ever yielded constructive results or advanced rubber technology.

Some twenty-odd years ago, after Staudinger announced the long-chain structural formula, opinion began taking shape that the extension and retraction of rubber were simply an integration of the behavior of the component molecules.[12] In other words, it was assumed that the rubber molecule itself is subject to extension and exhibits forceful retraction thereafter. This concept has steadily gained ground. It is true that no direct evidence exists to confirm this concept, and by its very nature perhaps there never will be; on the other hand, no contradictory evidence exists, which very well could if this concept were in great error. Therefore, until some such evidence is obtained or a concept is developed which fits the facts more accurately, this theory should be accepted as the nearest available approach to the truth.

Under this concept a generalized theory of molecular behavior has been developed. For example, refer to Staudinger's long-chain formula above. It is obvious that this is not a true space configuration since the tetrahedral characteristics of carbon atoms are disregarded. Imagine such a space model and take into account that parts of this molecule can rotate about any single bond. Now fold the molecule back on itself many times about single bonds and a much more compact model is obtained than would appear from looking at the long-chain formula. This is a good picture of how a rubber molecule may retract, but it gives no insight into why it does so. Long paraffin molecules, such as hydrogenated rubber, could do the same thing as far as structure goes, but they do not. Rubber molecules do. Why?

Two explanations have been offered; one is by Shecklock[13] with later variations by others, based on thermal and thermodynamic considerations, and one is by Mack,[14] who makes use of van der Waals forces, applied to scale models. I am incompetent to differentiate critically between these two. Each of them fits certain observed data better than the other, but Mack's concept appeals more strongly to me, as it is based more closely in the fields of rubber chemistry with which I am familiar, and it predicts quite well the behavior of rubberlike and related substances of known composition, structure and isomerism. Its extension might be useful in predicting new molecular forms which could lead to better and less expensive synthetic rubbers than we now have.

As just stated before, I am not qualified to criticize either of the above theories, but I do feel qualified to criticize both rubber chemistry and chemists for not having mastered either of them more thoroughly. That they are difficult to master is no excuse, for the rubber chemist who expects to serve humanity well must be prepared to master many things more difficult than either of these theories.

In closing I should like to make myself clear on one point. I have not hesitated to criticize, severely, those concepts which are in disagreement with the results that I and my colleagues have obtained. I have done this in the full knowledge that I can be just as wrong as any one else, and I shall feel grateful to any one who proves that I have been, for then I shall profit by such proof in increasing my own understanding of these problems. Likewise I shall feel pleased if our results are confirmed, for then I shall have the satisfaction of feeling that I have aided in advancing rubber chemistry. I can be disappointed in only one way, to have our results ignored.

[11] Meyer and Mark, *Ber.*, 61: 1939, 1928.
[12] Astbury, *Ann. Repts. Chem. Soc.*, 1931, 322.
[13] Shecklock, *Trans. Inst. Rubber Ind.*, 8: 568, 580, 1933; 9: 94, 1933.
[14] Mack, *Jour. Am. Chem. Soc.*, 56: 2757, 1934.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE TWENTY-SIXTH ANNUAL MEETING OF THE PACIFIC DIVISION. II

Edited by Professor J. MURRAY LUCK
SECRETARY

AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS, WESTERN SECTION

(Report by D. I. Arnon)

The annual meeting of the Western Section of the American Society of Plant Physiologists was held at Salt Lake City, Utah, from June 17 to June 19.

The effect of war conditions was reflected in a number of last-minute cancellations of papers by prospective participants, but the cooperation of societies in arranging joint sessions for topics and papers of mutual interest contributed to the success of the meeting by favorably influencing both program and attendance. The program consisted of a symposium on "Organic Matter in Relation to Plant Growth," sponsored jointly with the Western Society of Soil Science and the Western Section of the American Society for Horticultural Science; a symposium on "Present Concepts of Water Relations of Plants,"

sponsored jointly with the Pacific Division of the Botanical Society of America and the Horticulturists; and three sessions of submitted papers, one session with the Botanists and another with the Horticulturists.

The symposium on organic matter in which papers were presented by J. Bonner, L. T. Kardos and jointly by J. E. Greaves, K. R. Stevens and L. W. Jones assessed some of the present concepts on the direct and indirect role of specific organic substances on the growth of intact plants under natural conditions in soil.

