retain the active principle of mosaic disease and can be used to infect living plants. With regard to soil research, the subject of the phosphorus requirements of tobacco with particular reference to old soils is given special prominence. The Report mentions that the library of the Station now contains 16,400 volumes, and that 48,000 copies of bulletins were mailed during the year.

THE UPPER WATERS OF THE BLUE NILE.—An important addition to our knowledge of the Nile drainage system was made by Major R. E. Cheeseman in 1926–27 in his survey of the Abbai River, one of the Abyssinian headstreams of the Blue Nile. Major Cheeseman's account of his explorations and his map of the river from Lake Tana to the Wanbera country is contained in the *Geographical Journal* for April. Previous knowledge of the river and earlier maps were fragmentary, and based mainly on the routes of travellers who had crossed it at various fords. The explorations included an examination of the Tisisat falls, some twenty miles below Lake Tana.

REGIONAL SURVEY.—An addition to the growing number of regional studies of Great Britain is made by Miss C. Pugh and Mr. G. E. Hutchings in "Stockbury: a Regional Study in North-East Kent," published by The Hill Farm, Stockbury. The study is divided into five sections: Geology and physical features, vegetation, animal life, historical geography, and the Stockbury district. The plants and animal life occupy more than half the book, and while a great deal of valuable matter occurs in these pages, much of it has little real bearing on the regional study of the area in the geographical sense which such work is generally taken to imply. The human part of the study, on the other hand, is disappointingly brief, but the work with its good maps is a careful introduction to the subject.

A FOSSIL MEDUSA.—Very few traces of the existence of Medusæ have been found in rocks of earlier date than the Upper Jurassic, so that interest attaches to the discovery of a specimen in the Carboniferous Limestone at Denée in Belgium, and described by

V. Van Straelen (*Acad. R. Belg. Bull. Classe des Sci.*, p. 952; 1927). It is a cast of the upper convex surface, nothing being known of the oral surface. The specimen is provisionally referred to the Rhizostomidæ.

PROTONS IN METALS.—In a letter in *Die Naturwissenschaften* of Mar. 16, Prof. A. Coehn announces that he has succeeded in effecting an electrolytic transport of hydrogen through palladium. A wire of the metal was charged with gas at the cathode of a cell containing decinormal sulphuric acid, and the subsequent diffusion of the hydrogen was followed by measurement of the electrode potential at various points on the wire. When an electromotive force was applied to the ends of the latter, the hydrogen passed preferentially towards the negative terminal, and could be moved to and fro by reversal of the field. The conclusion that Prof. Coehn draws from these results is that the hydrogen atoms, like those of the metal itself, are partly ionised, but that the resulting protons, not being bound in a space lattice, are free to be affected by an electric field.

SIMPLE MICROSCOPE PROJECTION APPARATUS.—A simple and useful accessory to the microscope has recently been designed by Mr. J. F. Marshall, director of the British Mosquito Control Institute, Hayling Island, by means of which the enlarged image of any object inserted under the microscope can be projected directly upon a screen either for the purpose of demonstration, drawing, or photography. The apparatus, which is known as the 'Moscon Macrograph,' consists of a projection screen attached to a vertically adjustable rod carried in a light but rigid framework which may be clamped to any table, shelf, or other convenient support. The microscope and the illuminant are placed on the floor and the image of the object is focused on the screen. As the screen is horizontal and can be fixed at a convenient height, the apparatus is extremely well suited for drawing, the tracing paper being easily fastened on the clear glass screen by means of the frame clips. For photographic purposes a light-tight bag of black cloth is attached to the frame of the screen and to the tube of the microscope, and a plate carrier is substituted for the glass screen after the image is focused. In this carrier the plate is covered by a hinged lid which opens downwards and works more smoothly than the usual sliding shutter. The macrograph, which costs £5, complete with carrying case and two projection screens, but without the photographic accessories, is marketed by Messrs. W. Watson and Sons, Ltd., 313 High Holborn, London, W.C.1.

THERMAL AND ELECTRICAL CONDUCTIVITY.—The paper on the thermal and electrical conductivity of some aluminium alloys and bronzes read by Ezer Griffiths and F. H. Schofield at the annual meeting of the Institute of Metals on Mar. 7 is of considerable practical importance. It is frequently stated that the Lorenz law, namely, that the thermal conductivity varies as the product of the electrical conductivity and the absolute temperature, fails when applied to data obtained with alloys. The results obtained by the authors prove, at least, that as a generalisation, this statement is erroneous. The error has probably arisen from the fact that the values usually given for the thermal conductivities of alloys are untrustworthy. The primary object of the research was to obtain the thermal conductivities of the alloys employed in the construction of aero-engines. Two different sets of alloys were investigated. The first group consisted of alloys rich in aluminium, and the second group

those rich in copper. For the second group, it was found that the Lorenz coefficient had practically the same value within  $\pm 2.5$  per cent. from  $75^\circ$  to  $250^\circ$  C. This is probably within the limits of experimental error. It appears, therefore, that the thermal conductivity can be deduced from a measurement of the electrical conductivity. As the determination of the latter quantity presents far less difficulty than that of the former, this result will be of great practical use. For the twenty-one aluminium alloys experimented on, very consistent results were obtained, except with a 13 per cent. silicon alloy. A determination of the Lorenz coefficient for a single crystal of aluminium (99.6 per cent. aluminium) gave the value  $5.46 \times 10^{-9}$ . This is in good agreement with that obtained for the alloys. The value of the Lorenz coefficient for very pure copper was  $5.89 \times 10^{-9}$ , which is in close agreement with the values obtained for the bronze alloys, but is decidedly higher than that obtained for the aluminium alloys.

