

## Research Items.

**Were-Tigers in India.**—In *Man* for October, Mr. L. A. Cammiade points out that in an article appearing recently in the *Illustrated London News*, and describing the killing of a man-eating tiger which had been responsible for the deaths of more than thirty people, there are indications that, all unknown to the hunter, Mr. L. Handley, the tiger he was hunting was, in the opinion of the jungle people, the Gonds, a man who by magical means had assumed that form for nefarious ends. Thus, although the Gonds are normally quite unafraid of tigers, they deserted Mr. Handley when he was approaching the place in the jungle where the body of a woman was being devoured. They would not follow the blood trail except in a crowd and with the beating of drums and letting off of fireworks. This would have frustrated his object had the tiger been an ordinary beast; but is intelligible as against witchcraft. In one case the body was placed in a tree after recovery; but this is a practice of the Koi and Konda Reddis, neighbouring jungle tribes, in similar cases. For some unknown reason the body must not rest on the ground. Mr. Handley would not be aware of the Gonds' belief, as to voice their suspicion above a whisper, even among themselves, might be followed by murder. Mr. Cammiade also points out that the deities "who have to be propitiated after the killing of the tiger", according to Mr. Handley's account, judging from their appearance, are not tiger deities but more probably the images of notable ancestors to whom an offering of thanksgiving was made for delivery from the were-tiger. Tiger deities would have to be propitiated, and consent obtained before any action was taken; while it is customary to ask the ancestors for protection on a journey through the jungle and for success in disposing of merchandise at its end.

**Oceanic Bird Wanderers to Ceylon.**—Under this title W. E. Wait describes twenty species of birds which appear casually in the neighbourhood of Ceylon (*Spolia Zeylanica*, vol. 16, p. 181, Aug. 1931). They comprise three species of terns, three frigate-birds, one booby, tropic bird, shearwater, and stormy-petrel, all of which may be said to frequent the tropical waters of the Indian Ocean; two gulls which are casual wanderers; and rare stragglers, including a shearwater and booby from the temperate South Indian Ocean, two skuas and a petrel from the Antarctic, and a petrel, a stormy-petrel, and probably a skua from the Northern Pacific Ocean. It seems likely that the location of Ceylon at the focus of many important steamer routes may have some bearing upon the appearance of these wandering birds, since it is known that many oceanic birds follow ships for long distances at sea.

**A Supposed Primitive Gill-less Nudibranch.**—A new family (*Okadaiidæ*) has been created by Kikutaro Baba for a gill-less holohepatic nudibranch, *Okadaia elegans*, described by him a year ago (*Annot. Zool. Japon.*, vol. 13, p. 63; 1931.) The new description deals in detail with the internal organisation of the sole species of the genus, which has been found at several localities on the Japanese coast. Until now, the only known gill-less dorid, of the tribe Holohepatica, has been *Doridoxa*, and while the main characters of *Okadaia* show that it belongs to the Holohepatica, there are others which recall in some degree the Cladohepatic series. The most striking structural characteristic described is the absence of a heart, for the sections revealed no trace of a proper pulsatory centre or the heart and pericardium comparable with

those in other nudibranchs. Sir Charles Eliot was of opinion that the absence of gills had little effect on the rest of the organisation; this unique case of the correlated disappearance of branchiæ and the proper circulatory centre is regarded by the author as "the most primitive or retrogressive form" (surely not the same thing!) amongst the dorids.

**Nature of Golgi Substance.**—In Papers from the Tortugas Laboratory of the Carnegie Institution of Washington, vol. 27, is an interesting publication by D. H. Tennant, M. S. Gardiner, and D. E. Smith, on a cytological and biochemical study of the ovaries of the sea urchin, *Echinometra lucunter*. A new method is introduced into the study of cell inclusions by examining them both as structures and as substances. The tissues were subjected to the usual fixing and staining techniques, and at the same time the tissues were analysed and separated into their component substances. These substances were then subjected to the same fixation and staining techniques as the tissues themselves. As a result, the authors come to the conclusion that neither Golgi bodies nor chondriosomes are constant structural elements in the cellular architecture, but that both are the chemical products of physiological processes. It would seem that fatty acids of the oleic series meet the requirements of a Golgi substance in their reaction with osmium tetroxide. In the same report, observations are given on the formation of the egg in *Echinometra lucunter*, by R. A. Miller and H. B. Smith.

