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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE SAN DIEGO MEETING OF THE PACIFIC DIVISION

Edited by Professor J. MURRAY LUCK

STANFORD UNIVERSITY

THE twenty-second annual meeting of the Pacific Division, American Association for the Advancement of Science, and of twenty associated societies was held in San Diego, California, during the week of June 20, 1938.

It is no exaggeration to describe these meetings as probably the most successful in the history of the division. It may be recalled that the second meeting of the division some twenty-two years ago was held in San Diego with a total registration of 133. Since that time there has been a steady increase in the number of scientific organizations in the Pacific Coast states and of members in attendance upon the annual meetings. As an indication of the growth of interest in science on the Pacific Coast, it should be mentioned that the total registration of 832 members and guests established a new record.

The general sessions and the meetings of the participating societies were held in Balboa Park. The material facilities provided by the host institutions were excellent in every respect. Not only were the buildings in which the sessions were held conveniently grouped together and within easy reach of registration headquarters, but the luxuriant gardens of the park provided a setting of great beauty which added much to the pleasure of the visit in San Diego.

Six organizations joined in sponsoring the meeting and served as hosts to the visiting members and guests: San Diego Society of Natural History, Scripps Institution of Oceanography (La Jolla), San

Diego Museum Association, Zoological Society of San Diego, San Diego State College and the San Diego County Medical Society.

The local arrangements were in charge of a general committee, of which Clinton G. Abbott served as chairman. Not only did many residents of San Diego and its immediate vicinity assist greatly in organizing the meeting through service upon committees, but substantial material aid was extended by the San Diego Convention Bureau.

The first general session was held on the morning of June 21 and consisted of a symposium on "Climate and Man" in which four invited speakers participated. As an introduction to the symposium, "The Present Climate of California" was discussed by Professor John B. Leighly, of the University of California. "Climatic Variations" was the subject of the second address presented by Dr. Ernst Antevs, of Globe, Arizona. Dr. Merrill K. Bennett, of the Food Research Institute, Stanford University, gave an illuminating paper on "Climate and Agriculture," while the concluding address, "Sociological Aspects of Climate," was presented by Professor C. M. Reynolds, of the department of economics, Stanford University.

On the afternoon of the same day a session of considerable interest was held in which the progress of research in several fields was described. Dr. J. A. Anderson, of the Mount Wilson Observatory, Pasadena, described "Recent Instrumental Developments in Astronomy"; H. U. Sverdrup, director of the Scripps Institution of Oceanography (La Jolla), reported on "Recent Advances in Our Knowledge of the Oceans"; Professor C. H. Danforth, of Stanford University, reviewed certain aspects of current research on "The Sex Hormones," and Professor R. Goldschmidt, of the University of California, Berkeley, gave the concluding paper on "Genetics."

Addresses of general interest to the visiting members, as well as to the lay public, were presented on three evenings of the week. The first of these took the form of a symposium on "Animal Experimentation," in which B. O. Raulston, of the University of Southern California, A. J. Carlson, of the University of Chicago, and H. B. Torrey, of Stanford University, participated. The necessity of animal experimentation for future progress in biology and medicine was emphasized in these addresses. Dr. Raulston presented "The Clinical Point of View," Professor Carlson, "The Laboratory Point of View" and Professor Torrey, "The Biologists' Point of View." The subject of this symposium proved to be of considerable interest to the public and very appropriate for consideration at the present time in view of the forthcoming referendum in California upon the so-called "Humane Pound Act," the effect of which would be to render almost impossible the use of dogs and cats for experimental purposes.

Dr. J. S. Plaskett, of the Dominion Astrophysical Observatory, Victoria, B. C., as president of the division, gave the second public address of the week on "Modern Conceptions of the Stellar System." The third and concluding address was presented on June 23 by Professor C. Skottsberg, of the Botanical Garden, Gothenburg, Sweden, on "The Distribution of Flowering Plants over the Pacific Ocean and its Significance."

Among the events of a social character arranged for the entertainment of visiting members and guests, mention should be made of a general reception which was tendered by the host institutions on the afternoon of June 21. This was held in the beautiful gardens of the Court of Honor, Balboa Park. On the afternoon of June 22, tea was served by the San Diego Branch of the American Association of University Women in the Loggia of the House of Hospitality, and again on the afternoon of June 23 in the Fine Arts Gallery by the director and staff.