**AN ULTRA-VIOLET LAMP WITH NEW ELECTRODES.**—The 'Uvir' lamp, made by Messrs. Bellingham and Stanley, Ltd., is interesting and of unusual design. The arc is formed between two parallel metallic electrodes mounted vertically in front of a radiator which constitutes the series resistance. The heating elements of this radiator are solid rods of a special composition which reach a higher temperature when running than is possible with wire spirals, and hence yield a greater percentage of radiant heat. The electrodes are rigidly mounted in a simple clamp, so that the arc has to be lit by placing a carbon rod across the points. A rod mounted in an insulating handle is supplied with each lamp. The electrodes are made of a special alloy which has been selected as giving an intense radiation over the range of wave-lengths 2900 Å.—3100 Å. For use on an A.C. supply, the metallic electrodes are replaced by carbon cored with the same alloy, but even so the starting of the lamp is found to be more difficult than on D.C. Both arcs burn steadily with less fume and oxide than tungsten, and can be blown out like a candle, but the electrodes require adjustment and turning round in the holder from time to time to keep them at the same height. The cost of the alloy electrodes is about half that of tungsten. The radiation generated by this lamp is of an unusual character, as a great percentage is concentrated round the wave-length 3000 Å., a range which is generally regarded as being of great therapeutic activity. Further, the shorter wave-lengths, of more dubious value, are not present to any marked degree. The 'Uvir' lamp may therefore be described as an efficient source of ultra-violet radiation of therapeutic value. It is for that reason to be regretted that more attention has not been given in the electrical design to safety devices. The radiator heating elements are protected by a wire grid, but the arc, which reaches a higher temperature and may be equally 'alive,' is outside the grid and entirely exposed. It is claimed that the somewhat crude method of striking the arc described above has the advantage of eliminating moving parts which are likely to corrode or oxidise, and in one way or another get out of adjustment. It may be found that the public is shy of taking such liberties with the ordinary type of mains and will require some form of switch on their ultra-violet lamps. The current consumed is approximately 3 amp. and the price is £5 5s.

**THE INFLAMMABILITY OF HYDROGEN.**—The January number of the *Journal of the Society of Chemical Industry of Japan* contains a further account of the work of Y. Tanaka and Y. Nagai upon the inflamma-

bility of hydrogen-air mixtures. They have found that, as would be expected, the tetra-methyl compounds of tin and lead act as anti-knocking agents in internal combustion engines, but these substances do not produce so great an effect upon the limits of inflammability of hydrogen mixtures as do the corresponding ethyl compounds. This is attributed to the smaller cross-sectional areas, and hence the smaller probability of collision with activated hydrogen molecules, of the molecules of the methyl derivatives. The theory of active collisions in combustion, and a derivation of the effects of pressure on the limits of inflammability, have already been given by Y. Nagai in the *Journal of the Faculty of Engineering of the Tokyo Imperial University*, vol. 17, No. 3, 1927.

**DEVELOPER STAINS.**—It is well known that in developing a photograph the oxidation products of the developer are deposited with the silver of the image and form a secondary 'stain image,' unless sufficient sulphite is present to prevent it. Messrs. Lumière and Seyewetz (*Brit. Jour. of Photography*, Mar. 11, p. 172) find that the colour of this image varies with the nature of the developer and sometimes with the alkali used, being orange yellow with pyrogallol and various shades of brown with other developers. The amount of anhydrous sodium sulphite necessary to prevent the formation of this stain image is generally 2 gm. to the litre, but pyrogallol requires 11 gm., pyrocatechin 6 gm., and glycin needs none, as it does not give this image at all. The formation of the stain image renders the gelatin insoluble in proportion to its intensity. This image is a mordant for basic dyes, and may be intensified by such dyes to a density even exceeding the density of the original image as developed. To isolate the stain image, the silver is dissolved away by means of ferricyanide and hypo.

**ELECTRICAL HARDENING AND ANNEALING PROCESSES.**—Electric salt bath furnaces have been found to be very useful for heating metals up to the exact temperature required for hardening in the shortest possible time. They are largely employed for hardening cutting tools. The tool to be hardened is placed in the salt which is to carry the electric current. When the salt melts it makes good thermal contact with the metal, the required temperature being attained very quickly. The salt bath also serves as a heat accumulator. Air is not in contact with the heated metal, and so it is not oxidised on quenching. Owing to the excellent way they retain their heat, salt bath furnaces are particularly suitable for hardening metals on a large scale. In *A.E.G. Progress* for December, a description is given of electrical welding and hardening processes. The furnaces for  $800^\circ$  C. are used for hardening carbon steels, and those for  $1300^\circ$  C. for high alloy steels. The salt used for temperatures from  $750^\circ$  C. to  $1000^\circ$  C. is composed of a mixture of barium and potassium chlorides, and that from  $1000^\circ$  C. to  $1300^\circ$  C. of barium chloride only. Electric annealing furnaces are also described. For these furnaces chrome nickel has been found most useful for the conductor which converts the electrical energy into heat. These furnaces are generally designed for temperatures up to  $950^\circ$  C. and are specially useful for heating processes which have to extend over long periods. They are sometimes equipped with automatic temperature regulators and can be used for annealing metals in hydrogen and other gases. The tempering of hardened tools can also be effected in electric salt bath furnaces even when the temperature required is so low as  $220^\circ$  C. In this case the conducting salt is a mixture of sodium and potassium nitrates.