Research Items.

Chronology and Archæology.—In *Antiquity* for June, Dr. G. A. Reisner examines the method of dating by means of objects from Egypt with special reference to stone vessels found in Crete and Mesopotamia, and incidentally lays down certain principles for its employment. (1) Conclusions have often been reached on the dating of single objects found in Egypt and little attention has been paid to its range. It is, therefore, necessary to know the whole range of time during which the object occurs in Egypt and the variations in form which it assumes in that time. (2) An Egyptian object found abroad must be identical in form, material, and technique with a type of known range in Egypt. It must be remembered also that most objects in Egypt pass through two stages of development, an earlier stage of practical use and a second in which more or less degenerate examples are made for burial purposes only. Taking the history of stone vessels in Egypt, it would appear that the period during which we might expect an export is that from the time of Zer (third king of Dynasty I.) to the end of Dynasty III.; but the export as gifts, especially royal gifts, might have taken place down to the end of Dynasty V. or even VI. Examining the evidence from the royal site at Knossos, it would appear that there is no object which can be dated with safety to the predynastic period or even Dynasties I.-II. Sir Arthur Evans's correlation of Early Minoan III., Middle and Late Minoan, with the Egyptian periods is correct in all essentials, but some modification is required for the correlation of the Cretan Neolithic and Early Minoan I. and II., as the history of Egyptian stone vessels has progressed considerably since the studies upon which he relied. Taking the material from Ur, so far as published, while the technique has some similarity to the most usual form of Egyptian technique—the boring with a stone—none of the vessels reported from Ur is of Egyptian origin, and they serve no useful purpose in the correlation of the early Sumerian and Egyptian periods.

The Development of the Thyroid.—Ernst Marcus (*Die Naturwiss.*, 27, Feb. 1931) gives a brief account of the development of the thyroid glands in Amphibia, based on his two recent papers on this subject in *Zool. Jahrb.* (Anat. Ontog. 52; Allg. Zool. u. Physiol. 49). Investigation of the ingrowing nervous layer of the ectoderm in all three orders of Amphibia—Gymnophiona, Urodela, and Anura—shows that the thyroid arises from this layer without participation of the endoderm. Implantation of oral ectoderm and mesoderm in the ventral region of the young larva results in the development there of thyroid; the turning of the presumptive oral ectoderm through 180° results in the development of a thyroid lying dorsal to the gut. If a piece of ectoderm the dorsal margin of which borders the ventral half of the presumptive oral region be turned, the portion of the nervous layer which remains in its natural position gives rise to a normal thyroid directed obliquely ventrally away from the endoderm of the gut, while the other portion of the nervous layer produces a thyroid directed obliquely dorsally and without relation to the endoderm.

Axolotls in Captivity.—Number 8, volume 4, of the *Aquarist and Pond Keeper* (May-June 1931) includes several references to the axolotl. In "Notes from the Brighton Aquarium", Mr. George W. Weller describes both black and white varieties. In the "Readers' Records", Mr. John Gray notes that an axolotl had tried to eat a stickleback, which choked and killed it; and Mr. W. E. Teschemaker makes the very interesting statement that a pair of axolotls living in an out-of-door pond have spawned and that the eggs are on the point of hatching. The parents have found their own food since last May, when they were first placed in the pond. The same observer has already reared the young axolotls in the open from the age of about six weeks or less, so that it is quite possible for the whole of the breeding and rearing to take place out of doors at low temperatures.

The Great Crossbill Movement of 1927.—In the summer and autumn of 1927, as many records in the British Isles witnessed, there occurred an important migration of crossbills (*Loxia curvirostra*). The movement, summarised by Ad. S. Jensen, extended over the greater part of Europe from mid-Russia to western France, Ireland, and Iceland, from Finmark to mid-Italy and the Ukraine, and even to the southern parts of western Siberia (*Det Kgl. Danske Vidensk. Selsk., Biol. Meddel.*, **10**, 1; 1930). It was noticeable that the crossbills showed themselves earliest in the most easterly countries visited and progressively moved westwards. The origin of the flight, therefore, must be sought in the east, indeed in the northern parts of Russia and Siberia, where the great pine-forests form the particular habitat of these birds. When explaining the migration, it must be remembered that in the summer of 1927 the pine-trees in these parts made extremely poor growth and the pine-seed harvest was a failure, so that the crossbills, deprived of their staple food, were compelled to wander to fresh feeding-grounds.

