present there are two scientific men from abroad: Kaare M. Ström, Norwegian limnologist from the Geological Museum at Oslo, who will present a paper on "The Sediments of Norwegian Lakes," and Dr. S. F. Snieszko, formerly professor of bacteriology at the University of Krakow, Poland, who will read a paper on "Pond Fish Farming in Poland." Dr. Snieszko is now at the University of Maine.

A dinner in honor of the eighty-ninth birthday of Dr. E. A. Birge, president emeritus of the University of Wisconsin, at which Dr. C. A. Dykstra, president of the university, will preside, will be given on September 5.

THE OPTICAL SOCIETY OF AMERICA

THE twenty-fifth annual meeting of the Optical Society of America will be held in Rochester, N. Y., with headquarters at the Hotel Sagamore, on October 3, 4 and 5. It is pointed out in the official announcement that the selection of Rochester for the twenty-fifth annual meeting is a natural one, in view of the importance of the city in the optical industry and of the part which Rochester members have played in the organization and development of the society. Special arrangements are being made to commemorate the twenty-fifth annual meeting, and a local committee, appointed by the Rochester Section, is active in plans to make the meeting successful.

The program as tentatively arranged is as follows:

THURSDAY, OCTOBER 3

Morning—Contributed papers.

Afternoon—Reserved for visits to industrial plants in Rochester.

Evening—Lecture by Edwin H. Land illustrated by experiments and by exhibits of Polaroid and some of its applications in the field of photography.

FRIDAY, OCTOBER 4

Morning—Symposium of invited papers. These are intended to comprise a review of the development of optics with emphasis on recent significant advances in the field, thus endeavoring to present both the historical and contemporary aspects.

Afternoon—Reserved for visits to industrial plants in Rochester.

Evening—Complimentary dinner at the Oak Hill Country Club, at which members and their wives will be the guests of the Bausch and Lomb Optical Company. The dinner, at which informal dress will be in order, will be featured by a recognition of the active Charter Members of the Society and the award of the first Adolph Lomb Medal.

SATURDAY, OCTOBER 5

Morning—Contributed papers.

Afternoon—Reserved for additional contributed papers as required.

Members desiring to read papers at the meeting are requested to send abstracts to Arthur C. Hardy, Secretary, Optical Society of America, Massachusetts Institute of Technology, Cambridge, Massachusetts. They should be in his hands not later than September 11. The chairman of the program committee is A. W. Kenney, of the E. I. du Pont de Nemours and Company. Mr. Hardy has been filling, until the next annual meeting, the vacancy created by the resignation as secretary of L. B. Tuckerman.

SCIENTIFIC NOTES AND NEWS

DR. THOMAS BARBOUR, director of the Museum of Comparative Zoology, Harvard University, has been elected a foreign member of the Linnean Society of London.

THE retirement is announced of Dr. Charles Albert Browne, supervisor of chemical research in the Bureau of Chemistry and Soils of the U. S. Department of Agriculture. Dr. Browne has been connected with the Department of Agriculture since 1906.

G. G. BROWN, professor of chemical engineering at the University of Michigan, was recently the recipient of the Hanlon Award of the Natural Gasoline Association of America for "outstanding contributions in the field of natural gasoline."

THE title of dean emeritus has been conferred on Dr. Langley Porter, of the Medical School of the University of California. He had been associated with the school since 1918.

COLONEL HAROLD W. JONES, librarian of the Army Medical Library, Washington, D. C., was reelected president of the Medical Library Association at its annual meeting in Portland, Ore., which was held on June 25, 26 and 27. Dr. Robert E. Schlueter, St. Louis, was elected vice-president and Miss Anna C. Holt, Harvard Medical School Library, Boston, was reelected secretary. The convention in 1941 will be held at the Medical School of the University of Michigan.

THE following officers for the year 1940–41 were elected at the annual meeting of the Royal Society of Queensland: *President,* Dr. F. W. Whitehouse; *Vice-presidents,* H. A. Longman and Professor H. R. Seddon.

DR. C. E. MCCLUNG, who recently retired as director of the biological laboratories at the University

of Pennsylvania, has been appointed visiting professor of biology at the University of Illinois.

DR. HENRY J. MASSON, professor of chemical engineering and director of the Graduate Division of the College of Engineering of New York University, a member of the faculty for twenty-three years, has been appointed acting director of the evening division of the College of Engineering. He succeeds Professor Sampson K. Barrett, who will devote his full time to teaching.

