

Research Items.

KENT'S CAVERN.—In the *Proceedings of the Torquay Natural History Society* for 1926–27, Sir Arthur Keith describes the fragment of a human jaw which was found at a depth of 10½ feet in the cave earth in the vestibule of Kent's Cavern. It represents part of the right half of the upper jaw, and includes the alveolar process from the middle of the socket of the canine to almost the hinder or distal margin of the socket of the second molar. Three teeth are in place—the right canine, the second right premolar, and the first right molar. The sockets for the first premolar and the second molar are empty, their teeth having fallen from the sockets after death. A small area of the lower wall of the sinus maxillaris and the basal part of the zygomatic ridge of the upper jaw are preserved, as well as a small part of the palatal process on the inner margin of the alveolar process. There is no sign of disease, but the crowns are worn flat and smooth so that a border of enamel encloses the exposed dentine. The state of the canine indicates an edge-to-edge bite. The condition of the fractured surface of the bone suggests that it was broken away before the animal matter had entirely disappeared. The bone is coloured a pinkish red, the colour of all fossil specimens from the cave earth, and there can be no doubt that it is as old as the date of the deposition of the cave earth. The teeth and jaws may very well have belonged to the same people whose remains have previously been found in the cavern, that is, the palate found in the stalagmite by Mr. Pengelly and the fragment described in the last report. It belongs to the type of modern man which includes the late palæolithic peoples of Europe.

ARGENTINE ROCK-PAINTINGS.—Among the papers presented to the twenty-first International Congress of Americanists at the Göteborg session was a study of Argentine rock-paintings by Mr. G. A. Gardner, which has since been published with illustrations in the *Proceedings*. Although rock-paintings were known to exist in the Province of Cordoba, Mr. Gardner, in the course of investigations extending over three seasons, was able to visit and record a large number which had not previously been described. The paintings are found along the back walls of shelters eroded from the exposed edges of the horizontal strata of the triassic sandstone occurring among the mountains of Cordoba. The individual figures which compose the paintings number more than nine hundred and consist chiefly of natural objects and designs of a geometrical character. Many are incomprehensible. The commonest geometrical figures are circles, but there is a number of rectangular figures resembling gratings, while others are not unlike the European palæolithic 'tectiforms.' Combinations of dots and strokes, suggesting tallies, are found, and some figures may represent human footprints and animal footprints. The natural objects consist largely of animals drawn in a realistic manner, of which some are the llama or the huanaco, and undoubted canines and felines. Birds are scarce but lifelike. Reptiles are represented by serpents, highly conventionalised, and a few tortoises. Recognisable vegetable forms are almost entirely absent. The absence of the human figure in most shelters was remarkable. They occurred in rudimentary and conventionalised form. A few were highly realistic, showing the dress and weapons of the Indians. Finally, representations of men on horseback appeared, clearly Spanish soldiers. Foot-soldiers are also shown. Few of the figures are in outline, most being silhouetted in colour laid on flat. Superposition is

noticeable. They clearly extend over a very long time, and probably ceased with the loss of independence of the Comechingons, as these Indians were known to the Spaniards, soon after the Conquest.

SCOTTISH SEA TROUT.—As a result of the continuous work being carried out by the Scottish Fishery Board on salmon and sea trout, Mr. G. H. Nall has collected information about the sea trout from the tidal waters of the Don and Ythan (*Fisheries, Scotland, Salmon Fish.*, No. II., 1927. London: H.M. Stationery Office), both of which rivers flow out on the Aberdeenshire coast, the former with a tidal estuary one mile long, and the latter with one four miles in length. Recapture of marked fish has shown that in 1926 the sea trout present in the Don estuary were 95 per cent. finnock, and consisted for the most part of fish wandering from other rivers, only a few being natives of the Don. Interesting movements of the trout were disclosed, one having travelled in eight months a distance of 165 miles by the coast line from the Ythan to the River Teith at Callander, in which river perhaps it was originally born. In marked contrast to the mixed population in the Don waters were the fish in the Ythan estuary, nearly all of which were natives of the Ythan river. Collections in this estuary were spread over the whole of 1926, and a review of the changing composition of these trout according to age is given. The writer adds a word of warning against the danger of depleting the stock of the Don and other rivers by anglers who capture thousands of finnock from the Don estuary, many of which in the spring are ill-conditioned fish. Amongst other interesting observations is the effect of the difference in type of west coast and east coast rivers at their junction with the sea on the feeding of the sea trout, which is reflected in their scales. A new departure is made by writing this paper in non-technical language, for the advantage of anglers interested in sea-trout life.