A number of attractive excursions were arranged, among which mention might be made of those to San Diego Gardens and the Hotel del Coronado, to the San Diego Zoological Gardens, to Point Loma and Old Town, to the Torrey Pines Park and the Scripps Institution of Oceanography, and finally, more extensive trips to Palomar Mountain and the new observatory now under construction by the California Institute of Technology.

Meetings of the executive committee were held daily and of the council on June 22. Dr. S. J. Holmes, professor of zoology at the University of California, Berkeley, was elected to the presidency of the Pacific Division for the ensuing year. H. S. Reed, professor of botany, University of California, Berkeley, was elected to the executive committee in succession to A. R. Davis on completion of the customary five-year term of office. Professor T. G. Thompson, of the University of Washington, Seattle, who had just completed a term of office of three years as a member of the executive committee, was reelected for a full five-year term.

The following eight fellows of the association were elected as members-at-large to serve upon the council: Professor C. H. Thienes, department of pharmacology, University of Southern California (one-year term); Professor E. B. Babcock, department of genetics, University of California, Berkeley (one-year term); Dr. F. J. Veihmeyer, division of irrigation, University of California, Davis (two-year term); Professor C. McLean Fraser, department of zoology, University of British Columbia, Vancouver, B. C. (two-year term); Professor A. P. Krueger, department of bacteriol-

ogy, University of California, Berkeley, three-year term); Professor Max Mason, department of mathematics, California Institute of Technology, Pasadena (three-year term); Professor C. L. Utterbach, department of physics, University of Washington, Seattle (four-year term), and Dr. H. A. Spoehr, director, Carnegie Institute of Plant Biology, Stanford University (four-year term).

The following resolution on the so-called "Humane Pound Act" was adopted by the council:

WHEREAS, Our past impressive achievements in the cure and prevention of disease throughout the world have resulted from an intelligent understanding of the functions of the human and animal body in health and disease, and

WHEREAS, The very imperfect advance of our race from savagery and superstition has depended and will continue to depend in no small measure upon a steady increase in our knowledge of the life processes of living beings, both plant and animal, and

WHEREAS, An important part of such knowledge can only be obtained by the actual study of living animals by experimental methods, humanely conducted, and

WHEREAS, An active but misinformed minority of our citizens has persistently refused to recognize the source of these discoveries though ever willing to benefit from them and has continually charged our leading medical and biological authorities with inflicting cruelty upon animals, and has endeavored to hamper these persons by legislation and otherwise, and

WHEREAS, A measure is to be placed upon the ballot next November, and voted upon by the people of California, which purports to be a humane measure, designed to protect from mistreatment animals in public pounds, but whose real effect would be to seriously handicap important and necessary research, and

WHEREAS, The enactment of such legislation would be to greatly retard the progress of biological and medical research in this state,

Therefore, be it resolved by the American Association for the Advancement of Science, Pacific Division, assembled in San Diego in June, 1938, that the Division strongly urges the defeat of the so-called "Humane Pound Act" and recommends the employment of widespread publicity calculated to achieve this end.

Announcement was made that the 1939 meeting of the division would be held at Stanford University from June 26 to July 1, 1939, and that of 1940, which will be national in character, will be at the University of Washington, Seattle.

SESSIONS OF THE AFFILIATED SOCIETIES

Twenty of the affiliated and associated societies participated in the meetings and over three hundred papers were presented. The reports of the various sessions follow:

AMERICAN ASSOCIATION OF ECONOMIC ENTOMOLOGISTS, PACIFIC SLOPE BRANCH

(*Report by J. F. Lamiman*)

The Pacific Slope Branch of the American Association of Economic Entomologists held its twenty-third annual meeting on Thursday and Friday, June 23 and 24. During the sessions twenty-two papers were presented. These dealt with a wide range of entomological subjects, including insect toxicology and evaluation of field data.

The entomologists' dinner was held on Thursday evening, and the members were addressed by J. J. Davis and J. A. Hyslop.

The total attendance at the meetings was seventy-two.

The officers elected for 1938 are: *Chairman,* R. H. Smith, University of California at Los Angeles; *Vice-Chairman,* B. G. Thompson, Oregon State College; *Secretary-Treasurer,* J. F. Lamiman, University of California, Davis, California.

