Research Items.

TEETH AND JAWS OF THE AUSTRALIAN ABORIGINES.—Anthropologists have long stood in need of data relating to the teeth and jaws of a primitive human race. This want has now been supplied by the publication, on the part of the University of Adelaide, of a thesis submitted to it by Dr. T. D. Campbell for the degree of Doctor of Dental Science ("Dentition and Palate of the Australian Aboriginal," The Hassell Press, 1925). Dr. Campbell's monograph is founded on a systematic examination of 630 dentitions collected from all regions of Australia, and representing every stage in the growth, eruption and wear of aboriginal teeth. The measurements of teeth and palate which are supplied by Dr. Campbell will prove of the utmost utility, and many of his observations are of high interest. In form and size of crown, in the number and arrangement of cusps, and in the development of roots, the teeth of the aborigines are "exceedingly primitive, probably more so than in any other living race and also than in some extinct races, such as Tasmanian and Neanderthal man." Large as are the dimensions of the molar teeth of Pithecanthropus (the Java man), Dr. Campbell met with examples in his series which outdid them. Particularly interesting to students of the teeth of fossil races of mankind are his observations on the filling up of the pulp cavity as a reaction to the wear of the crown—a reaction seldom seen in the teeth of civilised races. Campbell found that even amongst the aborigines the third molar teeth are the most variable, but whereas he had to examine nearly 200 skulls to find a single instance in which a third molar was absent, an English dentist would have to examine no more than five mouths to find a similar number. On the other hand, an English dentist would have to search 500 patients or more to find a fourth or supernumerary molar, whereas Dr. Campbell found seven or more instances in a similar number of Australian aborigines. We have touched only on a few of the important and novel observations made by Dr. Campbell.

NEOLITHIC REMAINS IN LIGURIA.—In *Man* for May, Mrs. J. W. Crowfoot gives an account of some excavations carried out by her in the cave known as the Grotte de Bertrand in the Taggia Valley, near San Remo, in 1907-9. The cave proper is 33 ft. long by about 12 ft. with a bottle-neck entrance 8 ft. 4 in. in length by 1 ft. 7 in. in width and 1 ft. 8 in. in height. It is 4 ft. high in the centre. The objects found included worked flints—a lunate arrow-point, and an arrow or javelin head, thick and roughly worked, with stem but no barbs—a needle-like pendant of bone, possibly made from a boar's tusk, six other bone pendants, also probably of boar's tusk, and five bone points, a number of shells of *Helix Nicaensis*, human skeletal remains of at least ten individuals, some showing primitive characters such as large teeth, heavy os calcis, perforation of the humerus, platycnemia, etc. Nearly all the long bones and portions of the skulls were poked under the rock at the side of the cave and piled one upon top of the other, so that they could not be in the original position of interment. Three hundred beads of five different types were found, including the winged type sometimes thought to be phallic. Beads alternating grey and white were strung into a necklace identical with some in the museum at Toulouse. The human remains have been pronounced neolithic. Both Prof. Issel and Prof. Cartailhac, to whom the results were communicated, were of the opinion that the culture of the cave belonged to the late Neolithic period.

FRESH-WATER AMPHIPODA.—Hermann Spandl (*Sitzungsber. Akad. der Wissensch.*, Wien, Abt. I. Bd. 133, Heft 9, 1924) gives a systematic survey of the fresh-water amphipods and discusses the methods—active and passive migration—by which marine animals have entered fresh water. He refers in some detail to the amphipods of Lake Baikal, and concludes that many of the genera found there can be traced back to a small number of ancestral genera; the amphipod fauna of Lake Baikal does not represent a relict fauna but has arisen by progressive differentiation in the lake itself. In the Caspian Sea, however, the fauna can be divided into two parts, one part of marine origin and the other a fresh-water fauna; the genera in each category are given, and the relationships of this fauna with that of the Arctic Sea and of the Baltic are discussed. A short account is given of the genera of amphipods found in subterranean waters and of the geographical distribution of fresh-water amphipods.