The symposium on water relations, which attracted the interest of many, covered in a series of well-prepared papers the following aspects: the forces governing absorption and movement of water in plants, by A. S. Crafts; the structure and function of water-conducting tissues, by H. E. Hayward; the relation of soil moisture at various levels to plant growth, by L. A. Richards; and problems of water deficiency with special reference to grasses, by D. F. McAlister.

The Thursday morning session for submitted papers included the presentation of data obtained under highly controlled conditions on root respiration and certain phases of sulfur metabolism in plants by M. D. Thomas, R. H. Hendricks and G. R. Hill. A negative correlation between CO_2 evolution by roots of Vinifera and Labrusca grapes and the respective susceptibility to chlorosis was reported by F. B. Wann. H. E. Hayward, W. M. Blair and P. E. Skaling found by means of a special device that the most active zone of water absorption in corn and citrus roots is that of the region of differentiation. H. T. Northen discussed the relation of cellular activities to protein behavior with special reference to reactions involving protein dissociation, and J. Bonner presented observations on the distribution and transport of riboflavin and pantothenic acid in plants.

Other papers included an interesting study of chlorofucine and fucoxanthine, green and yellow pigments of diatoms and brown algae, by H. H. Strain and W. M. Manning. The continuous application that radioactive isotopes find in physiological research was reflected in a paper by O. Biddulph on the movement of radiophosphorus and in another by T. C. Broyer and D. R. Hoagland on the relation between permeability and accumulation. Three papers dealt with micronutrient deficiencies: H. S. Reed discussed the effect of nutrition on vacuolar components, E. Archibald and F. B. Wann reported on the zinc content of deficient and normal leaves, and D. I. Arnon reviewed the present status of the indispensability of molybdenum for higher plants. C. H. Davis presented evidence on the direct relation between reduced moisture content and the decreasing rate of growth, and W. O. Williams reported on the effects of temperature on the composition of tracheal sap in some woody plants.

A most interesting trip through the greenhouses and laboratories of the American Smelting and Refining Company, conducted by Drs. G. R. Hill and M. D. Thomas, was enjoyed by the group on Friday afternoon.

The officers for the coming year, as announced at the annual dinner are: *Chairman,* E. T. Bartholomew; *Vice-Chairman,* F. J. Veihmeyer; *Secretary,* D. I. Arnon.

ASSOCIATION OF PACIFIC COAST GEOGRAPHERS

(Report by Willis H. Miller)

The first day of the association meeting was devoted to the geography of Utah, with special emphasis on the unique farm villages which characterize the Mormon commonwealth. In a paper on "Utah House Types" Dr. J. E. Spencer, of the University of California at Los Angeles, traced the history of Utah houses from the earliest ill-adapted "Hollywood" stucco bungalow. Dr. J. A. Geddes, of the Utah State Agricultural College, called attention to the large areal extent and the widely scattered houses typical of many Mormon farm villages. To this feature he largely attributed the low proportion of homes having piped water, gas, electricity and sewage connections. As a solution, Dr. Geddes recommended the development of long, narrow farmsteads, each having relatively short frontage on the main village street.

During the afternoon a spirited symposium on "Utah Mormon Village Communities" was held under the leadership of Dr. George H. Hansen, of Brigham Young University. A qualified panel of experts thumped and probed the physical, economic and social bodies of Utah villages. It was agreed that, although these villages have relatively declined, a combination of community pride and good planning could again make them attractive, efficient places in which to live and make a living.

At the morning session on the second day, D. W. Thorne, of the Utah State Agricultural College, and D. A. Anderson, of Brigham Young University, discussed "Irrigation and Permanent Agriculture." An analysis of ancient irrigation projects and studies of Western irrigated lands led them to conclude that irrigated agriculture was as permanent as any other type. Dr. L. O. Quam, of the University of Colorado, illustrated his timely paper on "The Use of Maps in Propaganda" with a collection of recent German maps.