AMERICAN CHEMICAL SOCIETY, PACIFIC INTERSECTIONAL DIVISION

(*Report by William G. Young and Dudley H. Robinson*)

The opening session on Wednesday morning was devoted to contributed papers in organic and biological chemistry. Two interesting papers were presented on physical and chemical tests for freshness of fish for food. One group of papers dealt with physiological activity of vitamin C and of vitamin-B_2 analogs and with the synthesis of compounds possessing vitamin-B_2 activity by the pea root. Another group dealt with rearrangements during the synthesis of stereoisomeric compounds.

Wednesday afternoon was given over to an invited group of papers of general interest. Professor A. O. Beckman, of the California Institute of Technology, discussed difficulties encountered in the use of the glass electrode. Professor M. S. Dunn, of the University of California at Los Angeles, presented results on the physical and chemical properties of the amino acids. Professor C. R. Noller, of Stanford University, discussed the structural chemistry of the saponins and sapogenins from the California soap root, while Professor Roger J. Williams, of Oregon State College, summarized his work on the chemical nature of pantothenic acid. Professor Don M. Yost, of the California Institute of Technology, concluded the session with a paper on "Artificial Radioactivity and its Chemical Applications." All the papers were interesting, and an active discussion followed each of them.

The Thursday morning and afternoon sessions were devoted to physical and inorganic chemistry. A number of papers on colloidal and surface chemistry were presented by investigators from Stanford University. An exhibit of several types of inexpensive air-driven ultracentrifuges attracted particular attention. Another group of papers on the determination of molecular structure by x-ray and electron-diffraction methods

were presented by investigators from the California Institute of Technology.

Other papers included micro-qualitative analysis of the alkaline earths, polarographic investigations, photochemical oxidation of crotonaldehyde, efficiency of reduction by zinc amalgams and xanthates as collectors in ore flotation.

A dinner for chemists was held on Wednesday evening, and Professors F. O. Koenig, of Stanford University, and H. V. Tartar, of the University of Washington, were elected as members of the executive committee of the Pacific Intersectional Division of the American Chemical Society.

American Meteorological Society

(Report by Geo. F. McEwen)

The program of the American Meteorological Society concerned four groups of subjects: (1) Fog, clouds, minimum temperatures and dew points; (2) Weather conditions in relation to forest-fire danger and desert rainfall; (3) Comparative data on Southern California floods based upon official instrumental observations and historical research using old manuscript and published reports; (4) Methods of making upper air observations by means of small portable equipment that can be carried by a pair of sounding balloons. Dynamical treatment of certain upper air observations for calculating the wind velocity at various levels.

Encouraging progress has been made in using not only base station observations but also those from the fine networks of stations in regions of citrus cultivation supplemented by studies of general weather maps, for forecasting minimum temperatures on the afternoon of the preceding day. Methods of forecasting the formation and dissipation of fog and clouds are being developed along quantitative thermodynamical lines using diagrams and tables for facilitating computations. Such results are of special importance to naval operations in the Pacific.

Studies of compilations of numerous observations of wind temperature and humidity and the amount of moisture in inflammable forest material, determined from standard test strips of wood, have made it possible to construct charts invaluable to the forester in efficiently preventing forest fires and in fighting those that do occur.

Studies of available official instrumental observations and older historical records, carefully appraised, indicate several storms in the Los Angeles area comparable with those of February and March, 1938. Certain grossly inaccurate reports have been accepted and recopied as correct, even though a critical study failed to reveal convincing evidence of their correctness. Such research work, leading to tested conclusions and the elimination of unreliable statements, is being continued and should be encouraged.

Remarkable progress, especially since 1930, has been made in developing a small combination of radio transmitter, clock and storage battery, light enough to be carried by a pair of sounding balloons. Thus, essential upper air data on winds, temperature and humidity at heights up to about ten miles can be obtained during nearly all weather conditions and without making aeroplane flights.

Not only instrumental technique has improved but theoretical methods of dealing with upper air data have been developed, enabling the calculation of winds from more or less incomplete observations.

