Laboratory at Wallaceville and the Dairy Research Institute at Palmerston North.

DR. HERMANN FISCHER, a son of Dr. Emil Fischer, professor of inorganic chemistry at the University of Basle, Switzerland, recently spent a week at the University of Toronto. On February 15 he gave a lecture before the Biochemical Society and on February 19 he spoke before the Chemical Society.

THE William Potter memorial lecture was delivered on February 11 by Dr. Henry A. Christian, Hersey professor of the theory and practice of physic at the Harvard Medical School. His subject was "The Fruition of a Clinician."

# DISCUSSION

## THE HEN'S EGG NOT FERTILIZED IN THE OVARY

IT is a well-known fact that the hen may continue to lay fertile eggs for two or three weeks or even longer after isolation from the inseminating male. Since it is rarely possible to recover normal, living spermatozoa a day after insemination (Barfurth, Lau, Anderson[1]) Iwanow[2] was led to consider the possibility of synchronous fertilization of a whole clutch of growing oöcytes *within the ovary.* Experimentally he found that hens would lay fertile eggs despite a thorough flushing of the body cavity and the oviduct with an appropriate spermicide. Walton and Whethan[3] were able to corroborate these results in that a lavage of the body cavity and of the oviducts of inseminated hens with such excellent spermicides as hexyl resorcinol or formaldehyde (Voge[4]) did not prevent the subsequent laying of fertile eggs. Nevertheless, these authors were loath to accept Iwanow's explanation of their results on the ground that spermatozoa can hardly be expected to pierce the thick capsule overlying the smaller oöcytes. This contention seems most reasonable.[5] Walton and Whethan furthermore point out that in these "Iwanow" experiments sperms hidden among the folds of the oviduct may well escape contact with the spermicidal lavage.

As the matter stands, therefore, it would seem that preovulatory fertilization in the bird is far from established so far as the foregoing experiments are concerned. It appears to the writer, however, that genetic proof against the Iwanow theory is already existent in the extensive data presented by Warren and Kilpatrick's experiments[6] on fertilization in the domestic fowl. These workers exposed laying hens alternately to males of different strains, all of which possessed dominant characters readily recognized in the chicks at an early stage of development. Thus, for example, in one series, eleven hens were penned with White Leghorn males for 21 days, then with Black Minorcas for 21 days, then again for a similar period with White Leghorns and so on. The results showed that in some cases as early as the second day after changing males the eggs laid had been fertilized by sperms from the replacing male. There was practically no overlapping of the offspring. The conclusion seems inevitable that the clutch of eggs were *not* coincidently fertilized in the ovary.

Harper[7] expressed the opinion that in the pigeon the ripe oöcyte about to rupture from its greatly attenuated follicle might be fertilized in this condition, since the wall is at this time but 3.5 $\mu$ thick. But even this seems unlikely, since the egg laid by the hen as much as 24 hours after insemination is always infertile, as has been known for over a century (Coste).

CARL G. HARTMAN

DEPARTMENT OF EMBRYOLOGY,
CARNEGIE INSTITUTION OF WASHINGTON,
BALTIMORE

1 W. S. Anderson, *Ky. Agric. Exp. Sta. Bull.* No. 239, 1922.

2 E. Iwanow, *C. R. Soc. Biol.*, Paris, 91: 54, 1924.

3 A. Walton and E. O. Whethan, *Jour. Exp. Biol.*, 10: 204, 1933.

4 C. E. B. Voge, "The Chemistry and Physics of Contraception," Jonathan Cape, London, 1933.

5 *Cf.* G. W. Bartelmez, *Jour. Morph.*, 23: 269, 1912.

6 D. C. Warren and L. Kilpatrick, *Poultry Science*, 8: 237, 1929.

7 E. H. Harper, *Am. Jour. Anat.*, 3: 349, 1904.

## STRUCTURAL CONTROL OF THE FORM AND DISTRIBUTION OF SINK-HOLES

MALOTT'S work[1] on Indiana caves shows interesting relations between subsurface forms and surface drainage; structural control of caves is shown remarkably well in McGill's treatise[2] on the Virginia Caverns. Martel's monumental work[3] is profusely illustrated with maps and cross-sections, many of which also show structural control, and Martel emphasizes energetically the tectonic influence in the development of sink-holes and caves, citing many instances of origin on fracture lines. However, specific reference to structural control in the form and distribution of sink-holes has escaped the present writer's notice.

1 Clyde A. Malott, "Handbook of Indiana Geology," Indiana Division of Geology, Indianapolis, pp. 94–98, 187–210, 233–247, 1922; also several papers in the *Proceedings of the Indiana Academy of Science*, notably in Vol. 38, pp. 201–206, 1928 (1929).