AERATION OF AQUARIA.—The attention of those who desire to maintain aquaria and to provide for their aeration is directed to an account, by Prof. H. Graham Cannon and Dr. A. J. Grove, in the December issue of the *Journal of the Royal Microscopical Society*, of a simplified apparatus which has proved efficient in use. The clear description and two text-figures will enable anyone who has even a moderate amount of technical skill to make and put together the apparatus. The principle is that previously employed in the apparatus of Gemmill, namely, that water from a tap flows through a tube into the horizontal arm of a T-tube and down the lower vertical arm sucking in air through the upper vertical arm. The suction tube in this apparatus, instead of being straight as in the previous types, has upon it near the top a complete twist, and "it is an advantage for this twist to be badly made" and to contain "one or two constricted bends such as the ordinary amateur glass-worker manages to produce." This apparatus should prove useful in many biological laboratories.

THE SPECIES OF ANCYLOSTOMA.—B. Schwartz (*Proc. U.S. Nat. Mus.*, vol. 72, Art. 1, 1927) has made an examination of specimens of *Ancylostoma pluri-dentatum* and confirms the validity of the species. Abnormalities in the teeth in the mouth capsule are recorded—the outermost teeth on the dorsal wall of the capsule being in some cases truncated and resembling those of *A. braziliense*, but the author considers the two species to be distinct. He gives

a brief review of the species of *Ancylostoma* and a key by the help of which they may be differentiated. He points out that the teeth in the ventral portion of the mouth capsule are three pairs in some species (e.g. *A. caninum*); in other species (e.g. *A. duodenale*) the innermost of the three teeth is small or rudimentary; in others (e.g. *A. malayanum*) only two pairs of ventral teeth are present; and in *A. pluridentatum* and *braziliense* the inner pair is reduced in size and in some examples of the latter species is entirely absent, there being only a single pair of ventral teeth.

A PARASITE OF THE EGG OF THE LIVER FLUKE.—Prof. J. Bayley Butler and J. J. C. Buckley describe (*Sci. Proc. R. Dublin Soc.*, vol. 18, No. 45, 1927) the occurrence of a Chytridiacean parasite, *Catenaria anguillulæ*, in the eggs of the liver fluke, *Fasciola hepatica*, kept in tap-water in laboratory cultures. The source of the *Catenaria* is believed to be the tap-water employed. The infection of the fluke egg takes place by a zoospore of *Catenaria* settling upon the egg-shell and piercing it obliquely, making an aperture about 0.5μ in diameter. The penetration takes place within twelve hours from the settling of the zoospore. The zoospore after entering enlarges to form a subspherical cyst from which a mycelial filament grows out into the contents of the egg and develops a series of enlargements which vary considerably in shape. The intervening unswollen parts of the mycelium become septate and form isthmuses. The enlarged parts—the sporangia—develop nutritive rhizoids which may branch. Within the sporangia, zoospores are formed and eventually escape through a dehiscence tube or beak which usually pierces the egg-shell or pushes open the operculum of the egg. No form of sexual reproduction and no resting spores have been observed. The eggs of the liver fluke will continue to live and to hatch out into miracidia if kept at laboratory temperature for a period of nine months. At any time during this period miracidia can be obtained by placing some of the eggs in test tubes in water in an incubator at 24° to 26° C. Eggs infected with *Catenaria* would not develop. The possibility of using *Catenaria* as a means of checking the infection of snails by miracidia is suggested.

ASCENT OF SAP IN TREES.—Before the recent meeting of the American Botanical Society, Dr. D. T. MacDougal, Prof. J. B. Overton, and Prof. G. M. Smith described some experiments on the passage of water up the trunks of trees (*Daily Science News Bulletin*, by Science Service, Washington). They conclude that the wood vessels in the sapwood of trees, assumed to be wholly devoted to carrying water upwards to the leaves, are to some extent air reservoirs. These air-containing vessels are, moreover, not scattered at random, but have a definite zoned arrangement which differs in different species of trees. Investigations were carried out by injecting red dye into various kinds of trees and either letting the natural suction of the leaves pull it up or pulling it up by a vacuum pump. When the suction applied was small, the dye travelled up the trunk in a natural way, and of course did not enter the vessels blocked by air. The zone of transport was thus clearly marked in red. By this means it was found that in willow the sap stream passed exclusively through wood formed late in autumn, in alder in the early spring wood only, and in walnut through the inner and outer faces of an annual ring, but not through the median portion.

