RESEARCH ITEMS

Trephining in New Britain

AN account of trephining methods employed by the natives of New Britain during tribal wars is contributed by J. L. Meacher, of Frankston, Victoria, Australia, to the *Brit. Med. J.* (No. 4156; Aug. 31, 1940). The observations were made and communicated to him by Mrs. Parkinson, who settled there sixty years ago. Skulls showing healed trephine wounds have been deposited by her in the Australian Museum of Anatomy. The operator first washes the wound with coconut milk and cuts the skin in the middle of the wound with a bamboo knife, dividing the skin into two halves. The wound is then scraped round with a black stone which "falls down from lightning", that is, a meteorite. The operator then blows into the wound through a bamboo pipe fourteen inches long to discover if there are any small pieces of bone there. A strip of coconut shell four or five inches long is used to extract pieces of bone. Coconut milk is used to wash the wound while bone is being extracted. The scalp flaps are then replaced and sewn up with a needle made from the wing-bone of a flying-fox and banana fibre thread. The wound is covered with a banana leaf, and over that the skin of the banana flower. To prevent air from getting into the wound, a paste of chewed pepper, lime and soft betel-nut is placed over the leaves. The whole head is covered with *taro* leaf and big round leaves of a bush called *paba*. A frame worked like a net protects the head. The patient is kept on a soft diet to obviate moving the jaws, while he must lie quiet for three days after which the doctor removes the frame to examine the wound. In case of malaise the wound is opened up, blown upon and scraped to remove fragments of bone previously overlooked. When a week has passed without pain the cure is tested by the eating of an old hard piece of coconut. Absence of pain indicates that no more pieces of bone are left, and the relatives are bidden to prepare a feast as the operator is about to remove the frame. Injury to the brain is treated by scraping the injured part and the insertion of a pad of *mal* (pounded wood of a small tree) which is left permanently in the wound. A pad of *mal* is also wrapped over the wound until it heals. [A description of trephining in New Britain was communicated to the Anthropological Institute in 1901 by W. Crum and Sir Victor Horsley, see *J. Anthrop. Inst.*, **32**; 1902.]

Celtic Ornament from Elmswell, Yorks

A PANEL of Celtic ornament, described and analysed by Philip Corder and C. F. C. Hawkes (*Antiq. J.*, **20**; July 1940), was found in the excavations at Elmswell, East Riding, Yorks, in 1938 on a native site of the Parisii occupied from Flavian times to the end of the Roman period, and then in subsequent pagan Saxon times. The site as a whole shows the persistence through Roman times of an Iron Age mode of life. The panel found, unstratified and unassociated, is a thin sheet of bronze covered with an embossed design of flowing curves garnished with rosettes. On the upper edge is fitted a strip of bronze ornamented with champlevé enamel of a bright orange-red (now green). Beneath is an iron plate bent at right-angles to form a flange. It appears to be a panel which ornamented the side of a box. It measures 9·5 inches by 3·1 inches. Such ornamented boxes it is known were made and prized in Britain in the period. Discussing the panel, Mr. Hawkes compares it with a bronze strip from the Santon Downham hoard. Its Belgic technique (especially the enamelling and repoussé) suits the state of affairs among the Parisii in East Yorks. The style, however, rules out the suggestion that it was imported Belgic work. It shows the northern tradition of the Torrs champfrein, but with a debt to the south. In the rosettes it may be thought is an element of the Romanizing convention which can be seen in the Elmswell style. Actually the rosette has a longer history in British art. The occurrence and distribution of the rosette, the relation of the Elmswell panel to the Aesica brooch and other considerations suggest that the panel is the work of an artist on the edge of the Roman world but not yet in it, most probably about A.D. 60, when the Parisii were included in the territory of the pro-Roman Cartimandua, Queen of the Brigantes.

Coral Reefs

FOR long enough coral reefs have furnished food for speculation and interest to naturalists and other men of science. Much has been written on the formation of reefs and atolls but not so much on the living activities of the animals themselves, and yet it is just these activities that determine the nature of the reefs. This aspect of the "biology of reef-building corals" has been dealt with by C. M. Yonge (Great Barrier Reef Exped. Sci. Rep., **1**, 1940) in a publication which synthesizes previous work and the author's own observations and experiments. Coral polyps are adapted for feeding upon zooplankton, and the zooxanthellæ they contain play no part in their nutrition; for while the zooxanthellæ are dependent on the corals and do not occur free in the sea the converse is not true and individual coral colonies are not dependent upon the zooxanthellæ. Reef-building corals exhibit a marked phototropism and so light plays an important part in their growth and is indeed responsible for their vertical distribution. Their horizontal distribution is limited mainly by temperature, but other factors incident upon local conditions also play their part. Reef corals are able to get rid of sediment by the action of their cilia, and unattached corals can uncover themselves when buried under sand. The diversity of the adaptional possibilities exhibited by different species of corals determines their position in the reef. The photographs by T. A. Stephenson of the same colony during daylight and at night (taken by flashlight) are illuminating.

Meiosis

FROM the general accounts of meiosis given in text-books a simple and in some respects a misleading picture is obtained. While the final result is the reduction of the chromosome number so that upon fertilization the normal somatic number is restored, the details by which the reduction is brought about vary within wide limits. A review of these variations provided by C. D. Darlington is a useful

antidote to the simplicity of the text-books (*Biol. Rev.*, July 1940). There are three main sources of the variations: (1) the place where the pairing chromosomes touch; (2) the time that is available for pairing; (3) the amount of twisting that can be undergone by the portions of the chromosomes which are paired. The material upon which the review is based is from the plant kingdom.