Biological Control in Mauritius.—Mauritius, like many other sugar-cane growing countries of the world, suffers severely from the ravages of Lamellicorn beetle larvæ. The species *Phytalus smithi* appears to have been accidentally imported into Mauritius from Barbados, some time prior to 1911, when it was first recorded as a pest. Good work has been achieved by various artificial methods of control, and this has been augmented by the application of biological measures. In 1916, the solitary wasp, *Tiphia parallela*, was introduced from Barbados and has now become well distributed over the whole region of infested cane. The present-day position of the problem is described by Mr. D. d'Emmerez de Charmoy, in the issue of the *Bulletin of Entomological Research* for March. He points out that since the *Phytalus* has been well established in Mauritius, some twelve or fifteen years before the introduction of its parasite, the latter is, for the time being, at a disadvantage from the economic point of view. Years must elapse before it can increase to the point where it will exterminate a sufficient proportion of the host population to yield the desired degree of control. At present the *Tiphia* destroys up to 30 per cent of the *Phytalus* and its work is being augmented by a second parasite, *Elis thoracica*, which was imported from Madagascar in 1917. At the present juncture, it may be said that artificial measures of control are required to be rigidly prosecuted so long as the biological method remains only very partially efficacious.

Tea in India.—Dr. Harold H. Mann's lecture, published in the *Journal of the Royal Society of Arts* of April 3, upon the scientific aspects of the Indian tea industry, was an interesting historical résumé, by one qualified to speak, of the progress in tea cultivation under Indian conditions. Dr. Mann went to India in

1900 as the first scientific officer of the Indian Tea Association. When tea plants were first cultivated in India, early in the nineteenth century, plants were introduced from China, but the discovery of indigenous tea plants on the borders of India and in Assam directed attention to the suitability of certain districts, especially Assam, for tea cultivation, and in 1839 the Assam Company was floated to take over and extend two-thirds of the Government plantations in the province. In those days, only Chinese experience and Chinese methods of cultivation were available, and Dr. Mann suggests that the Indian industry has only thrived since it has been broken away from these methods and developed its own. Tea is a crop with special requirements; it thrives on acid soils and deteriorates upon liming; the crop required is not flower or fruit, but the young leaf, so that a special pruning and cropping technique is required in order to encourage the continual succession of young leafy shoots suitable for plucking.

Flora of Lancetilla Valley, Honduras.—In compiling an enumeration of lowland Honduran plants of the region about Lancetilla Valley and the port of Tela, P.C. Standley (Field Museum of Natural History, *Botanical Series*, vol. 10, Publication 283, Jan. 1931) has made available a botanical work which will be equally useful for study purposes anywhere in the lowlands of Central America, as the area is typical of the wet lowlands of the whole Atlantic coast of that country. Almost all the area which is not devoted to the cultivation of bananas, which is the principal industry and furnishes the chief article of export from Honduras, is covered by dense forests, wooded swamps, or marshes. A general botanical description of the different types of vegetation, with accounts of the climate, geography and inhabitants, economic plants of the district, the relationships of the flora, vernacular names, and previous botanical exploration of the region, precede the descriptive flora. Both flowering plants and cryptogams are included, though the list of the latter is very incomplete. Many of the commoner plants are well illustrated.

Permian Insects.—In part 13 of his series of papers on "Kansas Permian Insects", Dr. R. J. Tillyard (*Amer. Jour. Sci.*, 21, p. 232; 1931) deals with a small group which at first sight appear to be true Coleoptera (or beetles), but a study of the venation and method of folding of the hind wing shows that there is no close relationship between these two groups. For these Permian insects Dr. Tillyard proposes a new order, the Protelytroptera, which he regards as the ancestral group from which the existing Dermaptera (or earwigs) have been derived.