DR. WILLARD L. VALENTINE, associate professor of psychology at the Ohio State University, has been appointed chairman of the department of psychology at Northwestern University.

DR. ROGERS D. RUSK, since 1928 associate professor of physics at Mount Holyoke College, has been appointed chairman of the department to succeed Dr. Elizabeth R. Laird, who retired in June.

DR. BRADLEY T. SCHEER, research assistant in the division of biochemistry and physiology at the Scripps Institution of Oceanography of the University of California at La Jolla, has been appointed instructor in zoology and physiology at West Virginia University.

DR. T. G. H. JONES, lecturer in chemistry at the University of Queensland, has been appointed professor of chemistry in succession to the late Professor L. S. Bagster.

DR. JASPER L. STUCKEY, who resigned as state geologist of North Carolina in 1926 to become professor of geology in the State College at Raleigh, has returned to the survey to succeed H. J. Bryson, who resigned in the spring to take a position with a mining concern. Dr. Stuckey, who is head of the department of geology at the State College, will continue as a member of the faculty, devoting himself on a part-time basis to the administrative functions of state geologist. T. G. Murdock, for a number of years a mining engineer in Chile, Peru, and more recently in Cuba, who has been appointed assistant state geologist, took up his work on August 1.

DR. ROBERT JACKSON NOBLE, chief biologist of the Department of Agriculture of New South Wales, has been appointed under secretary for agriculture in succession to G. D. Ross, who retired recently because of ill health.

DR. W. J. GERTSCH, associate curator of spiders of the American Museum of Natural History, has returned from an expedition to Utah and Arizona bringing with him a collection of 5,000 spiders, including black widow spiders and tarantulas. Many of the specimens brought back were found at altitudes of 8,000 to 10,000 feet.

DR. MARY SWARTZ ROSE, professor of nutrition at Teachers College, Columbia University, has leave of absence until July 1, 1941, when she will retire.

DR. FRANCIS SCOTT SMYTH, of the department of pediatrics of the University of California, will spend six months at the Medical School of the University of Buenos Aires working in the department of physiology with Dr. B. A. Houssay, professor of physiology.

DR. HERNÁN AGUILAR, associate professor of medicine at Buenos Aires, has sailed for the United States to work on thoracic surgery in the Medical School of Washington University, St. Louis.

DR. SHARAT K. ROY, curator of geology of the Field Museum, Chicago, who is conducting an expedition to various localities in Wyoming, Colorado and South Dakota and also to various eastern states to collect specimens relating to structural and dynamic geology, left Chicago on August 16. He expects to be absent for about ten weeks.

LEÒN GRODSINSKY, of the Division of Phytopathology of the Ministry of Agriculture, Buenos Aires, sailed on August 9 for home. He had spent a year in phytopathological and mycological study in the United States. He was a delegate to the eighth American Scientific Congress held in Washington, D. C., from May 10 to 21.

OWING to the war, the meeting of the Australian and New Zealand Association for the Advancement of Science has been postponed indefinitely.

THE Second National Medical Congress in Peru is to be held this month in Arequipa under the auspices of the Peruvian Government in connection with the four hundredth anniversary of the founding of the city. There will be sections for medicine, surgery, hygiene and social medicine.

THE Allegheny Section of the Society for the Promotion of Engineering Education will hold its sixth annual meeting at the Carnegie Institute of Technology, Pittsburgh, on October 25 and 26. The subject of the meeting will be "The Coordination of Engineering Curricula." The address of welcome will be made by Dr. Robert E. Doherty, president of the institute. The Engineers' Council for Professional Development will meet in Pittsburgh on October 24.

A CONFERENCE on Soil Mechanics and Its Applications will be held at Purdue University, West Lafayette, Ind., from September 2 to 6, under the auspices of the Committee on Foundations and Soil Mechanics of the Civil Engineering Division of the Society for the Promotion of Engineering Education and the School of Civil Engineering and department of engineering extension of Purdue University.

THE *Journal* of the American Medical Association states that Dr. David Riesman, professor of the history of medicine, who died on June 3, bequeathed his brain to the Wistar Institute of Anatomy for research purposes. He made a bequest of $1,000 to the College of Physicians of Philadelphia; of $500 to the Philadelphia County Medical Society and of $2,000 to the medical board of the Philadelphia General Hospital "to encourage research on the part of the staff."

