

Research Items.

EARTHWORKS IN AMERICA.—The Peabody Museum of American Archaeology and Ethnology, Harvard University (vol. viii. No. 3), has issued a monograph by Mr. C. C. Willoughby on the Turner group of earthworks in Hamilton County, Ohio, with notes on the skeletal remains by Mr. E. A. Hooton. The book, admirably illustrated by sketches and photographs, gives a full account of these interesting structures. Mr. Willoughby remarks that the builders attained a degree of excellence in art design probably unsurpassed north of Mexico. It is important to note that they show no affinity with the people of the Madisonville site, beyond those which are common to all Indians. Their affinities are rather with the Eastern dolichocephals, although there is present a brachycephalic element such as is often found among the Eastern Indians.

LONG BARROWS IN THE COTSWOLDS AND WELSH MARCHES.—Under the title of "Notes on the Archaeological Information incorporated in the Ordnance Survey Maps," Mr. O. G. S. Crawford, Archaeology Officer, Ordnance Survey, has published a useful pamphlet with a map showing the position of the Long Barrows and Stone Circles in the Cotswolds and the Welsh Marches. He remarks that the fact that the Cotswold limestone area is a region of relatively high elevation has led some to suppose that this accounts for the abundance of long barrows in this district. But the factors which influenced prehistoric man in the choice of a settlement were not elevation but vegetation and water supply. Prehistoric man selected these limestone areas when the soil favoured an open growth of vegetation, because many regions of high elevation, such as the Black Mountains, are entirely devoid of long barrows. He chose sites where the streams are more numerous, and in Monmouthshire the position of two out of the three long barrows shows that Neolithic man did not shun the lowlands when they served his purpose. Mr. Crawford's introductory essay is interesting and suggestive, and it may be hoped that archaeologists will soon be in possession of similar maps indicating the position of prehistoric remains in other districts.

THE PAINTED GLASS OF GLOUCESTER CATHEDRAL.—In that gem of ecclesiastical architecture, the Lady Chapel of the Abbey, Gloucester, the east window, a work dating from the end of the 15th century, at once attracts attention. But the glass is in such a confused and disordered state that the ordinary spectator is scarce able to distinguish any definite subject, and carries away the impression of a mere mass of richly toned fragments, with here and there a face or a form dimly visible. The scheme of the window was obviously to illustrate miraculous stories about the Virgin, but hitherto little has been done to arrange the fragments in a definite way. In the Transactions of the Bristol and Gloucestershire Archaeological Society for 1921 (vol. xliii.) Mr. G. M'N. Rushforth, working on a catalogue prepared in 1915 by Mr. J. D. Le Couteur, a well-known authority on medieval glass, publishes an exhaustive paper, supplied with good photographs. Many of the figures and incidents have now been satisfactorily identified, and much new light is thrown on an important collection of 15th century painted glass.

GERMINATION OF INDIAN BARLEY.—Experiments on the influence of atmospheric conditions on the germination of Indian barley have been carried out by Mr. W. Youngman, Government economic botanist, United Provinces, and the results, which have been published as a memoir of the Indian

Department of Agriculture, are summarised in the *Bulletin of the Imperial Institute* (vol. 20, No. 2). It was found that if barley is exposed to an atmosphere containing a large amount of moisture, its germinating capacity is seriously reduced and may even be destroyed entirely. Such a condition of the atmosphere exists in North-eastern India during the period of the monsoon, *i.e.* after May, and consequently the germinating power of barley shipped from Calcutta after May is liable to be low. Barley produced in North-western and Central India would not meet with adverse conditions at any time, and although the humidity of the atmosphere along the sea-board area from Karachi to Bombay is high after May, barley exported at that period from these ports would not suffer appreciably if it were not delayed long in the sea-board area. In 1912-13 nearly 300,000 tons of barley, of a total value of about 1½ million pounds sterling, were shipped from the various ports; about two-thirds from Karachi, slightly less than one-third from Calcutta, and a small quantity from Bombay. No barley has been exported to this country from India during the last three or four years, but when shipments are again made, the results of this work should be borne in mind.

