from 1871 to 1903, whose discoveries of the phase rule and other thermodynamical laws are the bases of modern processes of petroleum refining and of other chemical industries.

The 1937 medal jury was composed as follows: Professor Joel H. Hildebrand, of the University of California; Dr. Carl S. Miner, of Chicago; Professor Julius Stieglitz and Professor Hermann I. Schlesinger, of the University of Chicago; Professor Hugh S. Taylor, of Princeton University; Professor Harold C. Urey, of Columbia University; Dr. Ernest H. Volwiler, of the Abbott Laboratories, North Chicago; Professor Harry B. Weiser, of Rice Institute; Dr. George O. Curme, of the Union Carbide and Carbon Company, New York; Dr. Irving Langmuir, of the General Electric Company; Professor Ross A. Gortner, of the University of Minnesota; Dr. Eugene C. Sullivan, of the Corning Glass Works, Corning, New York.

SCIENTIFIC NOTES AND NEWS

DR. FREDERICK G. NOVY, professor of bacteriology emeritus at the University of Michigan, has been elected an honorary member of the Société de Pathologie exotique, Paris.

DR. B. R. KIRKLIN, of the Mayo Clinic, Rochester, Minn., has been elected a corresponding member of the German Röntgen Society.

THE Duddell Medal of the Physical Society, London, has been awarded to Dr. Walter G. Cady, professor of physics at Wesleyan University.

THE honorary degree of doctor of science was conferred on Dr. Charles Gordon Heyd, president of the American Medical Association, by Temple University at its Founders' Day exercises on February 15.

THE degree of doctor of pharmacy, *honoris causa,* was conferred by the Philadelphia College of Pharmacy and Science on Dr. Thomas Parran, Jr., surgeon general of the United States Public Health Service, on the occasion of the one hundred and sixteenth celebration of Founders' Day on February 23. Dr. Parran, who gave the principal address, spoke on "The Aims of the United States Public Health Service."

AT the annual dinner in New York City of the American Institute of Mining and Metallurgical Engineers, honors for distinguished service were awarded as follows: The William Laurence Saunders Gold Medal was awarded to Erskine Ramsay, chairman of the board and general consulting engineer of the Alabama By-Products Corporation of Birmingham. The first Anthony F. Lucas Gold Medal was awarded to J. Howard Pew, president of the Sun Oil Company. George S. Rice, chief mining engineer of the Bureau of Mines, Washington, D. C., won a certificate of honorary membership in the institute. The Robert H. Hunt prize for 1937 was awarded to William Floyd Holbrook, of the U. S. Bureau of Mines, and to Thomas L. Joseph, of the Minnesota School of Mines and Metallurgy in Minneapolis. John M. Hassler, engineer of the Southern District Republic Steel Corporation, of Birmingham, Ala., won the J. E. Johnson award.

THE 1936 Lamme Medal of the American Institute of Electrical Engineers has been awarded to Dr. Frank Conrad, assistant chief engineer of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., "for his pioneering and basic developments in the fields of electric metering and protective systems." The medal and certificate will be presented to him at the annual summer convention of the institute, which will be held in Milwaukee from June 21 to 25. The Lamme Medal was founded as a result of a bequest of the late Benjamin G. Lamme, chief engineer of the Westinghouse Electric and Manufacturing Company, who died on July 8, 1924, to provide for the award of a gold medal annually to a member of the American Institute of Electrical Engineers, "who has shown meritorious achievement in the development of electrical apparatus or machinery."

IT is recorded in *Nature* that the council of the British Institution of Electrical Engineers has made the fifteenth award of the Faraday Medal to Professor André Blondel, of Paris. The medal is awarded not more frequently than once a year, either for notable scientific or industrial achievement in electrical engineering or for conspicuous service rendered to the advancement of electrical science, without restriction as regards nationality, country of residence, or membership of the institution.

IN addition to the Wollaston Medal, which was awarded by the British Geological Society to Professor Waldemar Lindgren, of the Massachusetts Institute of Technology, for his researches concerning the mineral structure of the earth, the following awards have been made: the Murchison Medal to Dr. L. J. Spencer, in recognition of the value of his original contributions to mineralogical science and of his services to the publication of mineralogical literature; the Lyell Medal to L. Richardson, for his contributions to the geology of the Jurassic rocks of Great Britain; the Bigsby Medal to Professor C. E. Tilley, in recognition of the value of his researches in petrological science; the Wollaston Fund to Dr. D. Parkinson; the Murchison Fund to S. H. Straw. The Lyell Fund was

divided between J. F. Jackson and Miss M. E. Tomlinson.

