

RESEARCH ITEMS

Archæological Finds in the Scottish South West Isles

A FEW years ago, J. Harrison Maxwell described (*Trans. Glasgow Arch. Soc.*, 10) a vitrified fort on Eilean Buidhe, an island lying immediately to the north of the narrow channel in the Kyles of Bute. The feature which Mr. Maxwell was especially interested to examine was the existence of a tower base at each of the cardinal points of the compass on the circumference of the fort. Unfortunately, very little further evidence of an illuminating kind seems to have been obtained at this obviously interesting site, which lies so near Glasgow. Further investigations have also been carried out by Mr. Maxwell at a site on an island, Eilean Rìgh, in the upper reaches of Loch Craignish, Argyll, and were mentioned in a recent lecture before the Glasgow Archæological Society. The island yielded an Early Iron Age fort of normal structure. But another hut circle inside a larger enclosure was the object of Mr. Maxwell's attention. It lies almost due west of the jetty. The inner circle measured 25 ft. × 23 ft., the outer enclosure some 80 ft. × 49 ft., the wall being about 5 ft. thick. Mr. Maxwell suggests that it was a prehistoric shrine of the moon god, and he amends the name of the island from Rìgh to Re, which in Gaelic means moon. He gives, however, an alternative suggestion that the structure is the remains of a cashel—one of those early ecclesiastical establishments which were built by the Irish monks. Other sites in the Loch Craignish district were also studied, notably a fine though dilapidated round-chambered cairn of the Early Bronze Age at the northern end of the Loch.

Prehistory of North America

"ARCHÆOLOGICAL and Geological Investigations in the San Jon District, Eastern New Mexico" (*Smithsonian Mis. Coll.*, 103, No. 4) is by F. H. Roberts. Like similar investigations which have appeared from time to time under the auspices of the Smithsonian Institution, this work is of local interest. All the same, the comprehensive picture of the prehistory of North America will only become possible as a result of quantities of such local studies. While it appears in this case that the later levels of the excavations are to be associated with Indian groups, it is claimed that the earliest level, which yielded a sort of Yuma point, contained bones of extinct species of bison and mammoth. The antiquity of the earliest stone age in America is still *sub judice* and, too, the date when any one species of animal became extinct is not necessarily the same in different parts of the world. At the same time, evidence does seem to be accumulating to show that some of the earliest American stone industries may be older than has hitherto been thought probable.

American Land and Freshwater Isopods

A SECOND supplement to William G. Van Name's useful work "American Land and Fresh Water Isopod Crustacea" (1936) is now published by the author (*Bull. Amer. Mus. Nat. Hist.*, 80, Art. VIII, 299-329; 1942). This covers additional species and the more important new information about previously included species that has been published since the first supplement to that work came out in 1940. Four new species are described and twenty-nine species are added to the list of American land and freshwater forms given previously. The species

of some of the aquatic freshwater isopods are very difficult to distinguish. It is found that in the Asellota the characters of the male pleopods are the most reliable, as already used by Dudich, Tattersall and Racovitza. The interesting genus *Cæcidotea* is specially considered. Many of these are large, *C. acuticarpa* reaching a length of 20 mm.; some have no eyes, or the eyes are very much reduced, their habitat being springs, wells and caves. *Janiropsis exul* is a member of the otherwise exclusively marine family Janiridæ. It differs, however, from Sars' *Janiropsis*, in which it is placed provisionally, in certain features of the male, notably in the relatively enormous development of the long anterior process of the second pleopods and in the conspicuously widened posterior portion of the body. The figures given in this supplement are excellent and very helpful, being in a good clear outline.

Salmon of the River Erne

MR. ARTHUR E. J. WENT, continuing his researches on Irish salmon, publishes a short paper dealing with the scales and lengths of the fish, mainly in 1928 ("Results of the Examination of a Small Collection of Scales and Data". *Sci. Proc. Royal Dublin Soc.*, 22 (N.S.), No. 49; 1942). Ninety-two per cent of the fish had migrated as two-year smolts whereas the remainder were one- to three-year smolts. Almost eighty-four per cent were maiden summer fish. The small summer fish having relatively high average weights are the most important commercially, as they are approximately one sixth heavier than the grilse, the next heaviest age group. The faster growing fish migrated first. As in the River Shannon, the smolts could be divided into two groups depending on whether or not the fish had made growth in fresh water in the spring prior to migration as a smolt. Type A smolts of any smolt class have a greater mean length at the end of every year of life than Type B smolts of the same smolt class. In the sea the large spring fish had a greater average growth-rate than any other age group.

Giant Fibres in Crustacea

It has been known for some time that while myelinated nerve fibres are rare in invertebrates in general they do occur in some crustacea. William Holmes (*Phil. Trans. Roy. Soc.*, B, No. 582; 1942) has studied the giant myelinated fibres in the prawn, *Leander serratus*. It is found that the median and the lateral giant fibres in the central nervous system are formed by the fusion of the processes of many segmented nerve cells. A previous writer claimed to have found a new type of synaptic relation in the prawn, shrimp and crayfish, but the present investigation gave no support to this, and indeed it was found that there was always complete discontinuity in the axoplasm. Two quite different types of synapses are described; in one the individual neuroplasms in a giant fibre while running side by side are nevertheless separated by a myelin layer over by far the greater part of their course, but they do appear to come into actual contact over a length of not more than 10 μ . In the other type a myelinated fibre has contact with a non-myelinated fibre by means of a number of fine axonic processes, which perforate the myelin sheath. Some of the myelinated fibres may have a total diameter of 60 μ in the central nervous system and 90 μ peripherally, so that they are noticeably larger than those that have been described for any vertebrate.