PALÆOBOTANY AND EARTH-HISTORY.—The importance of the correct determination of fossil plants from the point of view of stratigraphers is well brought out in two short papers by Prof. A. C. Seward in the Quarterly Journal of the Geological Society of London, vol. 78, part 3, Sept. 1922. In one, the first fossil plants recorded from Ceylon are described, from specimens collected in dense jungle by Mr. E. J. Wayland. They prove the existence of Middle Jurassic strata, comparable with those of Madras. The second paper deals with Carboniferous plants collected by Mr. J. A. Douglas on the west coast of Peru. Dr. F. Fuchs recorded plants from this locality as Carboniferous in 1900, but he included two Wealden species, which Prof. Seward is inclined to reject in the absence of further evidence. If the list now given could be regarded as representing a flora of Upper Carboniferous age, its north-European affinities and the absence of any member of the Glossopteris flora would give it special significance. Prof. Seward, however, states that it may be Lower Carboniferous. Mr. J. A. Douglas, in the discussion on the paper, suggested that a chain comparable in height with that of the existing Andes may have formed an effectual snow-clad barrier between the region supporting the Gondwanaland flora and that yielding a more normal Carboniferous type farther to the west.

AMERICAN VERTEBRATE PALÆONTOLOGY.—A number of short "Contributions from the Paleontological Laboratory" of the Peabody Museum, Yale University, have of late been appearing in the *American Journal of Science* (vols. ii. to iv.). E. L. Troxell, from "A Study of Diceratherium and the Diceratheres," is led to divide the true Diceratherium, Marsh, of the Great Basin of Oregon, from those of the Great Plains of Nebraska and Wyoming, which he refers to a new genus *Menoceras*, and further to separate both from *Aceratherium*, Kaup. The same author, treating of "Oligocene Rodents of the genus *Ischyromys*," hazards the suggestion that this genus developed into the modern prairie-dog, *Cynomys*. Mr. Troxell has also investigated "the genus *Hyrachyus*," which he considers divisible into three groups. R. S. Lull supplies a "Restoration of *Blastomeryx marshi*" and discourses on the "Primitive Pecora in the Yale Museum," among which with other novelties is described *Nanoträgulus loomisi*, gen.

et sp. nov., from the Miocene of Wyoming. M. R. Thorpe describes a "New genus of Oligocene Hyænodontidæ," from South Dakota, under the name of *Neohyænodon*. He also discusses the "Oregon Tertiary Canidæ" and "A new Merycoidon" as well as "Aræocyon, a probable old world migrant." The last-named, founded on a jaw from the Middle Pliocene of Oregon, has its nearest ally in *Simocyon primigentus*, Roth, from the Pikermi beds near Athens, and should it prove to be a derivative of purely American ancestry it will, the author considers, be one of the most remarkable cases of convergence known to the science of vertebrate palæontology. Finally, in a more lengthy paper Mr. Thorpe describes "Some Tertiary Carnivora in the Marsh Collection," including new forms.

RAIN-PRODUCING INFLUENCES IN SOUTH AUSTRALIA.—From an examination of the rainfall records and other evidence in South Australia, Mr. E. T. Quayle has come to the conclusion that there is an area of marked rainfall improvement lying south-east from Lake Torrens, where in places it ranges as high as 20 per cent. In the Proceedings of the Royal Society of Victoria, 34 (N.S.), Pt. II., Mr. Quayle discusses the reasons of this improvement and its bearing on the reclamation of arid areas in the interior. The area of improvement in South Australia is continuous with a similar one in Victoria, and both are in contrast to areas of marked decrease to the north. Irrigation as a source of improved rainfall cannot operate in South Australia, for it has made practically no progress. Mr. Quayle finds the causes in changes in vegetation, due to settlement, and to variations in the water supply of the great inland lakes. From various data it would appear that Lake Torrens and Lake Frome are now impounding more water than formerly, but quantitative data are difficult to obtain. Certain places to the south-east or lee of the lake show increased rainfall in recent years, while places beyond its influence show a decrease. The full cause of the increase of water in these lakes is not clear, but Mr. Quayle considers that the substitution of cereal crops or grass for Mallee scrub leads to a marked increase in rainfall. The destruction of forest trees and the extension of pastoral lands are aids in local rain production. This matter is of so much importance that it is to be hoped that investigations on a larger scale will be undertaken.