American Physical Society

(Report by Paul Kirkpatrick)

The Wednesday morning session was devoted to the presentation of brief contributed research reports of theoretical and experimental investigations of the properties of nuclear and cosmic ray particles, phenomena of gaseous ions and certain biophysical phenomena, including the effects of low temperatures upon living cells. This program was followed on Wednesday afternoon by a symposium on "Nuclear Transformations and their Astrophysical Significance," a joint session of the American Physical Society and the Astronomical Society of the Pacific at which W. A. Fowler spoke on "Nuclear Reactions as a Source of Energy," J. R. Oppenheimer upon "The Physical Problem of Stellar Energy" and R. Minkowski upon "The Composition of Stellar Atmospheres."

Contributed research reports constituted the program of the Thursday morning session, with problems of x-ray absorption and electron emission, sound absorption, atomic spectra, gaseous conduction, induced radioactivity and experimental techniques under consideration. The Thursday afternoon program, held at the Scripps Institution of Oceanography, comprised a symposium upon "The Physical Problems of the Ocean," a title comprehending questions of sand movemovement, sedimentary distribution, turbulence and suspension of small particles. This symposium was addressed by H. U. Sverdrup, F. P. Shepard, R. Revelle, W. E. Allen, G. F. McEwen and R. D. Gordon.

The final session, held on Friday morning, consisted of a series of contributed research reports treating the characteristics of certain research instruments (including one for objective determination of photographic graininess), a method for separating radioactive isotopes, emission of electrons under the action of electrostatic fields, variations in liquid viscosities due to flow orientation of molecules and the possible localization of the source of night-sky light in lower regions of the terrestrial atmosphere.

American Phytopathological Society
Pacific Division

(Report by L. D. Leach)

The Pacific Division of the American Phytopatho-

logical Society held three half-day sessions for the presentation of papers. About forty-five pathologists attended, and twenty-six papers were presented. The first half-day was devoted, mainly, to papers on diseases of citrus, among the most interesting of which were the reports by H. S. Fawcett and L. Klotz on the types and symptoms of psorosis and on its transmission.

The Tuesday afternoon program consisted of a series of papers on virus diseases. Of special interest to those in attendance was the report of Eubanks Carsner on the present status of resistance in sugar beets to curly top disease, that of N. J. Giddings on sugar-beet curly top virus strains, and C. W. Bennett's discussion of the movement of the virus of sugar-beet mosaic.

Other papers that attracted considerable interest were those by C. H. Spiegelberg on the pink disease of pineapple and by L. C. Cochran and Lee M. Hutchins on the host relationships of peach mosaic in Southern California.

Wednesday afternoon was devoted to excursions in the vicinity of San Diego. The largest group visited the Scripps Institution of Oceanography at La Jolla.

A short informal symposium on the teaching of plant pathology was held on Thursday afternoon. The same topic has been suggested for a more elaborate program during the next annual meeting.

Officers elected for the ensuing year are as follows: *President,* W. T. Horne, University of California; *Vice-president,* B. F. Dana, U. S. Department of Agriculture; *Secretary-Treasurer,* L. D. Leach, University of California, Davis; *Councilor,* E. Carsner, U. S. Department of Agriculture.

American Society of Ichthyologists and Herpetologists, Western Division

(Report by Margaret Storey)

More than twenty members and guests met informally at the laboratory and home of Laurence M. Klauber on Friday afternoon and visited his unsurpassed collection of southwestern rattlesnakes and other herpetological specimens. On Saturday a night desert collecting trip arranged by C. B. Perkins, of the San Diego Zoo, yielded eleven live lizards of two species and twenty-three live snakes of seven species in four hours in the vicinity of The Narrows. In addition, fourteen snakes of ten species and two lizards were observed run over on the road. Some of these were in sufficiently good condition to be saved. The National American Society of Ichthyologists and Herpetologists meeting at Berkeley from July 20 to 23 prevented official participation in the American Association for the Advancement of Science meetings this year.

American Society of Plant Physiologists, Western Section

(Report by A. S. Crafts)

The Western Section of the American Society of Plant Physiologists held its third annual meeting from June 21 to 24 at Balboa Park, San Diego. In what was declared by many to be the section's most successful meeting, a full program consisting of three sessions for submitted papers and four joint symposia was presented. Over fifty members registered and all meetings were well attended. Election of F. M. Eaton and J. R. Furr for chairman and vice-chairman, respectively, was announced at an informal dinner on Thursday evening.

