C. H. Best, professor of physiology, University of Toronto.

W. Brown, professor of plant pathology, Imperial College of Science and Technology.

J. W. Cook, professor of chemistry, the Research Institute, Royal Cancer Hospital.

T. L. Eckersley, research physicist, Marconi's Wireless Telegraph Company.

G. I. Finch, professor of applied physical chemistry, Imperial College of Science and Technology.

W. E. Gye, director of the laboratories of the Imperial Cancer Research Fund.

W. V. D. Hodge, Lowndean professor of astronomy and geometry, University of Cambridge.

J. S. Huxley, secretary of the Zoological Society of London.

J. Jackson, H.M. astronomer at the Cape.

Sir Robert Mond, chemist and Egyptologist.

J. E. Richey, district surveyor, H.M. Geological Survey.

F. S. Russell, naturalist at the Marine Biological Association.

B. F. J. Schonland, professor of physics, University of Cape Town.

F. S. Sinnatt, director of fuel research, Department of Scientific and Industrial Research.

K. M. Smith, senior research assistant, Plant Virus Station, Cambridge.

E. Stedman, lecturer in department of chemistry in relation to medicine, University of Edinburgh.

C. E. Tilley, professor of mineralogy and petrology, University of Cambridge.

W. E. S. Turner, professor of glass technology, University of Sheffield.

H. H. Woollard, professor of anatomy, University College, London.

THE FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY

THE Federation of American Societies for Experimental Biology will meet in Baltimore on March 30 and 31 and April 1 and 2. The federation is composed of the American Physiological Society, the American Society of Biochemists, the American Society for Pharmacology and Experimental Therapeutics and the American Society for Experimental Pathology.

This annual meeting will be unique in that it will celebrate the fiftieth anniversary of the founding of the American Physiological Society. The addresses at the banquet will be devoted to commemorating the work of the three men who organized the society and directed the first three physiological laboratories in the country. Dr. Walter B. Cannon, of Harvard University, will speak on Henry P. Bowditch; Dr. Anton J. Carlson, of the University of Chicago, on S. Weir Mitchell, and Dr. William H. Howell, of the Johns Hopkins University, on H. Newell Martin. Dr. Walter E. Garrey, president of the society, will introduce Dr. William T. Porter, honorary president, who will act as toastmaster.

All the original members of the society now living, together with the past presidents, representatives of other biological societies in this country and of the English and Canadian physiological societies, are expected to attend as guests. To further commemorate the occasion an illustrated history of the American Physiological Society is in process of publication. It will contain articles by William H. Howell and Charles W. Greene, with a foreword by Walter J. Meek.

SCIENTIFIC NOTES AND NEWS

DR. H. C. CHRISTENSEN, secretary of the National Association of Boards of Pharmacy, has been awarded the Remington Medal for 1938. The presentation will be made at a coming meeting of the New York Branch of the American Pharmaceutical Association. The medal is awarded annually to the "man or woman who has done most for American pharmacy during the preceding year or during a longer period of outstanding activity and of fruitful achievement."

PROFESSOR F. E. TURNEAURE, dean emeritus of the College of Engineering of the University of Wisconsin, and Dr. D. W. Mead, professor emeritus of hydraulic and sanitary engineering, were presented with honorary memberships in the Engineering Society of Wisconsin at the annual convention, which was held from March 17 to 19. At a banquet in the evening of March 17 the speakers were: President C. A. Dykstra, Colonel E. E. Gesler and C. R. Martin, of Milwaukee.

DR. ROSS G. HARRISON, Sterling professor of biology at Yale University, has been elected a foreign member of the Zoological Society of London.

DR. GEORGE B. BARBOUR, associate professor of geology in the Graduate School of Arts and Sciences of the University of Cincinnati, has been elected an honorary member of the Geological Society of Belgium.

AN honorary degree will be conferred on Dr. Harry Steenbock, professor of agricultural chemistry at the University of Wisconsin, at the eighty-fifth commencement exercises of the university on June 20.

THE honorary membership of the Rittenhouse Astronomical Society of Philadelphia was conferred upon Dr. Knut Lundmark, director of the observatory at the University of Lund, Sweden, at a joint meeting of the society with the Franklin Institute on March 24. Dr. John H. Pitman, of the Sproul Observatory, president

of the Rittenhouse Society, made the award, which was given in recognition of Dr. Lundmark's "important contributions to astronomy, particularly in his investigations on the objects of outer space." Astronomers upon whom honorary membership had previously been conferred are: Dr. Frank Schlesinger, Dr. Robert G. Aitken, Dr. Harlow Shapley, Robert R. McMath and Dr. Armin O. Leuschner.