Papers presented during the afternoon included an illustrated talk on "Erosion Lessons to be Learned

from Mexico," by W. A. Rockie, of the Soil Conservation Service. Mr. Rockie stated that erosion is so wide-spread that he believes Mexico will be hard pressed to produce enough food to support its population within fifty years. In his paper, "Geopolitics—Some Implications and Applications," Dr. Willis H. Miller, of the California State Planning Board, stressed the value of geopolitics as a device for determining policy, recommended the establishment of a Federal Geopolitical Office, and outlined several examples of geopolitics as applied to current and future problems of the United States.

Botanical Society of America, Pacific Section

(Reported by Bassett Maguire)

The program of the Botanical Society consisted of one symposium and four half-day sessions for the presentation of submitted papers.

In the Wednesday morning session three interesting papers dealt with some physiological and genetical problems of the sugar beet; two further papers treated the distribution of members of the Saprolegniaceae in Southern California and Desmid records for Utah.

On Wednesday afternoon a most interesting joint symposium was held with the Physiological Society of America and the American Society for Horticultural Science on the "Present Concepts of Water Relations of Plants." A. S. Crafts, H. E. Heyward, L. A. Richards and D. F. McAlister presented papers.

The Thursday morning session, held jointly with the Ecological Society of America, consisted of a presentation of papers, primarily ecological in nature. A series of papers treating various problems of range ecology and management elicited much interested comment. Others dealt with soil drought resistance in grasses, and production and maintenance of zooplankton in coastal waters of southern California.

A joint session for the presentation of papers of primarily taxonomic nature was held on Friday morning. The paper given by C. L. Hitchcock, dealing with the origin of the Western species of *Draba,* excited considerable interest, as did likewise two following papers presenting a taxonomic-ecological relationship of the genus *Zigadenus,* and a discussion of the Post-pleistocene vegetation and climate of the Pacific Northwest.

At the annual business meeting held on Wednesday morning the following officers were elected: *President,* Henry P. Hansen; *Council Member,* W. R. Hatch.

California Academy of Sciences

(Report by R. C. Miller)

The program of the California Academy of Sciences took the form of a progress report of the Committee on Natural Illumination authorized at the Pasadena meeting a year ago. At a session on Thursday morning, R. C. Miller gave a general report on the organization and work of the committee, and presented some results of continuous recordings of daylight in San Francisco over a period of nine months. C. L. Utterback reported on the visibility of near and more distant objects, and of different colors, in morning and evening twilight of carefully measured intensities. The session concluded with a round table discussion of the applications of illumination studies in various fields, with emphasis on the possibilities of their use in meteorological forecasting.

Ecological Society of America, Western Section

(Report by A. M. Woodbury)

The Ecological Society of America, Western Section, held its meetings on June 17 and 18. The excursions scheduled for June 19 and 20 had to be cancelled because of transportation problems related to war activity. On Wednesday morning, June 17, a symposium dealing with "Salinity as an Ecological Factor" was held jointly with the Western Society of Naturalists. Four papers were presented: W. D. Billings dealt with plants in the Lahontan Basin; Seville Flowers, with plants in the Bonneville Basin; Angus M. Woodbury, with animals in the Great Basin; and Walter P. Cottam, with plant types after a century of human occupancy.

The Biologists' dinner on Wednesday evening was attended by many ecologists. On Thursday morning, a joint session with the Botanical Society of America, Pacific Division, was held, at which seven papers were presented by S. S. Hutchings, George Stewart, L. A. Stoddart and A. D. Smith, A. W. Sampson, D. F. McAllister, O. S. Walsh and M. W. Johnson.

The Oceanographic Society of the Pacific

(Report by C. L. Utterback)

The program of the society consisted of a symposium on the "Resources of the Sea for Wartime Economy," and of an afternoon session of contributed papers.

"The Latent Marine Fisheries Resources of the Pacific," from Alaska to the coast of Mexico, were discussed by Dr. R. S. Croker, of the California State Fisheries Laboratory, and Dr. W. M. Chapman, of the Washington Shellfish Laboratories. An interesting analysis of the abundance and possible utilization was made of the many resources which are not now used commercially. This analysis included the results of the investigations of the various fish commissions, as well as a discussion of the problems pertaining to the canning and marketing of many of the less familiar food fish. The discussion of the Marine Plant Resources was similar in nature to that of the

Marine Fisheries Resources. Problems relating to the abundance of various marine plants and the immediate utilization of considerable amounts of their products were included. This discussion was led by Drs. G. B. Rigg and Trevor Kincaid, of the University of Washington, and Dr. J. F. Wohnus, of the Scripps Institution of Oceanography.