Combined Fertilization and Apomixis

G. Gentcheff and A. Gustafsson (*Bot. Not.*, 1940) have shown that a biotype of *Potentilla collina* forms embryos by parthenogenesis, but that the further development of the embryo cannot take place unless fusion of the central fusion nucleus with a nucleus from another source has occurred to provide an endosperm. In these apomicts the number of chromosomes in the mother, embryo and endosperm does not affect the setting of seed. Treatment with heteroauxin did not influence seed production but did induce parthenocarpy.

Tubercularia Fungi

A VERY detailed paper by T. Petch (*Trans. Brit. Mycol. Soc.*, **24**, Part 1, 33–58, June 1940) gives a critical account of the genus Tubercularia as accepted at present. From a bewildering number of species of the genus recorded for Great Britain the author finds only two valid namings—*T. vulgaris* and *T. versicolor*. The former is known to be a stage of *Nectria cinnabarina*, and the latter frequently occurs in company with various species of Nectria, though it is possible that it merely seeks the company of any fungus, having even been found on the stalk of *Polyporus squamosus*. One curious form, previously named *T. granulata*, is shown to be really modified *T. vulgaris*, and *T. nigricans* is parasitized *T. vulgaris*. The question of parasitization of Tubercularias is treated at some length, and forms a useful addendum to the critical part of the paper.

Copper-deficient Australian Soils

THE study of these interesting soils has been continued and a report by D. S. Riceman, C. M. Donald and S. T. Evans (from the Animal Nutrition Laboratory and the Waite Research Institute, Adelaide) is issued as Pamphlet No. 96 by the Commonwealth D.S.I.R. (by the photo-lithographic process as a war-time economy). The main objective is the establishment of superior perennial pasture, but the cereals, particularly oats, have proved the most satisfactory plants in their indication of copper deficiency. Maximum yield of oats and wheat was obtained with application of 14–56 lb. copper sulphate per acre. Further work will show how long the effect of these dressings will last. Analysis of the copper content of the plants in the dressed soils, suggests that other complicating factors are numerous, possibly in some cases the interplay of iron and manganese, but the influence of organic manure may be more effective than liberal applications of copper. It is clear that the heavier crop yields obtained after copper application may reveal further deficiencies in available elements, and in this connexion the supplies of iron and manganese are being closely scrutinized. The two grasses naturally prominent in the copper-deficient soils are *Bromus madritensis* and *Lagurus ovatus*. Apart from an improvement with nitrogen supplied in the spring these species have shown no response to copper or any other fertilizer treatment.

Forest Soils in the Adirondack Section, New York State

IN a paper on "Cation Exchange Properties of Certain Forest Soils in the Adirondack Section", R. F. Chandler, jun. (*J. Agric. Res.*, **59**, No. 7; 1939) states that the selection of methods for the determination of exchangeable cations in forest soils required special attention because of the high content of organic matter in certain horizons. The cation as well as the anion in the leaching salt markedly affects the solubility of the organic matter. The ammonium ion is particularly active in this respect, and hence methods should be avoided which involve the treatment of soils with any ammonium salt previous to the determination of total exchange capacity. The research work described has been undertaken in virgin forest soils. This fact may be stressed, for a considerable amount of ecological work in connexion with forest botany and forest soils has been carried out in forest areas the character of which has often been entirely changed, and not unusually degraded, by the action of man himself; misleading inferences leading to harmful economic action having been too often the result. The locality here dealt with appears to offer an excellent opportunity for studying the properties of virgin soils; the object of Mr. Chandler. There are, he says, localities where the climax forest types have not been appreciably disturbed by man or fire; the two most misleading factors when studying the remnants of the natural or pseudo-natural forests about the globe. The paper presents data on the cation-exchange capacity, exchangeable bases, percentage base saturation, percentage loss on ignition, and hydrogenation concentration for soils of similar geological origin but occurring beneath three distinct forest types, namely, red spruce, red spruce – sugar maple – beech, and sugar maple – beech – yellow birch.

Perchlorides of Hydrogen

AN investigation of the freezing point curves of mixtures of chlorine and hydrogen chloride by J. A. Wheat and A. W. Browne (*J. Amer. Chem. Soc.*, **62**, 1577; 1940) shows that two compounds separate: HCl,Cl_2, m.pt. $-115°$ and $2HCl,Cl_2$, m.pt. $-121°$. It is suggested that chlorine attached to hydrogen donates a pair of electrons to the chlorine of the chlorine molecule, and the formulæ of the compounds are thus written as: H—Cl→Cl—Cl and H—Cl→Cl—Cl←Cl—H.

Chemical Separation of Isotopes

A PAPER was read on this subject by H. C. Urey, of Columbia University, at the annual meeting of the U.S. National Academy of Sciences held during April 22–23. The chemical separation of the isotopes of nitrogen and carbon gives the most rapid separation of these isotopes which has so far been devised. Experiments have been made in which three fourths of a gram of C^{13} have been transported per 24-hour period. The simple process fractionation factor for the exchange reaction between ammonium ion and ammonia is 0·967, favouring the concentration of N^{15} in the ammonium ion, while the simple process factor for the exchange reaction between hydrogen cyanide and cyanide ion is 1·025, favouring the concentration of C^{13} in the gas. These rates of production are for laboratory production. There seems to be no reason why the method cannot be extended to plant size apparatus with the production on as large a scale as is required.