1925, will give a graduate course in the psychology of the handicapped at George Washington University. His place in Northwestern University will be filled by Professor A. R. Gilliland, of Lafayette College.

A. R. CAHN, PH.D. (Illinois, '24), and F. B. Adamstone, Ph.D. (Toronto, '24) have been appointed instructors in zoology at the University of Illinois.

DR. REYNOLD KENNETH YOUNG, of the Ottawa Observatory, has been appointed associate professor of astronomy at the University of Toronto.

DR. B. B. BAKER, of the University of Edinburgh, has been appointed to the university chair of mathematics at University College, London, tenable at the Royal Holloway College.

DR. MANGIAGALLI, senator and director of the post-graduate work at Milan, has been elected rector of the newly organized university there.

DISCUSSION AND CORRESPONDENCE

DETERMINATION OF "e" FROM MEASUREMENTS OF THE SCHROTT-EFFECT

SCHOTTKY[1] has calculated, under the name "Schrott-effect," the spontaneous variations in thermionic currents that are to be expected if electron evaporation follows the law of probability. These variations depend upon the value of "e". Hartmann[2] attempted to determine "e" by measuring these variations. He succeeded in amplifying the variations to audibility, and by subjective comparison with pure tones of known intensity obtained values of "e" which varied from one fifteeenth the accepted value to three times this value.

We have repeated these measurements, using a radio-frequency amplifier instead of audio-frequency, thus avoiding disturbances due to gas effects or mechanical shocks; and using a "square" vacuum tube detector and d.c. ammeter to measure directly the energy of the Schrott disturbance. *The values of "e" calculated from these measurements are all within 2 per cent. of the accepted value, and the mean differs by less than one half per cent. from this value.*

Schottky's theory is thus fully substantiated, and it appears possible that this method of measuring "e" may yield values comparable in accuracy with the oil-drop method.

The Schrott variations appear to be the same for all types of cathode (pure tungsten, thorium coated tungsten, etc.) provided the current is limited by temperature. *When the current is limited by space charge instead of temperature, however, the Shrott-variations are much smaller.* This is in accordance with the theory, since under space charge conditions the electrons no longer fly off independently, but influence each other in such a way as to smooth out the variations.

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[1] Schottky, *Ann. d. Phys. 57*, 541–67, 1918; *68*, 157–76, 1922.

[2] C. A. Hartmann, *Ann. d. Phys. 65*, 65, 1921.

AN OSMOSIS EXPERIMENT IN BIOLOGY

IT is customary in an elementary course in biology to set up a demonstration of osmosis. Sometimes the thing does not work. A biology teacher usually performs it as a side line to the regular course work and seldom has time to experiment when it fails.

We have tried various grades of parchment, not always with good result. The solutions would exchange too fast in some cases. Other grades proved impermeable. Our best results have been with chicken crop. The smooth side is put out.

When the craw proves impermeable, the outside should be scraped and 5 per cent. HCl be painted on with a brush. A rise to six feet can then be obtained. I hope this may prove of service to some who have met with troubles.

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LETTERS OF RAFINESQUE

APROPOS of the note on "The Bones of Rafinesque" in the issue of SCIENCE for June 20—it may be of interest to those who care to delve in scientific biography—to know there is on deposit at the Philadelphia Academy of Natural Sciences the Haldeman letters and correspondence which contains the personal letters of Rafinesque, pertaining to his early life not only in America but in Europe. It is a veritable mine of information for any one who may care to prepare a biography of this remarkable character.

JOSEPH LEIDY, II

SCIENTIFIC BOOKS

I. Descriptions and Biology of New or little known Coccids from Japan. By INOKICHI KUWANA. II. *Observations on the Hymenopterous Parasites of Ceroplastes rubens Mask., with Descriptions of New Genera and Species of the Subfamily Encyrtinae.* By TEI ISHII (Dept. Agr. and Comm. Japan, Imp. Plant Quar. Sta., Bull. 3, Aug. 1923, p. 1–68, pl. I–XIV, fig. 1–5 (Art. I.) and pp. 69–114, pl. XV–XIX (Art. II.).

THERE are only three existing copies of this paper, the remainder of the edition having been destroyed by the Japanese earthquake of September 1, 1923. Two of these have been retained in Japan, while the third was brought to Dr. L. O. Howard, chief of the Bu-

reau of Entomology, by Mr. C. P. Clausen, parasite expert of the bureau, at the request of Professor Kuwana. It is to be hoped that the paper will be reprinted eventually, but since several new Japanese species of scale insects and hymenopterous parasites have been described in the paper it seems desirable to give a brief statement as to its contents.