**Rust Diseases of Cereal Crops.**—A very useful summary of the present state of our knowledge of the commoner rust diseases of cereals is contained in the presidential address by Sir R. H. Biffen to the British Mycological Society (*Trans. Brit. Mycol. Soc.*, vol. 16, pt. 1, pp. 19-37). The strains and biologic forms of *Puccinia graminis* and other rusts are discussed in concise, though masterly fashion, and the recent work by Stakman and his colleagues on the crossing of forms is reviewed. Methods of control are dealt with at great length and include a historical as well as a modern presentation. Many factors which affect the incidence of epidemics are described, and the value of the removal of the ascidial hosts of such species as have them is discussed. The most valuable part, however, is the collection of recent results of work on the breeding of wheat resistant to the rust. The academic mycologist and the applied biologist will both find matter of interest in this account.

**Geological Map of Finland.**—Nearly twenty years have elapsed since the publication of the last edition of a general map of the ancient rocks of Finland. A new edition was prepared in 1925 for inclusion in the "Atlas of Finland", and this, with a few minor changes, is now published with *Bull.* 91 of the Commission géologique de Finlande. The Bulletin is a beautifully illustrated general account of the Pre-Quaternary rocks by Prof. J. J. Sederholm. The Pre-Cambrian rocks formerly known as Jatulian, Kalevian, and Ladogian are provisionally united under the common name *Karelian*. The levelled-down mountain chains which originated when these formations were folded are called *Karelides*. Their geotectonic study has already shown that they possess a structure analogous to that of the Alps. Mountain chains of a still more remote period are found from middle Sweden through southern Finland and these are designated *Sveco-Fennides*. It is shown that during the Pre-Cambrian, periods of erosion and quiet sedimentation were several times interrupted by epochs



of orogenic folding and intrusion of granite, and it is thought probable that in these early ages, as since, mountain-building has been restricted to narrow belts of the earth's crust.

**Absorption Spectra of Complex Salts.**—A paper by Dr. R. Samuel in a recent issue of the *Zeitschrift für Physik* (vol. 70, No. 1) contains much new information on the absorption spectra of complex salts of iron, cobalt, nickel, palladium, and platinum. The measurements have been made both in the visible region and well into the ultra-violet (2300 Å.), the progress towards shorter wave-lengths being due to an improvement in technique, involving the use of the continuous spectrum of hydrogen as a light source. Graphs are given showing the variation of absorption coefficient with wave-length for twenty-one substances. The chief interest in these experiments is in their possible bearing on the structure of the complex radicles. Dr. Samuel records a number of apparent regularities, such as the existence of three similarly situated bands in the spectra of the diamagnetic cyanides and the appearance of a fourth band at greater wave-length with paramagnetic cyanides. His work, although extensive, is, however, definitely of a preliminary nature. The physics department of the Muslim University of Aligarh, of which Dr. Samuel is the head, is being reorganised and equipped to provide facilities for research in molecular physics, and he is continuing his work there.

**Explosions in Closed Cylinders.**—There is a pronounced increase in the speed of propagation of flame in a gas mixture in a tube open at both ends when a number of restricting brass rings are arranged within the tube. This effect, observed by Chapman and Wheeler in 1926, has been shown by Kirkby and Wheeler, in the *Journal of the Chemical Society* for September, to apply also to a closed tube. In explanation of the general effect of restrictions, it has been shown that during the early stages of an explosion in a

tube the unburnt mixture ahead of the flame front moves as a current and the speed of the flame depends on the speed of the current. When the restricting rings are close enough together, the tongue of flame issuing from the first ring passes through the second and initiates combustion of the gas beyond while the portion between the two rings is still burning. The combustion of a comparatively large volume of gas is thus almost instantaneous. The effect occurs also in closed tubes, the sudden expansion resulting from the almost simultaneous combustion of the gas in each compartment producing a shock wave.