An interesting paper presented by R. P. Dempster and R. C. Miller included the effect of the character and abundance of plankton on the penetration of solar light into sea water.

THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE

(Report by Charles C. Johnson)

The meeting of the Society for Experimental Biology and Medicine was held on Friday, June 19, at 1:30 P.M. Ten papers were read by the authors and four were read by title, as the authors were unable to be present.

J. Wolk and W. W. Smith, of the Department of Bacteriology of the University of Southern California, reported that 95 to 98 per cent. of samples of sugar obtained on the retail market would pass National Canners' tests and hence were suitable for home canning purposes.

Morphine used as a sedative in labor may either depress or stimulate uterine motility or have no effect whatever, apparently depending largely on the type and degree of uterine motility existing at the time of the administration of morphine. Dr. Con Fenning, of the department of pharmacology and physiology of the University of Utah, drew these conclusions after studies of uterine motility on 200 patients, using a recently perfected apparatus for recording uterine movement in pregnant women.

Dr. H. M. Schamp and Dr. H. M. Leicester, of the College of Physicians and Surgeons, Dental School of San Francisco, presented a new method for clearing teeth and bone by immersion in liquefied phenol for twenty-four hours. They then used this method to study caries in the teeth of rats to establish a caries index.

Using mercury-indigo-disulfonate, Dr. J. E. Davis was able to bring about either complete disappearance or regression of breast cancer in mice.

Clarence R. Mott, of the department of pharmacology and physiology of the University of Utah, reported a direct correlation between the increased growth and the basal metabolism in ovariectomized rats when proper selection of animals was made with relation to age and time elapsing between ovariectomy and determination of basal metabolism. He found that there was a statistically significant increase in basal metabolism in the ovariectomized rats when the operation was performed at 26 days of age and the basal metabolic rates compared with controls at the ages of 40 to 90 days.

WESTERN SOCIETY OF SOIL SCIENCE

(Report by W. P. Martin)

The meetings of the Western Society of Soil Science were featured by extensive field trips, cordiality of association and a representation from all the eleven western states. Attendance ranged from 40 to 80 soil scientists who listened to and discussed 26 papers on current research during four half-day sessions. In addition, three papers were presented during a symposium on "Organic Matter in Relation to Plant Growth," under the chairmanship of W. P. Kelley, in which the soil scientists collaborated with the plant physiologists and the horticulturists.

Papers ranged from a description of some of the results obtained on the excellent sand culture installation of the American Smelting and Refining Company by M. D. Thomas and R. H. Hendricks to the effect of denitrifying bacteria on soil structure by V. P. Sokoloff. The papers presented on Monday morning dealt chiefly with the influence of environmental factors on plant growth. Acidulated materials, phosphatic fertilizers, sulfur and alkaline salts were included in these discussions.

On Monday afternoon, the scientists examined soil profiles peculiar to the Salt Lake Valley under direction of D. S. Jennings. In the evening, a picnic supper was provided for 65 by the Utah State Agricultural Experiment Station in Logan Canyon; Professor D. R. Hoagland and O. C. Magistad contributed remarks on the place of the soil scientist in the war effort.

On Tuesday morning, papers ranged from a mathematical description of the precipitation data for Utah as related to erosion due to the influence of carbon dioxide pressure on the measurement of pH values. The effect of surface mulches on water intake, the influence of moisture tension on moisture retention, water-application efficiencies in irrigation and methods used for the reclamation of an alkali soil in Wyoming were discussed during this session.

On Tuesday afternoon the group were shown over the Davis County Water Shed Conservation Project of the Intermountain Range and Forest Experiment Station by George Stewart. How destructive floods had been effectively controlled by water-shed conservation practices was strikingly demonstrated on this trip.

On Wednesday afternoon, the eight papers presented dealt largely with the influence of environmental factors on soil properties. The influences of

irrigation, long-continued tillage of orchard soils, organic materials and soil microorganisms were considered. In addition, enzymatic *vs.* microbial concepts of urea hydrolysis, the maintenance of nitrogen in dry farm soils and the persistence of algae in old adobes were topics presented.