DR. ROBERT W. HODGSON, professor of subtropical horticulture in the College of Agriculture of the University of California at Los Angeles, has received the decoration of Officier du Mérite agricole, France, in recognition of professional services in the horticultural development of French North Africa in 1930 and 1931, and for advice since that period. He spent a year conducting horticultural surveys for the French protectorate governments of Tunisia and Morocco.

THE thirty-fifth anniversary of Dr. Smith Ely Jelliffe's editorship of *The Journal of Nervous and Mental Diseases* will be celebrated at the New York Academy of Medicine on April 22. The celebration will consist of a Neuro-Psychiatric Symposium to be held on the afternoon of April 22 at two o'clock, and will be followed by a dinner in the evening. Speakers at the dinner, who will pay tribute to Dr. Jelliffe, are: Earl D. Bond, who will speak on "Balance in Psychiatric Research"; George Draper, on "The Man Factor in Disease"; Frederick Tilney, on a "New Interpretation of the Hippocampus"; Oskar Diethelm, on "Psychiatry and Neurology in the Last Fifty Years," and Karl A. Menninger, on "Somatic Correlations with the Unconscious Repudiation of Femininity in Women."

A. E. COLLINS, assistant to the president of the International Nickel Company of Canada, has assumed the presidency of the Canadian Institute of Mining and Metallurgy for the 1938–1939 term. He succeeds the Honorable Michael Dwyer, Minister of Mines for Nova Scotia.

DR. HERBERT V. NEAL, professor of zoology and dean of the Graduate School of Tufts College, will retire at the end of the academic year. He joined the faculty of the college in 1913.

DR. GEORGE W. MCCOY, medical director of the U. S. Public Health Service, at the request of Dean Rigney D'Aunoy has been assigned by Dr. Thomas Parran, Jr., surgeon-general of the United States, to the School of Medicine of the Louisiana State University. His title will be professor of preventive medicine and public health.

MAJOR THOMAS D. STAMPS, of the U. S. Corps of Engineers, has been nominated by President Roosevelt to be professor of civil and military engineering at the U. S. Military Academy, at West Point, N. Y.

DOUGLAS F. MINER, manager of the Central Engineering Laboratories and Standards of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, has been appointed George Westinghouse professor of engineering at the Carnegie Institute of Technology. He will act as coordinator for the Westinghouse cooperative engineering plan, under which a qualified group of engineering students will take the usual technical college course, and during the same period will receive shop and engineering experience at the Westinghouse plant. Students may follow any of the engineering courses given at the institute. The professorship is part of the plan announced last autumn when the Westinghouse Company gave $200,000 to the endowment fund of the institute. Ten scholarships are also provided annually for exceptional students, who over a period of five years will receive the sum of $3,000.

AT the University of Chicago, Dr. Alfred L. Kroeber, professor of anthropology at the University of California, has been appointed visiting professor for the spring quarter in anthropology. In addition to his courses on "The Nature of Culture" and "Primitive Art," he will give a series of public lectures. Dr. Robert Petrie Walton, professor of pharmacology at the University of Mississippi, will be a visiting lecturer in pharmacology. Dr. Wilton Marion Krogman, of Western Reserve University, has been appointed associate professor of anatomy and physical anthropology.

DR. R. V. CHRISTIE, until last September a member of the Medical Clinic of McGill University, previously of the Hospital of the Rockefeller Institute of New York City, has been appointed to the university chair of medicine at St. Bartholomew's Hospital Medical College, London.

DR. COLIN G. FINK, professor of electrochemistry, Columbia University, has been appointed an official American delegate to the thirteenth Conference of the International Union of Chemistry and the tenth International Congress of Chemistry to be held at Rome from May 15 to 21. He will deliver an address on "The Electrochemistry of the Rare Metals."

DR. A. J. NICHOLSON, chief of the Division of Entomology of the Australian Council for Scientific and Industrial Research, Canberra, has arrived in the United States and is working in the laboratory of Professor Harry S. Smith at the University of California Citrus Experiment Station at Riverside. Dr. Nicholson is known for his work on growth and balance in animal populations. Dr. and Mrs. Nicholson expect to spend five weeks at Riverside, after which they plan to visit eastern United States, Canada, En-

gland, Germany and various other European countries, returning to Australia *via* the east coast of Africa.