SERPENTINES OF THE SHETLANDS.—Dr. F. C. Phillips makes a noteworthy contribution to the local geology of a somewhat inaccessible region, and to the

general problem of the transformations undergone by ultrabasic rocks, in a paper published in the *Quar. Jour. Geol. Soc.*, pp. 622-652, 1927. The Unst intrusion, which is the largest studied, ranges from dunite and peridotite through pyroxenite to gabbro, the latter being penetrated by pegmatoid gabbro. Disseminated, banded, and massive varieties of chromite occur in the more basic serpentines, and form workable deposits. The differentiation series is thus of a normal character, and is referred to primary crystallisation *in situ*. Autometamorphism brought about serpentinisation of the ultrabasic rocks, amphibolitisation of the pyroxenes, and saussuritisation of the feldspars. Dynamic action is considered to have contributed to the metamorphism at two stages: contemporary stress to the genesis of antigorite; and subsequent stress to that of various schistose products. The formation of carbonates is referred in part to the action of atmospheric weathering.

CORAL REEFS AND A MIGRATING ANTICLINE IN FIJI.—The Fiji Islands include examples of fringing, barrier, and atoll reefs in all stages of growth, and elevated barriers and atolls in various stages of dissection. The region has therefore played a considerable part in the coral-reef controversy. In the *Amer. Jour. Science* for November last, Prof. W. M. Davis uses it to show that despite many weighty opinions to the contrary, its evidence may still be unequivocally in favour of Darwin's theory. He shows that four or five roughly north-south belts of unlike reefs can be recognised, and he describes the vertical movements which the islands of each belt have suffered. It is found that the phases of movement of the western belts occur later than the corresponding phases of belts to the east. This suggests the westward propagation of a broad and shallow wave-like deformation of the ocean floor. The observed changes of level thus appear to be equivalent to the slow westward migration of a broad anticline preceded and followed by shallow synclines. The wave-length is to be measured in scores of miles, but the height from trough to crest is only a few thousand feet. This remarkable hypothesis co-ordinates in a very simple fashion a large variety of observations which hitherto have given a hopelessly confused picture of the history of this unstable region. Prof. Davis finds that the adoption of his scheme of a migrating anticline at once removes all the difficulties which Darwin's coral-reef theory has had to encounter in Fiji. He concludes, "... in spite of the many obituaries written over it in the past forty years, it may be expected to regain in the coming half-century the worldwide acceptance that it enjoyed for a generation a hundred years earlier."

OPAQUE MEAL FOR X-RAY DIAGNOSIS.—We have tested a sample of a new barium meal preparation for X-ray diagnosis prepared by the British Drug Houses, Ltd., and supplied under the name 'Shadofom.' It is put up in boxes containing the equivalent of 4 oz. chemically pure barium sulphate specially prepared, so that it forms, when mixed with cold water, a fine suspension with no tendency to settle, as the cruder forms of barium sulphate are apt to do. A little care is necessary in mixing with the water to form a suspension free from lumps, but if the instructions are followed a very good mixture results, which is palatable and of a smooth texture. The definition on the screen is good, and the meal can be manipulated easily while in the stomach. No tendency of the opaque material to settle was noticed, and excretion appeared to be satisfactory. The material is stated to be chemically pure, and hence no possibility of absorption

of barium salts will arise. In this material we have a satisfactory meal which can be quickly made up.

SCATTERING OF ELECTRONS IN IONISED MEDIA.—The article by Dr. I. Langmuir in the *Zeitschrift für Physik* of Dec. 14 on electric discharges in gases at low pressures, is a valuable review of some of the advances of recent years for which he has been directly or indirectly responsible. His methods for measuring potentials, and ionic concentrations and energies, are by now well established, and have been applied to numerous problems, but there is the curious outstanding difficulty that groups of electrons acquire a thermal distribution of velocities far more readily than can be accounted for by collisions of any ordinary type. Dr. Langmuir gives reasons for supposing that the apparent scattering cannot be an effect of either regular or aperiodic fluctuations of the discharge, as has been suggested by other authors, but the exact mechanism by which it takes place is still obscure. A large number of numerical results has, however, been collected by now, and it appears probable that the process is reversible, and that the agent responsible, whatever its nature, is in a species of thermal equilibrium with the electrons affected.