At the banquet on Wednesday evening at which were present fifty-one members and guests, President F. S. Harris, of Brigham Young University, described some interesting and peculiar agricultural problems of Iran.

Officers of the society elected for the coming year were as follows: *President,* T. L. Martin, Brigham Young University; *Vice-President,* O. C. Magistad, U. S. Regional Salinity Laboratory; *Secretary-Treasurer,* W. P. Martin, University of Arizona.

OBITUARY

RAYMOND L. DITMARS

As a keen student of human nature has reminded us, "Contemporaries appreciate the man rather than the merit, but posterity will regard the merit rather than the man." Most creative thinkers are content to have it this way, for they realize that they labor for future generations rather than for their own. The life and works of Dr. Ditmars will illustrate the truth of the observation. Quietly and persistently he toiled in his chosen field. To many biologists he was but little known; to others he was the modest curator of reptiles in the New York Zoological Park. But it may be safely predicted that future historians of American zoology will recognize in him an important contributor to the science.

Scientists too generally fail to appreciate that research is promoted not only by the efforts of skilled investigators but also by the labors of those who undertake to develop the students of the future. Zoologists particularly are prone to decry attempts to popularize the results of their studies. This is unfortunate, for most teachers will testify to the great value of natural histories and manuals in stimulating in the youthful mind an interest in the natural sciences. It is to this field that Dr. Ditmars has contributed effectively and permanently. He has successfully popularized, in the best sense of the term, the study of reptiles, and the results are already appearing in an augmented group of specialists in the habits, distribution and relationships of an important, difficult, neglected and much maligned group of animals.

Thus, while it will be the future Copes, Boulengers and Stejnegers who will really give to this man full credit, we who are privileged to have known him may feel proud to have been associated with one who is destined to be considered a good teacher. He would desire no other epitaph.

Dr. Ditmars died on May 12. The events of his life are given in biographical directories. "American Men of Science" prints the following:

Ditmars, R(aymond) L(ee), Zoological Park, New York, N. Y. *Natural history.* Newark, N. J., June 20, 76. Pub. and private schs. Asst. curator entom, Am. Museum Nat. Hist, 91–97; stenographer, 97–99; reporter, 'N. Y. Times,' 99–00; *curator reptiles, N. Y. Zool. Park, 00–, mammals, 27–* Soc. Ichthyol. and Herp; N. Y. Zool. Soc; N. Y. Entom. Soc; Linnaean Soc. N. Y. Herpetology; mammalogy; educational motion pictures.

ALEXANDER G. RUTHVEN
UNIVERSITY OF MICHIGAN

HENRY FRANCIS NACHTRIEB

HENRY FRANCIS NACHTRIEB, professor emeritus of animal biology at the University of Minnesota, died at his home in Berkeley, California, on July 17 in his eighty-sixth year. He is survived by his wife and daughter. Born near Galion, Ohio, in 1857, Professor Nachtrieb began his higher education at German Wallace College at Berea, Ohio. From there he came to the University of Minnesota and received his B.S. degree in 1882. Graduate work at the Johns Hopkins University from 1883 to 1885 completed his professional training. Returning to the University of Minnesota in 1885 as an assistant, he became assistant professor the following year and department head in 1887, which position he held until his retirement in 1925.

During his long service to the university he was untiring in his efforts to build up the work in zoology. When Governor John S. Pillsbury was considering the gift of a building to the university in 1889, Professor Nachtrieb was influential in having the building devoted to the natural sciences. As the work grew, and additional space became imperative, he was again influential in securing a legislative appropriation for a new building to be devoted exclusively to zoology. This fine modern laboratory was built in 1915, according to plans largely developed by him.

During the years of the Geological and Natural History Survey of Minnesota, Professor Nachtrieb was active in directing this work as state zoologist. At this time he began his work on the spoon bill or paddle fish, Polyodon. He accumulated much material on this extraordinary form, but, unfortunately, the greater part was never published. His published papers dealt chiefly with leeches and fishes.

In addition to his scientific interest, Professor Nachtrieb had a warm interest in the whole of human life