DR. EUGENE DAVENPORT, dean emeritus and first director of the Experiment Station of the College of Agriculture of the University of Illinois, and H. W. Mumford, the present director, were the principal speakers at the celebration of the fiftieth anniversary of the station on March 25.

PROFESSOR A. N. WINCHELL, of the University of Wisconsin, delivered the third series of Grant Memorial Lectures at Northwestern University on March 30, 31 and April 1. On the evening of March 31 he gave a non-technical lecture entitled "Where Art and Science Meet" and on three successive afternoons a series of technical lectures on "The Nature of Crystal Structure."

THE fifty-sixth course of the Lane Popular Medical Lectures will be given at Stanford University during April and May. There will be four lectures on Friday evenings, beginning on April 1. The lecturers are: Dr. Walter W. Boardman, Dr. Donald E. King, Dr. William J. Kerr and Dr. Dwight L. Wilbur.

DR. WALLACE M. YATER, professor of medicine in the School of Medicine of Georgetown University, delivered the annual Kober Lecture at the university on March 28. The lecture was entitled: "Goiter and the Heart: An Exposition of the Present Status of Our Knowledge of the Subject."

DR. EDISON PETTIT, astronomer in the Mt. Wilson Observatory of the Carnegie Institution of Washington, on March 16 gave at the University of California at Los Angeles a lecture on solar prominences illustrated by motion pictures recently secured with the tower telescope of the McMath-Hulbert Observatory of the University of Michigan at Lake Angelus. Dr. Pettit was accompanied by Robert R. McMath, the director of the McMath-Hulbert Observatory, who made a few informal remarks after the lecture.

DR. DAVID KENNEDY HENDERSON, professor of psychiatry in the University of Edinburgh, physician superintendent of the Royal Edinburgh Hospital for Mental Disorders, will deliver the sixth series of the Thomas William Salmon Memorial Lectures at the New York Academy of Medicine on April 18, 19 and 20.

DR. FRANCIS G. BENEDICT, research associate of the Carnegie Institution of Washington and formerly director of the Nutrition Laboratory of the Carnegie Institution in Boston, gave addresses from March 2 to 18 under the auspices of Sigma Xi on the subject, "Animal Metabolism from the Mouse to the Elephant," at the following institutions: The Ohio State University, the Michigan State College, the College of Medicine of the University of Illinois, Chicago; the University of Colorado, the University of Washington and Purdue University. In many cases he also spoke informally on "What the Research Worker may Learn from the Magician."

THE American Psychological Association will hold its forty-sixth annual meeting at the Ohio State University from September 5 to 10. Officers this year are: *President,* J. F. Dashiell, University of North Carolina; *Secretary,* Willard C. Olson, University of Michigan; *Treasurer,* Willard L. Valentine, the Ohio State University. Arrangements for the convention are in the hands of a committee consisting of the president and secretary of the association and Dr. H. E. Burtt, of the department of psychology. Numerous subcommittees are in charge of convention details. The Society for the Psychological Study of Social Issues, the Psychological Corporation, the Psychometric Society and the American Association of Applied Psychologists will meet in conjunction with the association.

THE ninth spring meeting of the Eastern Branch of the American Psychological Association will be held under the auspices of New York University on Friday, April 1, at the Hotel Commodore, New York City, and on Saturday, April 2, at the University College of Arts at University Heights. A banquet will be held at 7 o'clock on the evening of April 1, after which Professor Karl S. Lashley, of Harvard University, will give the presidential address. He will speak on the "Experimental Analysis of Instinctive Behavior."

THE governor of Alabama has announced that the Rockefeller and Carnegie Foundations will provide an endowment of $10,000,000 for construction of a medical center at Tuscaloosa in conjunction with the University of Alabama and the state mental hospitals. It will provide a four-year medical school for the university, a general hospital, a psychopathic hospital, nurses' school and state-wide clinics.

AN allotment of $90,525 has been made by the Works Progress Administration for the running of geodetic surveys throughout the State of Louisiana and in establishing permanent bench marks. The headquarters of the survey will be in New Orleans.

PRELIMINARY arrangements have been made recently with officials of the U. S. Biological Survey for the collection of stream flow records by the Geological Survey at three of the Migratory Waterfowl Refuge projects where information relating to the water supplies is essential in connection with their operation. These projects are in South Dakota, Oregon and Michigan.