OFFICERS of the American Institute of Electrical Engineers for the year beginning on August 1 have been nominated as follows: *President,* W. H. Harrison, assistant vice-president, Department of Operation and Engineering, American Telephone and Telegraph Company. *Vice-presidents:* Middle Eastern District, I. Melville Stein, director of research, Leeds and Northrup Company, Philadelphia; Southern District, Edwin D. Wood, general superintendent, Louisville Gas and Electric Company; North Central District, L. N. McClellan, chief electrical engineer, U. S. Bureau of Reclamation, Denver; Pacific District, J. P. Jollyman, hydroelectric and transmission engineer, Pacific Gas and Electric Company, San Francisco; and Canada District, M. J. McHenry, manager, Toronto District, Canadian General Electric Company, Limited. *Directors:* C. R. Beardsley, general superintendent of distribution construction, Brooklyn Edison Company, Inc.; V. Bush, vice-president and dean of engineering, Massachusetts Institute of Technology; and F. H. Lane, manager, Engineering Division, Public Utility Engineering and Service Corporation, Chicago. *National Treasurer,* W. I. Slichter, professor of electrical engineering, Columbia University.

THOMAS BUCKLEY, assistant chief engineer and surveyor of the Philadelphia Bureau of Engineering, Surveys and Zoning, has been elected president of the newly organized American Public Works Association.

CYRIL S. KIMBALL has been elected to succeed Dr. Foster Dee Snell as honorary secretary of the American Section of the Society of Chemical Industry. Dr. Snell served as honorary secretary for over ten years.

DR. EDWARD HIRAM MCALISTER, of the Oregon State College, having reached the age of seventy years, has retired with the title professor emeritus of mathematics. He has been connected with the Oregon State System of Higher Education for forty-six years.

DR. LEE FOSHAY, associate professor of experimental bacteriology, has been appointed professor of bacteriology and head of the department in the College of Medicine, University of Cincinnati, in the place of the late Dr. William B. Wherry.

DR. W. J. DE HAAS, professor of physics and meteorology at the University of Leyden, has been appointed Scott lecturer at the University of Cambridge for the next academic year.

DR. JOHN STIRLING YOUNG, professor of pathology in Queen's University, Belfast, has been appointed Regius professor of pathology in the University of Aberdeen, in place of Professor Theodore Shennan, who has resigned.

R. W. JAMES, reader in experimental physics at the University of Manchester, has become professor of physics in Capetown, South Africa. He has been associated with Professor W. L. Bragg in the study of the structure of crystals.

B. J. MARTLES, assistant lecturer in zoology at the University of Bristol, has been appointed to the chair of biology at the University of Otago, New Zealand.

DR. KENNETH F. MAXCY, professor and head of the department of preventive medicine and public health at the University of Minnesota, has been elected scientific director of the International Health Division of the Rockefeller Foundation. The appointment, which became effective on January 1, is for three years.

DR. GEORGE H. GODFREY, formerly of the Pineapple Canners' Experiment Station at the University of Hawaii, has been appointed plant pathologist at the Texas Agricultural Experiment Station at Weslaco, not at the University of California as stated in the issue of SCIENCE of February 12.

PHILIP C. STAPLES, president of the Bell Telephone Company of Pennsylvania, has been elected president of the Franklin Institute of Philadelphia. He succeeds Nathan Hayward, who resigned recently but continues as a member of the board of managers.

N. B. KINNEAR and Dr. H. A. Baylis have been appointed to deputy keeperships in the department of zoology of the British Museum.

THE Rockefeller Foundation has awarded a two-year grant of $10,000 to Professor James Franck, of the Johns Hopkins University, for research in photosynthesis and photo-observation.

DR. VICTOR G. HEISER has left for a five-months' tour of Africa. He will visit leper colonies and investigate the possible spread by airplane travel of yellow fever.

DR. MAURICE STACEY, of the staff of Professor W. N. Haworth, director of the department of chemistry of the University of Birmingham, England, is visiting the laboratories of the department of medicine of the College of Physicians and Surgeons, Columbia University, and the Presbyterian Hospital, New York, to engage in immunochemical studies.

DR. G. J. HUCKER, chief in research in bacteriology at the New York State Experiment Station at Geneva, has been granted six months' leave of absence to accept an invitation from the Government of New Zealand to spend four months in the Dominion conferring with bacteriologists, experts in dairy problems and veterinarians on a research program on the detection and control of mastitis and septic sore throat. Dr. Hucker will leave Geneva about July 1 and will divide his time between the University of Hamilton, the Veterinary

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 μ 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).

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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.