The general session on Tuesday morning was devoted to papers on hormones, autonomic exudation cycle, bud inhibition, polarity and other topics involving autonomic responses in plants. This program served to show what rapid progress is being made in relating these complex activities of plants to the auxins and other growth factors.

The Thursday morning session for submitted papers covered topics of horticultural interest, including pest control and soil-plant relations. The Friday morning session provided papers of biochemical and nutritional interest. Of particular merit were reports on methods of study and results with microelements by D. I. Arnon and P. R. Stout. Folke Skoog presented evidence of a relation between zinc deficiency and auxin. These studies, conducted in Professor D. R. Hoagland's laboratory, mark a distinct advance in our knowledge of the function of metals in the nutrition of plants.

Symposia on "Salt Tolerance of Plants and Related Problems," "Plant Invasion on the Pacific Coast," "Cell-Wall Structure" and "Progress in Plant Science" presented cabable reviews in these various fields and emphasized the rapid advancement being made. Of outstanding interest were papers on salt absorption and translocation by D. R. Hoagland and T. C. Broyer, a discussion of the results of studying the plant remains found in adobe brick by G. W. Hendry and J. N. Bowman, papers on cell-wall structure by James Bonner and Wm. S. Stewart, of the California Institute of Technology, and reviews on "Plant Hormones," by F. W. Went, "Permeability," by L. R. Blinks, and "Nature of Viruses," by T. E. Rawlins. The extent to which x-ray analysis, polarized light and radioactive elements from the cyclotron are being used in biology indicates the progressive nature of research in this field of science.

Association of Pacific Coast Geographers

(Report by Peveril Meigs, 3rd)

Fourteen papers, two dinners and two field-excur-

sions marked the sessions of the Association of Pacific Coast Geographers. Thursday morning was devoted to an interesting series of papers on geographic problems of Southern California. Culture and erosion in the valleys and marine terraces were dealt with by R. M. Glendinning and George Carter. Reports on their geomorphologic studies in the San Gabriel Mountains were given by Gordon Oakeshott and Joseph Williams. Williams took challenging but convincing exception to some existing theories of physiographic history of the San Gabriels. Thursday afternoon was given over to a field-excursion led by Alvena Storm dealing with the historical evolution of San Diego. Some of the papers presented on Friday morning were: a survey of North American sand deserts, by Forrest Shreve; a study of the Rio Verde Valley, Arizona, by Agnes Allen; description of Papago villages, by J. W. Hoover; and survey of aboriginal trade routes for sea shells in the southwest, by Donald Brand. An analysis of middens has shown that shells for ornamental purposes had been brought into Arizona and New Mexico in large quantities from the Pacific Coast of Southern California, though the chief source of southwestern shells was the Gulf of California, and a few were brought from the Gulf of Mexico. On Friday afternoon a report by Russell McClure on the Hudson Bay wheat route was read, describing difficulties such as ice, fog and lack of return cargoes, but attaching considerable value to the route as a freight-rate-reducing competitor for Montreal. Peveril Meigs discussed the historical geography of water planning in the Great Central Valley of California, analyzing the changing plans of the past eighty years, culminating in the Central Valley Project now under construction.

At the annual dinner on Friday evening, John B. Leighly gave the presidential address, an analysis of methodologic controversies in nineteenth century German geography. The mystical attitude of Karl Ritter, occupant of the first academic chair ever established in geography, and the gradual breaking-away of geographers from the Ritterian philosophy, leading to the development of modern regional geography, formed the central themes of the address. Saturday was devoted to an all-day field excursion in the foggy coastal desert of Baja California, Mexico, led by Lauren Post and Peveril Meigs.

Officers elected: John B. Leighly, University of California, *president*; Frances M. Earle, University of Washington, *vice-president;* Peveril Meigs, 3rd, State College, Chico, California, *secretary-treasurer;* Otis W. Freeman, College of Education, Cheney, Washington, *editor of Yearbook.*

Astronomical Society of the Pacific

(Report by Alfred H. Joy)

On Wednesday afternoon, June 22, a joint session was held with the American Physical Society with an attendance of one hundred. A symposium on the subject, "Nuclear Transformations and their Astrophysical Significance," was held. The following topics were presented: "Nuclear Reactions as a Source of Energy," by W. A. Fowler, California Institute of Technology; "The Composition of Stellar Atmospheres," by R. Minkowski, Mount Wilson Observatory.