THE Florida Academy of Sciences is interested in entering into exchange arrangements with scientific

periodicals published anywhere in the world. Volume I (1936) of the proceedings has just appeared. Any communications and copies of proceedings for exchange should be sent to Dr. J. H. Kusner, secretary, Florida Academy of Sciences, University of Florida, Gainesville, Florida.

DISCUSSION

SHOCK DISEASE AND THE SNOWSHOE HARE CYCLE

THE periodic decimation of the snowshoe hare in North America, which approximately every ten years reduces the numbers of these animals to scarcity, seems again to have run its course in Minnesota. For several years past hares have decreased in numbers throughout the state, and in most areas appear to be near or at the extreme low point. On the Lake Alexander Area in Morrison County, where extensive field and laboratory studies have been carried on since 1930, a peak population of hares was reached in 1933, when the trapping census showed 478 hares per square mile. The decline has been continuous since that time, but the greatest drop occurred during the fall and winter of 1935, so that by the spring of 1936 the population was reduced to 164 hares per square mile. Now in the fall of 1937 the numbers are so low that any enumeration will be difficult.

It has been the finding of the Minnesota Wildlife Disease Investigation,[1] from intensive studies on the Lake Alexander hare population and from supporting investigations on hare samplings throughout the state of Minnesota, that the die-off of snowshoe hares is due to a new disease entity in that species which we have called "shock disease."[2]

Hares suffering from shock disease appear perfectly normal until they are suddenly stricken with convulsions and die in the seizures or abruptly sink into a fatal coma. We first used the term "shock disease" when we recognized that some hares trapped and held in capitivity would die from the shock of change in environment. Later we learned that the convulsive seizures in these animals were hypoglycemic in character and that death was usually due to an abnormally low blood sugar.

So far as we have been able to determine, the basis of the disease is a degeneration of the liver. Usually in advanced cases the liver is a dark mahogany in color and is atrophic and definitely smaller than normal, so that the capsule is separated from the parenchyma and lies as a wrinkled membrane over the surface of the organ. Microscopically, the liver cords are highly atrophic. Thus far we have recognized consistent changes only in the liver; pathological findings in other organs are variable.

The liver degeneration is associated with a failure to store glycogen. When the carbohydrate reserve in the liver reaches a low value, the hare leads a precarious existence. As excitement or exertion depletes the small glycogen reserve, the blood sugar drops below the normal range, unconsciousness supervenes, and the hare dies. Routine technical procedures have shown that normal hares have an average liver glycogen value of 5.5 per cent., while hares in shock have values from 0.02 per cent. to 0.18 per cent.

Our first investigations of this disease in live hares were confined to animals found sick in box traps and dying, as a rule, while being taken to the laboratory. When it was recognized that the condition was so widespread that large numbers of hares died when subjected to the mild but continuous strain of captivity, intensive investigations were carried out on captive groups. During March, 1936, just at the end of the period of sharpest decline, we held 204 hares under observation. The animals survived an average of only 4.2 days, and not a single hare survived the 20th day. The conditions of captivity were favorable for extended survival as the food and surroundings were identical with those provided for groups of hares held under observation indefinitely, previous to the widespread occurrence of shock disease in the hare population. The hares appeared at ease, hopped around interestedly, and ate a variety of foods. However, a hare appearing normal would suddenly spring into the air in convulsions or sink to the floor in coma. In either case, death usually followed from a few minutes to an hour after the onset of symptoms.

This type of sudden death of hares was observed in the woods under entirely natural conditions by our staff at the same time, and similar occurrences were reported to us by others. During the summer of 1936, with the assistance of Deane Mather, of the U. S. Forest Service, shock disease was demonstrated to occur in hares 6 weeks old while living in a wild state in fenced natural ranges in which they were born. It has become evident that the death of hares which we have observed in captivity is a process which has been accelerated, but which is otherwise identical with that involving the animals undisturbed in the wild.

The large groups of hares which we have held in captivity while observing deaths from shock disease represented samples from central Minnesota, northeastern Minnesota and the northwest area lying south

[1] Executive Reports of the "Minnesota Wildlife Disease Investigation," Vol. 1 (July, 1933, to December, 1934), and Vol. 2 (January, 1935, to June, 1936). Mimeographed by U. S. Department of Agriculture.

[2] R. G. Green and C. L. Larson, *Am. Jour. Physiol.*, 119: 319–320. 1937.