A NEW bird exhibit, known as the Snow Mountains-New Guinea Group, in the Whitney Memorial Hall of the American Museum of Natural History was dedicated by Mrs. Harry Payne Whitney on August 20. The group, which is a replica of bird life 11,000 feet up in the little-known Snow Mountains of Netherland New Guinea, was presented to the Museum by Richard Archbold, and was collected by Dr. A. L. Rand, of the American Museum staff, during the 1938–39 Archbold-New Guinea Expedition of the museum. The principal speaker at the ceremony was the Honorable J. S. Schurman, Consul General of the Netherlands.

ACCORDING to the London *Times* the department of zoology of the British Museum has received from Admiral Sir Sidney Bailey a series of mounted heads of North American ungulates, including a very fine moose and some exceptionally good wapiti and caribou. The collection also contains a head of a Rocky Mountain goat. Another gift to the same department is a series of 10 skulls with horns of African antelopes from the Dinder River District of the Sudan, presented by Mr. T. W. H. Dore. This collection includes some skulls of Soemmerring's gazelle and of the Sudan race of the roan antelope. The department of geology has acquired from the committee of the Royal Literary and Scientific Institution, Bath, a collection of 99 invertebrate fossils from the mesozoic of Australia, including a number of type and figured specimens.

A WESTINGHOUSE Electric and Manufacturing Company exhibit at the Golden Gate Exposition, San Francisco, is a model of the giant 200-inch Mount Palomar telescope by means of a one-tenth size operating scale model constructed at the cost of $25,000. The model is owned by the California Institute of Technology, which has used it for more than a year for actual astronomical observations. Although it was built primarily to illustrate the construction of the Palomar telescope, the 20-inch mirror makes it valuable for practical use. Throughout the construction, technicians of the company collaborated with experts from the California Institute and the Mount Wilson Observatory. Reproduced in the model is the horseshoe bearing, which in the big telescope makes it possible to swing the shaft of the instrument with 1-165,000th of a horsepower. The original bearing itself weighs 400,000 pounds and is 46 feet in diameter.

ACCORDING to *The Collecting Net*, a new instrument, the Continuous Plankton Recorder, has been received by the Oceanographic Institution at Woods Hole, which will have the recorder on loan from Professor A. C. Hardy, of University College, Hull, England, for the duration of the war. The instrument will be used to record the density of living matter in the ocean, and has the advantage over other forms of collecting apparatus in that it does not have to be periodically removed from the water. It can be towed by a ship and will record the fluctuation in density of living matter along the course. Shaped like a torpedo, the recorder contains a spool of gauze which unwinds as the plankton is caught at the rate of about an inch for every mile that the ship travels. About twenty of these recorders are now in existence, and the two at the Oceanographic Institution, which will be used by the *Atlantis*, are the only ones outside of England.

THE London *Times* reports that two films concerned with problems of British agriculture recently were shown privately in London to a specially invited audience which included several members of Parliament. The films were presented by John Grierson, who spoke of the contribution that films could make towards bridging the gap in understanding between townsmen and countrymen, and in making known to the farmers the important work that agricultural research stations are doing. "Speed the Plough" and "Protection of Fruit" were, Mr. Grierson said, the first of many films which might be made; production had just begun on a film describing the grass breeding experiments being carried out by Professor Sir Reginald George Stapledon at the University of Aberystwyth. "Speed the Plough," which was made under the supervision of Professor Scott Watson, is designed to show the new mechanical and scientific methods that are being adopted by farmers. The film on the "Protection of Fruit" was made in collaboration with agricultural research stations in Great Britain and in Holland and Palestine. It has been specifically made for showing to audiences of farmers.

THE *Journal* of the American Medical Association states that the Kaiser Wilhelm Society for Scientific Research has been increased by the addition of a new institute of biophysics, constructed in Frankfort on the Main with the support of the city and the cooperation of the university. The building contains twenty research laboratories. There is here the first laboratory for the diagnosis of radium-intoxicated persons, that is, occupational diseases like those of miners and employees of radium factories. The principal tasks of the institute are the investigation of the biophysical problems of the effects of roentgen and radium rays

on the tissues, the problems of the medical and the technical use of light, the effects of electric waves and of radioactive substances and the study of idioradiation of living organisms, especially of the hypothetical rays of cell division. The new institute will be under the direction of Professor Rajewski.