The details of the theory of possible nuclear changes in the lighter elements and the possibility of their application to the interior of stars were considered. On account of the limited observational data available it is difficult to compare proposed theoretical conditions with those prevailing in the stars themselves. Dr. Oppenheimer suggested a model with a high central concentration of neutrons.

Sessions for papers were held on Thursday, June 23, with an attendance of about fifty. An unusually wide range of topics was presented in twenty-nine papers from ten different institutions. They were well distributed in different fields and touched upon the asteroids, the sun, stars, variables, novae, nebulae, interstellar matter and instrumental equipment.

In the papers several points of especial interest were noted. D. M. Beard and Mrs. Kaster reported on determinations of the distance and orbit of the asteroid Hermes, which passed very near the earth in 1937. Mrs. Mulders's study of solar activity indicates that the maximum of the sun-spot curve was probably reached in July, 1937. E. Pettit showed photographs of a prominence which reached the record height of 960,000 miles. A. H. Joy gave the results of his study of galactic rotation based on the radial velocity of Cepheid variables, and H. W. Babcock presented a remarkable curve indicating the rotational velocities in the Andromeda nebula at different distances from the center. A direct determination of the darkening at the limb of an eclipsing star was observed by G. E. Kron with a new photoelectric photometer. The spectra of the two super-novae of 1937 were discussed by R. Minkowski, and F. Zwicky described his plan of search for such objects in the extra-galactic nebulae.

Professor R. T. Crawford, Professor W. T. Skilling and Dr. J. S. Plaskett presided at the various sessions in the absence of President Jeffers.

On Friday, June 24, a party of forty members of the society and their families visited Palomar Mountain and were shown the 200-inch dome and the 18-inch Schmidt telescope by Drs. Anderson and Zwicky and Captain McDowell.

Botanical Society of America, Pacific Section

(Report by A. W. Haupt)

The Botanical Society of America, Pacific Section, held two sessions at which papers were presented, one

symposium and two joint symposia with the Western Section of the American Society of Plant Physiologists. At the Tuesday morning session Geo. B. Rigg described a convenient light filter through which plants containing chlorophyll appear red while green paint appears green. H. S. Reed described structural changes in tomato leaves when the plants are grown in nutrient solutions lacking traces of copper or zinc salts. W. E. Allen pointed out that the structural features of certain marine plankton diatoms of the East Pacific are so variable that the identification of species is rendered difficult. Ivan C. Jagger and Thomas W. Whitaker reported on the occurrence of a hybrid between *Lactuca canadensis* and *L. graminifolia,* apparently the first record of an authentic species hybrid in the genus. A paper by Daniel I. Axelrod dealt with the fossil evidence regarding the age and origin of certain California endemics. By request, this paper was read again at the Tuesday afternoon symposium.

On Tuesday afternoon a symposium was held on the "History and Relationships of the Southwestern Flora," in which three invited speakers participated. R. W. Chaney, speaking on plant migrations of late geologic time in relation to modern plant distribution, emphasized that these migrations have been largely from the north, with local and temporary reversals at several times. As a result, many genera have become concentrated in the lower latitudes, others have been eliminated, and still others have survived in modified form. Philip A. Munz gave an illuminating account of endemism in Southern California, discussing the restricted distribution of species in each geographical area. An analysis of the flora of Arizona, showing the proportion of the different geographical elements, prepared by T. H. Kearney and R. H. Peebles, was presented by Mr. Peebles.

At the Thursday morning session, two papers were presented by G. J. Hollenberg, the first dealing with culture studies on the following marine algae from Southern California; *Eisenia arborea, Petrospongium rugosum* and *Hapterophycus canaliculatus.* The second paper was devoted to a description of *Amplisiphonia pacifica,* representing a new genus of Rhodomeliaceae.

At a short business session, held on Thursday morning, the following officers were elected for the coming year: *President,* LeRoy Abrams; *Secretary,* Ira L. Wiggins, Stanford University, California.