MORPHOLOGY OF FISHES.—Prof. F. H. Edgeworth (*Jour. Anat.*, vol. 60, pt. iii.) gives an account of his reinvestigation of the development of certain of the branchial muscles in the Selachii. In 1911 the author concluded that the coraco-branchiales muscles were developed from the ventral ends of all the branchial muscle plates and the cucullaris muscle from the upper ends of the same plates. This conclusion was disputed by Allis. Reinvestigation of the matter on new material has confirmed the author in his former conclusions. In the same number of the *Journal of Anatomy*, Mr. E. P. Allis contributes a paper on the homologies of the prechordal portion of the skull in the Holocephali, and concludes that the trabecular and polar cartilages of the skull are the pharyngeal elements of the mandibular and premandibular arches which have swung upwards and forwards, in connexion with the development of the mouth, into a position approximately parallel to the plane of the parachordals.

RESIN EXCRETION IN THE BUDS OF *ALNUS VIRIDIS*.—The development and micro-chemistry of the glandular hairs on the epidermis of the leaves and bud scales of Alnus have been studied by Friedrich Dormann (*Sitzungsber. Akad. der Wissensch.*, Wien, Abt. I. Bd. 133, pp. 585-612, 1924). Many of these glandular hairs never share in the excretion of resin. Under examination these are found to be full of spherical droplets which, from their micro-chemical reactions, would appear to be complex terpenes. These contents, which seem similar to those in the glandular structures of Betula and Populus, are probably connected with resin formation. They occur, however, not only in the glandular hairs in Alnus, but also generally distributed in epidermal cells of the young leaves, so that the epidermis probably shares in resin secretion. Dormann concludes that the membrane of the cells shares in the work of resin excretion so that to this extent the expression 'resinogenous layer' used by Tschirch may be justified, but there is no reason for thinking that this part of the membrane is alone responsible for the complicated chemical changes involved in the production of resin.

CAMPANULA MUTANTS.—A large tetraploid mutation from *Campanula persicifolia* was exhibited horticulturally in 1916 under the name "Telham Beauty." It appears to be identical with a form recorded as coming from South Carolina in 1791, and must have arisen independently. It is self-fertile, while the

species is self-sterile. Like similar tetraploids, Telham Beauty is stouter, has larger nuclei, and frequently more pores in the pollen grains. Its much larger flowers are, however, shallower in shape. It was crossed by Miss A. E. Gairdner (*Journal of Genetics*, vol. 16, No. 3) with *C. persicifolia* and with a dwarf form called *nitida* in which the flower has an almost superior ovary. Miss Gairdner finds that in the triploid F_1 (24 chromosomes) in diakinesis, univalent, bivalent and trivalent chromosomes occur. In the F_2 offspring various other chromosome numbers are obtained, one plant having 17, *i.e.* a single extra like many Œnotheras and Daturas, another being tetraploid (32 chromosomes). The hereditary behaviour of the latter indicates that the maternal chromosomes in the egg had been doubled. In the pollen formation of the tetraploid form, occasionally half of the heterotypic chromosomes split without separating, thus forming a tetraploid pollen nucleus.

DISCOVERY OF A DINOSAUR IN QUEENSLAND.—The remains of a large herbivorous dinosaur have been found in the Walloon series (Lower Jurassic) of Durham Downs in the Roma district of Queensland. They consist mainly of vertebræ with fragments of femur, tibia, fibula and pelvic bones, and are referred to a new genus, Rhœtosaurus, which is tentatively placed in the family Camarasauridæ of the Sauropoda. It is probable that Rhœtosaurus attained a length of more than 40 feet (H. A. Longman, *Mem. Queensland Museum*, 8, 3, 1926, p. 183, pls. 29-33).

AIR TEMPERATURE IN THE ARCTIC.—Six years in the Arctic have enabled Dr. H. U. Sverdrup to draw some valuable conclusions from his scientific observations with the Maud expedition. In an article in the *Scientific Monthly* for May on the results of the expedition, he points out that in winter the air temperature is always lower close to the ice than three hundred metres above it. The mean temperature at the ice is $-28{\cdot}4°$ C., with a fall to about 100 metres, then a rapid rise to about 300 metres, and then a slower rise to $-20{\cdot}3°$ C. at 1000 metres. On calm days the mean temperature at the surface averages about $-33°$ C. but corresponds with the mean at higher altitudes. The low surface temperatures are due to contact with the ice, which loses heat by radiation. Wind causes a mixing of the lower layers of the atmosphere on account of numerous eddies, and there is a decrease of temperature with altitude, but this clearly affects only the lower layers. At higher altitudes an inversion of temperature is the normal condition. Thus an explanation is offered of the phenomenon, previously noticed in polar regions, of a rise in temperature when the wind begins, independently of its direction. The minimum surface temperature is about $-45°$ C. because, though the ice loses heat by radiation, it is always gaining heat by conduction from the underlying sea, which retains a temperature of about $-1{\cdot}7°$ C.