DISCUSSION

A STANDARDIZATION OF OSMOTIC PRESSURE AS A TERM

THE vast amount of confusion which arises from certain physiological terms makes it advisable to bring about a standardization of such terms so that each term will convey a definite and clear concept. Osmotic pressure is a term which most of all needs standardization. At national botanical meetings in discussions involving osmotic relations it is apparent that no two of the botanists have quite the same idea or definition for osmotic pressure. Authors of botanical texts also show a diversity of opinion on the subject. Apparently, some authors either are undecided about a definition or regard the usual definition as unsatisfactory because they present no definition for osmotic pressure.

The definition of osmotic pressure which is generally accepted is that it is or is equal to the maximum hydrostatic pressure exerted by a solution when it is in equilibrium with pure water at the same temperature. This definition is poor and confusing because it either infers erroneously that osmotic pressure is the result and not the cause of osmosis or merely evaluates the pressure in terms of another variable without explaining or describing the nature and the cause of osmotic pressure. Shull[1] in explaining an example which he cited states that "the actual osmotic pressure here is the pressure of the water molecules passing through the bladder membrane." This idea of Shull is a splendid one and is the one which should be universally adopted, because it describes osmotic pressure as a dynamic and functional force, and not as an end result, which it certainly is not.

Since the author has given this subject considerable thought and has discussed it at great length with Dr. Lyons, of Dartmouth University, and has discussed it somewhat with several other plant physiologists, he wishes to propose the following standardization for osmotic pressure. Please bear in mind that the proposed standardization is merely an expansion of Dr. Shull's sound and logical idea.

Water molecules diffusing through a membrane exert a diffusion pressure. Since this special type of diffusion is called osmosis, the diffusion pressure of the water molecules tending to diffuse through the membrane can logically be referred to as *osmotic pressure*. It should be understood that osmotic pressure is not the result of osmosis but that it is the cause of osmosis, and that osmotic pressure is both the diffusion pressure exerted inwardly by water diffusing into the cell and the diffusion pressure exerted outwardly by water diffusing out of the cell.

The osmotic pressure of the water in the vacuole of a plant cell is increased by turgor pressure and decreased by the solute concentration of the cell sap. The water in the plant vacuoles at a given turgor pressure has a maximum osmotic pressure when there are no solutes present. With increased concentrations of solutes in the cell sap, the osmotic pressure of its water is proportionally reduced. To say that the osmotic pressure of the cell sap of a given cell is 1.5 M means that the diffusion pressure of the water in the cell sap is the same as the diffusion pressure of the water in a 1.5 M aqueous solution of cane sugar. To say that the osmotic pressure of the cell sap of a given cell is 4.2 atmospheres means that the diffusion pressure of the water in the cell sap is 4.2 atmospheres less than that of pure water at the same temperature and external pressure. Each gram molecular weight of cane sugar or of any non-electrolyte dissolved in enough water to produce a total of one liter of solution reduces the diffusion pressure of the water molecules 22.4 atmospheres at standard conditions (0° C. and 760 mm. barometric pressure).

The rate of osmosis into a cell is directly proportional to the difference between the osmotic pressure of the water surrounding the cell and the osmotic pressure of the water inside the cell.

Water diffuses osmotically from the cell with the greater osmotic pressure to the adjacent cell with the less osmotic pressure. For example water diffuses from the cell with an osmotic pressure of .2 M to a cell with an osmotic pressure of .4 M. Distilled water which has an osmotic pressure of *zero molar* will diffuse into a cell with an osmotic pressure of .2 M. It must be remembered that the greater the solute concentration the less is the osmotic pressure of the solvent (water), because solute molecules decrease the activity of the solvent molecules.

If one defines osmotic pressure as the diffusion pressure of solvent (water) molecules tending to diffuse through a membrane, there is no need for the terms "diffusion pressure deficit" and "suction tension." These latter terms are not desirable. The term "diffusion pressure deficit" erroneously conveys the idea to many that a cell with a diffusion pressure deficit is in an abnormal state. The term "suction tension" indicates that a cell takes up water by a sucking action which in reality does not exist.

The above standardization for osmotic pressure as a term is advisable, therefore, (1) because it is simple, sound and logical, (2) because it does not necessitate the use of the undesirable terms "diffusion pressure

[1] Charles A. Shull, "A Textbook of Botany Revised." Vol. II. "Physiology," p. 16. Cincinnati: American Book Company, 1930. (Coulter, Barnes, and Cowles.)