2 W. M. McGill, Virginia Geological Survey Bulletin 35, 1933.

3 E. A. Martel, "Nouveau Traité des Eaux souterraine," Paris, Chapter 2, 1921.

In 1933 while engaged in field work, preliminary to the building of the Norris Dam by the Tennessee Valley Authority, the writer noticed instances of obvious control of sink-hole form and distribution. In certain outcrop areas of the soluble zones of the Knox dolomite, where the dips were in the neighborhood of ten degrees and where the drainage water found inlet along the bedding planes, sink-holes showed the tendency to migrate down-dip. The form resulting was observed to be an unsymmetrical sink-hole, steep, and rock-walled in the down-dip direction, more gently sloping and soil-covered on the opposite side. Usually slight elongation in the strike direction was apparent. Several such forms were observed in the interstream upland between the Clinch and Powell Rivers near their confluence.

In more steeply dipping rocks the unsymmetrical profile was not apparent, but the tendency toward elongation in the strike direction was noticeable. The Ordovician limestones in the Buffalo Creek valley near Loyston, dipping twenty-five degrees to thirty degrees, showed not only elongation along the strike but alignment of sink-holes along the outcrop.

Observations of this nature have practical as well as physiographic value. The Buffalo Creek valley is a subsequent form and southwest of Loyston a very low divide separates northeast from southwest surface drainage. Some evidence is present to indicate the divide is shifting, or has recently shifted. The alignment of sink-holes, along the strike and across the divide, raised the perplexing question whether the division of subsurface drainage necessarily coincided with the division of surface waters, and, in practical engineering terms, whether an impounding dike at the divide would show subsurface leakage.

A. C. SWINNERTON
ANTIOCH COLLEGE

## A METHOD OF DISPERSAL OF THE BLACK WIDOW SPIDER

GENERAL interest attends current mention or discussion of the black widow spider. The present note is prompted by an artificial though probably not uncommon means of this spider's dispersal that recently came to my attention.

On November 1, 1935, a lad, Richard Tortorice, of Albany, brought to the Office of Zoology at the New York State Museum a well-fed female example of *Latrodectus mactans,* which, he reported, had been taken from a box of California grapes the same day. The lad retained the spider in a glass jelly jar at the local high school, feeding it at intervals with flies, until December 3, when he returned it permanently to the museum.

We maintained the spider in an apparently healthful condition by supplying her with cockroaches and water from a saturated pledget of cotton until January 9, 1936, when she died. On the night of December 22, 1935, the spider attached a cocoon to the under side of the wire gauze covering the jar, but spiderlings never issued from it.

Perhaps the most interesting fact in this enumerated chain of events was the successful consummation of a railroad journey from California to Albany, New York, by this particular black widow spider. It affords still another illustration of the dispersal of a species by man-made devices. Had the spider been freed under more salubrious climatic conditions she might well have been responsible for the establishment of the species in that locality and a different story might have been associated with this importation.

DAYTON STONER
NEW YORK STATE MUSEUM

## CONCERNING FOSSIL LEGUMES

IN a recent number of SCIENCE,[1] E. B. Ford, I. L. Baldwin and Elizabeth McCoy expressed the hope that some paleobotanist would report observations regarding fossil nodules from the roots of leguminous plants. As these writers intimated, other fossil remains of Leguminosae, such as leaves, fruits, seeds and wood, have been reported; but there are no authentic records of fossil root nodules. The hope that such may be discovered is, I am afraid, doomed to be deferred indefinitely, because these relatively minute structures are generally delicate and evanescent and are unfavorably situated for preservation as fossils.

Only remotely analogous to leguminous rootlets and root nodules are the rhizomes and tubers of *Equisetum,* which are sometimes preserved as fossils.[2] These survive because they are composed of fairly resistant tissues and because they grow along banks of streams or the edges of marshes where, when detached, they are likely to be buried in sediments and subjected to the processes of fossilization.

Fossil objects that have sometimes been regarded as underground leguminous fruits, like peanuts, are those called *Leguminosites? arachioides* Lesquereux[3] and *L. a. minor* Berry.[4] I propose in a paper now being prepared to present evidence that these objects are not legumes, but the fruit pods of an extinct trochodendraceous group of plants having *Populus*-like leaves and producing small winged seeds.

ROLAND W. BROWN
U. S. GEOLOGICAL SURVEY

[1] SCIENCE, 85: 45, 1937.

[2] Oswald Heer, *Flora fossilis arctica,* 2(3): 31, pl. 1, figs. 1–15; pl. 2, figs. 1–4, 1870. Leo Lesquereux, U. S. Geol. Survey Terr. Rept. 7: 67, pl. 6, figs. 2–4, 1878.

[3] Leo Lesquereux, *idem.,* p. 301, pl. 59, figs. 13, 14.

[4] E. W. Berry, U. S. Geol. Survey Prof. Paper 156: 89, pl. 14, figs. 2–6, 1930.