Evolution in Plants by Kaleidoscopic Mutation

ARGUMENTS have recently been put forward by Willis in support of his claim that the course of evolution has been from family through genus to species, and not vice versa as is required by the selection theory. This progress was achieved by mutations that might apparently be of any rank. It is now pointed out (*Proc. Roy. Soc.*, B, 863, 161; December 1942) that where in any flora, as in that of Ceylon for which specific instances are given, a genus is represented by two species only, one of which is endemic to that area and the other more widely distributed, the characters differentiating the two are commonly very clearly marked and not infrequently are such as mark the division of the genus into sections or even subgenera. But the endemic species in such cases has almost always arisen from the other, and hence its characters are received from an ancestor in which they are not shown but which must have been carrying both characters of the contrasted pairs. As the occurrence of genera or species showing some character opposed to that in the family as a whole is a very common phenomenon, it is concluded that any member of a family carries in itself all the possible characters of that family, and that evolution takes place by mutations proceeding in a manner which is compared with the action of a kaleidoscope.

Take-all' Disease of Wheat and Associated Fungi

THE fungus *Ophiobolus graminis*, causing 'take-all' disease in wheat, is now shown by S. D. Garrett (*Ann. Appl. Biol.*, 28, 4, 325; Nov. 1941) to persist from year to year on the roots of several native grasses commonly used for the production of temporary leys. Survival of the parasite is, however, negligible on fallow ground and under clover. *Phleum pratense* is resistant to the fungus, and it is suggested that this grass, with *Avena elatior* instead of *Lolium* spp., should be used with clovers for seed mixtures on heavily-infected land. The fungus *Fusarium culmorum* is often pathogenically associated with *O. graminis*, and Alan G. Walker has studied the colonization of buried wheat straw by this secondary fungus (*Ann. Appl. Biol.*, 28, 4, 333; Nov. 1941). It was found that *F. culmorum* and *Penicillium* spp. were numerically the most important organisms developing on buried straw under the experimental conditions. *F. culmorum* had low resistance to mild sterilizing agents, but often grew more vigorously than the *Penicillium* spp. which were, however, more resistant to sterilization. These results indicate the probability of persistence of *F. culmorum* in the straw of ploughed stubble, and the possibility of its control, where necessary, by treating the stubble with a mild disinfectant.

Mutations in Gram

SEVERAL mutations have been found in *Cicer arietinum* by R. B. Ekboto (*Ind. J. Genet. and Plant Breed.*, 2, 50; 1942). One mutation—tiny leaf—produces a compound bipinnate leaf with tiny leaflets and a bushy habit to the plant. It behaves as a recessive. Another mutation, simple leaved, converts the compound leaf into a simple one; this phenomenon has not been reported frequently in genetical literature. The mutation is liable to undergo the reverse change to normal, consequently strains of simple leaved plants do not breed true.

Mutations of flower colour from pink to white and of seed coat from white to black have also been observed and their genetical behaviour analysed.

Electrical Detector of Condensation in High-Velocity Steam

A NEW method has been developed by A. M. Binnie and J. R. Green (*Proc. Roy. Soc.*, A, 181, 134; 1942) for finding where condensation in a convergent-divergent steam nozzle commences. The resistance of a short length of fine wire, mounted on a rod and traversed axially through the nozzle, altered sharply at a point where there was a small sudden pressure rise and where an earlier investigation had shown that condensation of the supersaturated steam began. The mean temperature of the wire upstream from this point was found to be nearly the same as that of the steam at entrance to the nozzle. It was greatly in excess of the temperature of the high-velocity steam passing the wire. The wire was heated electrically and the Nusselt number of heat transfer to the steam was measured under the prevailing supersonic conditions. A comparison is given between the Wilson line, showing the position of condensation on the Mollier diagram, with that obtained for a different nozzle used in earlier work. The steam conditions at inlet were as important as the shape of the nozzle.

Dark Companion of 61 Cygni

IN a paper on "The Orbital Motion in the Visual Double Star 61 Cygni", read at the autumn general meeting of the American Philosophical Society during November 20–21, K. Aa. Strand said that extensive photographic observations of high accuracy taken at the Potsdam, Sproul and Lick Observatories have revealed perturbations in the orbital motion of the visual double star 61 Cygni which are caused by the existence of a third invisible member revolving around one of the two visual components. The only solution which will satisfy the observed motions gives the remarkably small mass of 1/60 that of the sun or sixteen times that of Jupiter. Considerably smaller than the smallest known stellar mass, the dark companion must have such an extremely low intrinsic luminosity that it may be considered a planet rather than a star; this would mean that planetary motion has been found for the first time outside the solar system. An extensive investigation of the motion in the large orbit is being carried out at the Sproul Observatory. Though not yet completed, a period of 720 years and a semi-axis major of 24.554" represent closely the observed arc. For a parallax of 0.294" these elements give a total mass of 1.120 for the system. The relative motion of the visual component with respect to the centre of mass of itself and the invisible component, *C*, has a period of 4.9 years and a semi-axis major of 0.020". No decision can be made as to which of the two components *C* is attached. This is, however, of minor importance for the determination of the mass of *C*, because *A* and *B* are nearly equal in mass. Using the masses 0.580 and 0.550 as derived from Eddington's mass-luminosity curve, we obtain in either case: $M_C = 0.0160$; hence *C* is rotating in an orbit with a semi-axis major of approximately 0.70" or 2.4 astronomical units. On account of the large eccentricity ($e = 0.7$) of its orbit, *C* is at periastron only 7/10 of an astronomical unit from its visible companion.