**Rhenium Compounds.**—The preparation of rhenium tetrachloride, and the rhenichlorides of potassium and silver, is described by Briscoe, Robinson, and Stoddart in the September number of the *Journal of the Chemical Society*. Precipitates of insoluble rhenichlorides were also obtained with mercurous and thallos salts. The primary product of treating the metal in chlorine is the tetrachloride,  $\text{ReCl}_4$ , which has not previously been observed. No evidence of the existence of the reported hexa- and hepta-chlorides was obtained, although the black crystalline tetrachloride was always accompanied by traces of a brown, well-crystallised substance, melting sharply at about  $21^\circ$ , obtained in quantities insufficient for analysis. No evidence of the formation of a lower chloride was obtained when rhenium was treated in dry hydrogen chloride up to  $900^\circ$ , the metal being unattacked. Potassium rhenichloride,  $\text{K}_2\text{ReCl}_6$ , was obtained in green crystals by heating a mixture of rhenium and potassium chloride in chlorine and crystallising from cold water. The silver salt,  $\text{Ag}_2\text{ReCl}_6$ , was obtained as an orange precipitate on adding a slight excess of silver nitrate to an aqueous solution of potassium rhenichloride. It is not obviously crystalline. Preliminary experiments on the behaviour of metallic rhenium when heated with bromine and iodine confirmed the observations of Noddack: the products are regarded as tetrahalides.

### Astronomical Topics.

**Meteoric Hypothesis for the Origin of the Solar System.**—The Abbé Moreux contributes articles on cosmogony to *Scientia* for September and October. Instead of invoking the approach of another star to the sun, he supposes the sun to have traversed a region of space full of dust or meteoric matter, such as are indicated by the dark 'Horse's Head' in Orion and a number of similar dark patches. The orbits of such particles about the sun would in general be hyperbolic, but he suggests that by collisions and other mutual interference a considerable part of the matter might be captured by the sun. He traces its subsequent behaviour in some detail, and attempts an explanation of Bode's law of planetary distances. He notes that the planes of the giant planets are alternately on opposite sides of the invariable plane of the system; he draws an argument from this in support of his system. But the planes are in a state of constant change, and it would seem that proof is required that the relation now existing is permanent before any cosmogonic argument can be drawn from it. In his discussion of Neptune's system he assumes that Neptune's rotation is retrograde, like the motion of the satellite. The observations of J. H. Moore and D. H. Menzel at the Lick Observatory in 1928 showed that the rotation is direct. In such a difficult subject as cosmogony, it is well that all possible suggestions should be examined. It is unlikely that any one of the suggested systems is completely true.

**Repetition of the Michelson-Morley Experiment.**—Six years ago, Prof. D. C. Miller announced the results of a series of experiments that he made on Mt. Wilson; these seemed to indicate a variation of some 9 km./sec. in the course of the year, which he ascribed to a drift of the solar system in a direction nearly normal to the ecliptic. In the "Encyclopædia Britannica" (14th edition, vol. 15, p. 418) are described three series of experiments, by Kennedy and Illingworth, by Piccard and Stahel, and by Michelson, Pease, and Pearson, all made between 1927 and 1929, and all giving a zero effect like the original experiment.

The *Scientific American* for October gives details of a later series of experiments carried out by Prof. G. Joos, of the University of Jena, using apparatus constructed by the Zeiss works. The path of the light in the apparatus is brought up to 70 feet by repeated reflections. The results are recorded photographically and they are stated to preclude any ether drift exceeding one mile per second, so that it may be assumed to be zero. The large cross of the apparatus is constructed of quartz, for the double reason of its low coefficient of expansion and its freedom from magnetic effects. The cross is suspended by 700 springs of piano-wire, so as to support every part equally and prevent torsion. There is thus a great majority of experiments that indicate a zero effect of ether drift.