THE CONSTITUTION OF MALTOSE.—Irregularities in the results obtained by workers on the constitution of the polysaccharides caused considerable suspicion to fall on the formula given to maltose by Haworth and Leitch, and evidence has been published by J. C. Irvine and J. M. A. Black in the *Journal of the Chemical Society* for April 1926, which disproves Haworth's formula and substitutes two others between which no discrimination has yet been made. In the same issue of the journal a paper by C. J. A. Cooper, W. N. Haworth and S. Peat appears, confirming Irvine's work but admitting Irvine's priority. The constitution of maltose given by Haworth was based on the formation of 2:3:4 trimethyl glucose, but Irvine, by exact repetition of the experiments, has shown that this product is 2:3:6 trimethyl glucose. The revision of the structure of maltose involves the constitutional formulæ given to the other di-saccharides and poly-saccharides based on glucose.

THE CONDUCTIVITY OF PURE SODIUM HYDROXIDE SOLUTIONS.—The mobility of the hydroxyl ion has been determined by H. R. Raikes, A. F. Yorke and F. K. Ewart from conductivity measurements of sodium hydroxide in very pure water. Preparation of the carbonate-free hydroxide was carried out by electrolysis of sodium chloride solution, using a carbon anode and an iron cathode. The values, which appear in the *Journal of the Chemical Society* for March 1926, obtained from Washburn's value for the mobility of the sodium ion, are 173·8 and 144·3 at 18° and 10° C. respectively.

MAGNETIC PROPERTIES OF PERMALLOY.—From a separate copy of a paper on permalloy by Messrs. O. E. Buckley and L. W. McKeehan which appeared in the August 1925 issue of the *Physical Review*, we are able to supplement the information as to the magnetic properties of this alloy which was given in a note in our issue of January 9, p. 65. Permalloy is the name given to a series of alloys of iron and nickel, containing from 45 per cent. to 80 per cent. nickel. These alloys all possess high permeability for low fields and reach saturation at fields of less than 10 gauss. They have been tested in the form of wires 0.1 cm. in diameter, 60 cm. long in a solenoid nearly as long, by reversal of the field and measurement of the induction through a search coil wound over the middle of each wire and in series with a ballistic galvanometer. The 81 per cent. nickel permalloy reaches saturation at 4 gauss, when its intensity of magnetisation is a little more than 800, and at 1 gauss it has reached 700. The hysteresis loss per c.c. per cycle at induction 8300 is only 350 ergs, and is only half that amount for the permalloy with 78.5 per cent. nickel. When these wires are subjected to tension, saturation is reached within 5 per cent. for fields so low as 0·1 gauss and the hysteresis loss per c.c. per cycle reduced to 80 ergs.

TRANSMISSION FORMULA FOR RADIOTELEGRAPHY.—Mr. L. W. Austin has published in the *Journal of the Washington Academy of Sciences* for April 19 a preliminary note on proposed changes in the constants of the Austin-Cohen transmission formula used in radiotelegraphy. The formula has for the last twelve years been known to give satisfactory results for distances up to hundreds of kilometres and for rays of medium wave-length. At distances, however, of 6000 kilometres, the computed results are only about half those observed, and at 12,000 kilometres only about one-quarter of their true values. The author has made a close study of the numerous trans-Atlantic observations made by various observers during recent years. He finds it difficult to reconcile some of these observations. In some cases the waves have passed over water all the way, in others they have passed over more land than water. The shortest great circle from Nauen to Washington is twenty-five per cent. land, but from India to the European stations nearly the whole path is over land. It is generally agreed that land attenuation is much greater than that over water. Nevertheless, by slightly altering the empirical factor of the formula and leaving the theoretical part due to Hertz alone, Mr. Austin obtains a formula which predicts with quite satisfactory accuracy the field intensities at distances ranging from 6000 to 12,000 kilometres. In a further paper he proposes to discuss the results the formula gives in all the available cases.