Fossils of the Upper Rhine Valley.—W. Salomon-Calvi ("Oberrheinischer Fossilkatalog," Lief. 1, Berlin: Gebrüder Borntraeger, 1931; 35 gold marks) has edited a catalogue of the fossils found in the upper Rhine valley extending from Basel in the south to Hunsrück and the Taunus in the north. Under each species references are given to the works in which it is recorded or described, to the locality and horizon, and to the museum in which specimens may be seen. The part now published is divided into five sections: 1, "Palæozoic Animals" by M. Pfannenstiel; 2, "Triassic Vertebrates" by W. Scheffen; 3, "Jurassic Invertebrates" by W. Deecke; 4, "Triassic and Jurassic Vertebrates" by M. Pfannenstiel; 5, "Palæozoic and Mesozoic Plants" by K. Frentzen.

Ionic Wind Voltmeter.—One of the earliest effects noticed when a pointed conductor was connected with a source of high voltage was the electric wind produced at the point. The wind is produced by the ions colliding with the uncharged molecules and giving them velocities. The effect is observed at both the high tension and the earthed pole. When the latter is enclosed in an insulating vessel and a bent wire is used as an electrode, it is found that the wire is cooled by the alternating component of the wind according to definite laws. This phenomenon is used in the ionic wind voltmeter described by Prof. W. M. Thornton, W. Waters, and W. G. Thompson in the *Journal of the Institution of Electrical Engineers* for April. By making the earthed electrode part of a hot wire, bridge readings are obtained from which the voltages can be determined. The readings are due to the applied field upsetting the balance of the bridge. Indoor forms of voltmeters are made to indicate up to 300 kilovolts, and outdoor forms up to 132 kilovolts. In addition, portable forms from 3 to 150 kilovolts are made for general testing and X-ray work. The authors describe also a thermo-electrostatic relay which should prove a help in maintaining uniformity of voltage on the grid, a problem of considerable importance in distribution. If a fault or an excess load causes the line voltage to vary, the device actuates a warning signal. The authors state that the researches they made during their investigation on electrical discharge of gases have disclosed a new method of comparing molecular ionising potentials.

Fibre Structure.—An illustrated pamphlet of eighteen pages, issued by the University of Leeds, gives an account of the research work done there during the session 1929-30 with the aid of a grant from the Clothworkers' Company. It includes a five-page summary of the advances in our knowledge of the atomic structure of fibres by the X-ray analysis work of Messrs. W. T. Astbury and H. J. Woods. Wool in its natural state is built up of a number of molecular chains folded into a series of hexagons, and when the wool is stretched these hexagons break up into long zigzag lines the length of which may be double that of the series of hexagons. On the withdrawal of the stretching force, the original hexagonal form is resumed. Natural silk, on the other hand, behaves as would wool already stretched, and has not the long range elastic properties of natural wool. While steam has little effect on the properties of natural wool, it deprives stretched wool of its elasticity, and when the stretching force is removed the wool remains set in the extended state. This fact has important bearings on the dyeing and conditioning of wool and on other textile processes. The Government Grant Committee of the Royal Society granted £200 last year for the furtherance of these researches.

Rotation of Molecules in Crystals.—It has been suggested that in many cases there may be complete rotation of the molecules in crystals at temperatures below the melting point, and the transitions involving considerable absorptions of heat which have been found for solid hydrogen halides may be explained as due to the taking up of rotational energy by the molecules. The transition of solid hydrogen chloride is perfectly isothermal at 98·36° abs. and requires 284·3 cal. per mol. This explanation would require that the solids should have high dielectric constants, and for hydrogen chloride, for example, the dielectric constant of the solid should increase considerably at 98·36° abs. Cone, Denison, and Kemp, in the April number of the *Journal of the American Chemical Society*, show that this is the case. A temperature range of 85° to 165° abs. was used. At 98·4° abs. the dielectric constant changes isothermally from 3 to 10. Thus the theory of the rotation of the molecules in the crystal is supported.