SPACE CHARGES IN ELECTROLYTES.—Various aspects of the electrical convection of liquids, many of them known to Warburg and other earlier workers, are discussed by Prof. A. Coehn and Dr. Schnurmann in the *Zeitschrift für Physik* of Jan. 2, their object being to extend the analogy between conduction in gases and in liquids. The latter usually contain ions in such large numbers that many phenomena typical of the former are masked, but the correspondence is closer with electrolytes of one thousandth or less normality, and is especially prominent in the large fields near the surfaces of small sheathed electrodes. Here the differences in mobility of the positive and negative carriers are sufficient to set up a space charge, which can give rise to a motion of fluid towards the electrode. A particularly neat experiment that is described shows this effect, as well as the analogue of the electrical wind, by the reaction on a light enamelled wire, suspended in millinormal sulphuric acid with its lower end bent round, and only the extreme tip serving to give electrical connexion between the metal and fluid.

HUMIDITY TEST EQUIPMENT.—The amount of moisture in the atmosphere has a great effect on the mechanical and electrical properties of all fibrous materials. It is therefore to be expected that telephone apparatus connected to miles of insulated circuits and having closely adjusted moving parts should be specially susceptible to the effects of moisture. It is necessary for telephone laboratories to have humidity test departments where the effect of various percentage humidities in the atmosphere can be accurately studied. E. B. Wood, in the *Bell Laboratories Record* for December, describes the facilities this company has in its development laboratory for making humidity tests. The equipment consists of large cork insulated rooms, small air-tight chambers, and smaller portable units. The large rooms have a capacity of about 1500 cubic feet. The temperature and humidity of each room are controlled by a system of sprays, water-cooled radiators, and electric heaters, the air from a centrifugal blower circulating through them. This apparatus enables the humidity to be kept constant at any value from 30 to 95 per cent., and the temperature at any value between 70° and 110° F. This covers the range of conditions usually existing in telephone buildings. The operation is automatic, the humidity being maintained with one

per cent. accuracy and the temperature to within half a degree Fahrenheit. It is thus easy to test both raw materials and large pieces of apparatus under various operating conditions. The smaller test chambers are thoroughly heat-insulated from the outside. The humidity is controlled by the use of a solution of sulphuric acid contained in a large shallow lead tray over which the air is circulated by a fan. For temperatures below room temperatures, air cooled by contact with ice is circulated by an electric blower. For very accurate tests or for tests like corrosion tests which require a long exposure, these chambers are used. The portable units have a capacity of about eight cubic feet and are used for the inspection testing of raw materials and small manufactured articles.

REICHERT MICROSCOPES AND ACCESSORIES.—In a recently issued catalogue (List E7), Messrs. C. Reichert of Vienna give a description of various types of their microscopes and photomicrographic apparatus for biological and mineralogical purposes. Several models of the new mono-binocular stereo-microscope are illustrated. In this instrument, the pencil of light from the objective is equally distributed between the two oculars by internal reflection from a silvered prism. The silvering is thinner on one half of the reflecting surface than on the other. This gives rise to a difference between the intensity of the rays in the left half and that in the right half of the ocular receiving the reflected portion of the light. The conditions are exactly reversed in the other ocular, which receives the light transmitted through the partially silvered surface. The parallactic differences thus produced in the pictures presented to the two eyes give rise to the stereoscopic effect. This effect is obtained without the loss of light which is involved when part of the pencil of light has to be screened off. A series of F/4 anastigmat lenses suitable for macro-photography or projection is also listed in the catalogue. These give magnifications of from 4 to 24, with focal lengths of 100 mm. to 20 mm. respectively. Amongst the various types of vertical illuminators illustrated is a polarising illuminator which can be screwed on to the microscope tube when it is desired to examine metals or ores under polarised light. The illuminator embodies a rectangular illuminating prism, a rotating polariser, illuminating lenses, filter slot, and an electric bulb as the source of light. The catalogue also includes a wide range of objectives, eyepieces, condensers, and other microscope accessories made by Messrs. Reichert, whose London agents are Messrs. Chas. Hearson and Co., Ltd., 27 Mortimer Street, W.1.

BABYLONIAN ARTIFICIAL LAPIS LAZULI.—In the *Chemiker-Zeitung* of Dec. 31, Prof. Neumann gives an interesting account of some analyses which he has recently carried out of fragments of Babylonian artificial lapis lazuli, dating from about 1400 B.C., from the excavations at Nippur. The high percentage of lead previously found by Bertrand has been shown to be quite erroneous, but it has been conclusively established that both cobalt and copper are present as colouring matters. It is claimed that this is the only antique glass which is definitely known to be coloured by cobalt, for in spite of frequent references in technical literature to the existence of this metal in antique glasses, they appear to have no justification. Their origin has now been traced to a faulty observation published by Davy in 1815. Although many specimens of antique glasses from the period between 1500 and 850 B.C. have been analysed by Neumann and his collaborators, cobalt has hitherto never been detected in them.