THE LIGNITE OF THE LOUGH NEAGH CLAYS.—Evidence is accumulating to show that the Lough Neagh Clays in the counties of Tyrone and Antrim are of Oligocene rather than Pliocene age. The recent deep boring at Washing Bay has yielded to Prof. Johnson and Miss J. G. Gilmore (Sci. Proc. R. Dublin Soc., vol. 17, p. 59, 1922), through the cores preserved by the Geological Survey, material that calls forth the following interesting remark: "It needs little imagination to picture the presence of forests of Sequoia in N. Ireland, possibly contemporaneous with those in S. Devon at Bovey Tracey, the shores of the Baltic, the Rhine valley, Saxony, Silesia, and S. France. We may yet find in Ireland large deposits of lignite or brown coal of economic value like those abroad."

THE STATEMENT OF CRYSTAL-SYMMETRY.—Numerous minerals are known, the normal crystals of which indicate, on physical measurement, a certain type of symmetry, while the results of treating them with solvents lead to their being placed in another of the thirty-two crystallographic classes. A latent symmetry is thus revealed. E. T. Wherry (*Amer. Journ. Sci.*, vol. 204, p. 237, Sept. 1922) styles such crystals *amphisymmetric*, and regards the symmetry determined with the goniometer as that of the structure

built up by the atoms or molecules, and the latent symmetry as that of the separate atoms or molecules, with their attached electrons. This matter is ingeniously stated on p. 241. A halogen atom in sylvine, for example, may receive an electron from a potassium atom, and may then, as a complete octet, be capable of taking its place in a holosymmetric structure. When, however, it is attacked by a solvent, its low surface-symmetry, due to the presence of one electron of metal and seven of halogen, is revealed as the latent symmetry of the substance. Both classes of symmetry should be mentioned in the description of the crystal. Sylvine might thus be described as "Cubic; structurally holosymmetric; latently gyroïdal," or "Cubic, structurally of class 32, latently 29." A useful list of amphisymmetric substances is given by the author, including some not known as minerals.

INSULATION TESTING.—Messrs. Evershed and Vignoles, Ltd., of Acton Lane Works, Chiswick, have produced a new insulation tester which possesses several advantages over the older types. Mr. Evershed, who was the first to make a testing set consisting of a small hand dynamo and an ohmmeter, has produced many improvements on the original set during the last thirty years. His greatest improvement was when he made a "one-box" instrument in 1903 and raised the pressures produced by the hand dynamo to 500, 1000, and even higher voltages. This instrument is called the "megger" and has a world-wide reputation. The new instrument is called the "meg" insulation tester. As its weight is only 7 lb. and its dimensions are only $5\frac{1}{2} \times 7\frac{3}{4} \times 6\frac{1}{4}$ inches, it is much lighter and smaller than any similar instrument. The case is made of cast aluminium, one end of which is formed of an oil-tight gear box. It is always ready for use and will stand rough usage. A free-wheel device protects the gear from damage and prevents the armature from being turned the wrong way. At 100 rev. per. min. it generates 500 volts, and considering its size its efficiency is most satisfactory. The price is only about half the price and the weight is less than half the weight of the well-known "megger" testing set.

HEATING AND VENTILATION IN PASSENGER SHIPS.—With the general advance of scientific progress many of the discomforts of sea life have been eliminated. Distilling ensured a plentiful supply of fresh water; electricity solved the problem of lighting, refrigeration that of food preservation. The accommodation of our big ships is often and rightly described as palatial. If there is any problem that has lagged behind it is that of the ventilation and heating of passenger ships, a subject which was dealt with in a paper read by Mr. J. L. Musgrave at the Institution of Heating and Ventilating Engineers on October 11. The problem is admittedly a difficult one. Not only have large numbers of passengers to be accommodated in limited spaces but the conditions of sea life change from day to day. Then, too, odours from the machinery spaces, from the paintwork, store-rooms, kitchen, bathrooms, etc., have to be prevented from reaching the living spaces, and at the same time an ample supply of fresh air, heated or cooled as the case may be, has to be kept in circulation throughout dining saloons and cabins. In his paper the author referred to these things and gave it as his opinion that though ship-building firms employ experienced men to design the ventilating and heating arrangements, the co-operation of the fully-qualified heating and ventilating engineer at an early stage of the design of the ship would lead to more satisfactory results, and that expenditure on improved ventilation would prove a profitable investment.