The new species of Coccidae described are the following: *Prontaspis yanonensis*,[1] a close relative of *Chionaspis citri* Comst., from many species and varieties of *Citrus; Geococcus citrinus,* the second representative of this peculiar Pseudococcine genus, on roots of orange; *Rhizoecus kondonis,* another Pseudococcine species, from the roots of orange trees, and *Orthezia yasushii,* stated to occur on wild chrysanthemum and *Artemisia vulgaris.* In addition, the three species of *Ceroplastes* occurring in Japan, *rubens,* Mask., *floridensis* Comst., and *ceriferus* (And.), and *Geococcus oryzae* (Kuw.), previously considered to be a *Ripersia,* are discussed at length. An extended description of the different stages, accompanied by numerous quite satisfactory figures, is given for each species, and the description is supplemented by a discussion of the biology and host relationships of the species where information on these has been obtained.

The second article in this bulletin, as indicated by the title, consists in part of a consideration of the hymenopterous enemies of the introduced coccid, *Ceroplastes rubens,* and in part of technical descriptions of new Encyrtids. An extended discussion of the biology, habits, host relations and economic importance of the two species *Micropterys speciosus,* described as new, and *Coccophagus lecanii* Fitch is given, together with descriptions, accompanied by figures, of the different stages of each species. The general conclusion is reached that neither is effective in checking the increase and spread of the coccid host.

The second part of the paper describes the following new genera and species of Hymenoptera, all from Japan: *Clausenia,* new genus, and *C. purpurea,* new species, reared from *Pseudococcus* sp. on Citrus; *Neocopidosoma,* new genus and *N. komabae* new species, from a Tortricid larva on *Elaeagnus; Cheiloneurus ceroplastis,* new species, from *Ceroplastes rubens* and *C. ceriferus; Anabrolepis japonica,* new species, swept from bamboo infested with *Eriococcus onukii; Anabrolepis bifasciata,* new species, collected by sweeping: *Aphycus timberlakii,* new species, from *Lecanium* sp. on *Euonymus; Microterys ericeri,* new species, from *Ericerus pe-la* on Ligustrum.

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[1] First described (in Japanese) as *Chionaspis yanonensis* (Byokin Giachu Iho. Bur. Agr. D. H. Agr. and Comm. Japan, No. 10, 1923, pp. 1–33).

SPECIAL ARTICLES

GLACIAL PEBBLES IN EASTERN KENTUCKY[1]

WITHIN the last year (1923–24) the discovery of erratic pebbles of apparent glacial origin widely distributed throughout northeastern Kentucky has provided the first concrete evidence in support of a hypothesis of Pleistocene glacial ponding in a part of Kentucky heretofore thought to be without glacial characteristic. The occurrence of old elevated stream channels along the Ohio, notably at Huntington, West Virginia; Ashland, Kentucky; Ironton, Wheelersburg and Portsmouth, Ohio, has been known for some time, having been described by Leverett[2] and Tight.[3] These abandoned channels occur at elevations ranging from 680 feet to 690 feet above sea level. While they contain gravels chiefly composed of quartzite and chert of stream origin, possibly more remotely glacial, they are not to be confused with the pebbles which are now being found in remote parts of eastern Kentucky at much higher elevations.

In the course of non-glacial field work geologists on the Kentucky Geological Survey, including the writer, have found 18 pebbles varying in size from a few ounces to 13 pounds, consisting principally of quartzites, but with an occasional granite, gneiss or other crystalline or metamorphic rock. These pebbles range in elevation from 720 feet on the Big Sandy River to 850 feet on the North Fork of the Licking River, and have been found in Lawrence, Elliott, Lewis, Morgan, Carter and Boyd counties. Field evidence indicates that similar pebbles may also be found at similar elevations in parts of Menifee, Greenup and Rowan counties, though these are not a certainty. The drainage systems involved in these discoveries include the Big Sandy River, Little Sandy River and Tygarts Creek, and the North and Elk Forks of the Licking River.

Based on evidence now in hand, which will be supplemented this year by further investigations, the following hypothesis is advanced:

The general accordance of elevations of these pebbles coupled with their certain extraneous origin and decidedly glacial characteristic suggests their invasion into Kentucky by means of floating ice. It is held that they probably represent a complex assortment derived from both river and glacial front sources during the period of readjustment of the northward flowing drainage of this portion of the Cumberland plateau, while cols were being degraded to form the present course of the Ohio River at points just above (1) Ironton, (2) Portsmouth and (3) Manchester, Ohio, and possibly just above Cincinnati. It is

[1] Presented before the Kentucky Academy of Science, Lexington, Ky., May 10, 1924.

[2] Monograph XLI, U. S. G. S., p. 106, 1902.

[3] Prof. Paper No. 13, U. S. G. S., Plate XV2, 1903.