ECOLOGICAL SOCIETY OF AMERICA

(Report by H. De Forest)

The society held two sessions for the presentation of papers, on the morning and afternoon of Thursday, June 23. It organized two field trips, one for an examination of the trees and shrubs of Balboa Park, conducted by C. I. Jerabek, and one for the bird life, led by J. E. Crouch. It participated also in the Biologists' Dinner of Wednesday evening.

H. P. Hansen had a paper giving an analysis of bogs in the Puget Sound region, based on fossil-pollen studies, in which the post-glacial forest succession was presented. G. D. Pickford, in collaboration with E. H. Reid and L. A. Isaac, described the plant succession in a Douglas fir area of the Pacific Northwest which had undergone cutting, burning and grazing. E. Fritz reported on the accelerated growth of redwood in California after logging. M. W. Talbot, with H. H. Biswell and A. L. Hormay, described the abrupt and pronounced changes in the quantity and composition of the herbaceous annual vegetation in the grassland of the San Joaquin Valley of California. This extensive area contrasts sharply with other major forage regions of the West in its preponderance of annuals and its great abundance of species from the Old World. A. W. Sampson reported on the chemical composition of species as a factor in plant succession in several different plant communities of Central California. C. J. Kraebel and C. H. Gleason gave a paper on the sowing of mustard seed by hand and by airplane for erosion control in burned areas of chaparral in Southern California, reporting upon several ecological aspects of the problem after six years of governmental investigation. W. V. Turnage told of three different methods for determining soil temperature as employed in desert soils. A. G. Vestal discussed problems of the coastal sagebrush scrub and related plant communities—the garigue-like "bush" of Southern California. This was followed by an account of the federal government lysimeter installations in the chaparral scrub of Southern California, for evaluating the water relations of this vegetation, a paper by C. J. Kraebel and E. A. Coleman. Forrest Shreve offered a new classification of life-forms of the Sonoran Desert of North America and made use of a revised form of his map of this desert region. Twenty-five life-forms are recognized, a much larger number than is found in humid regions. Two papers, by C. E. ZoBell and W. E. Allen, and W. E. Allen, treated respectively of the marine phytoplankton near La Jolla, California, and of the offshore diatoms encountered on certain cruises of a research vessel. An increase of the phytoplankton of the sea was usually accompanied or followed by an increase in the bacterial population. The favorable influence of upwelling of ocean waters on diatom production was clearly shown. The greatest abundance of these forms was well away from shore.

SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE

(Report by C. H. Thienes)

The Pacific Coast and the Southern California

branches of the Society for Experimental Biology and Medicine met jointly on the afternoon of June 22. Eight papers were presented. Miles E. Drake, F. S. Modern, John F. Renshaw and C. H. Thienes described experiments by which they showed the post-ganglionic nature of sympathetic fibers and pre-ganglionic nature of the parasympathetic fibers in the mesentery of the intestine. Donald C. Collins discussed the use of papaverine in treating acute arterial embolism. The concentration of blood acetylcholinesterase is normal in diabetic patients and is uninfluenced by insulin or epinephrine, but its concentration is low in hepatic disease, according to A. E. Koehler and Y. J. Katz. Discussing tannic compounds in plants with "little-leaf," H. S. Reed showed lantern slides of the disorganization of plastids and deranged carbohydrate metabolism as a result of zinc deficiency in nutrient media for growing peach and apricot twigs. S. C. Rittenberg and C. E. ZoBell described the use of long "oval tubes" for growing anaerobic bacteria and showed that the oxidation-reduction potential of the media is more important than the quantity of free oxygen present for such organisms. Margaret Gulick Morehouse fed alpha, beta- and beta, gamma-deutero-butyric acid to rats during a period of endogenous ketosis. Twenty-five per cent. of the beta, gamma-compound appeared in the urine as deutero-beta-hydroxybutyric acid, while only 4 per cent. of the alpha, beta-compound was so excreted. A. Goetz and S. S. Goetz reduced yeast cells to $-185°$ and $-252°$ C., at varying rates. Evidence that vitrification resulted from rapid cooling and crystallization from slow cooling was presented. Such vitrification was reversible, with viable organisms recovered, while crystallization was lethal. Thermodynamic considerations were discussed. W. G. Clark observed marked decreases in the intestinal absorption of sodium chloride by adrenalectomized rats.

Society of American Bacteriologists, Southern California Branch

(Report by Meridian R. Greene)

Papers presented to members of the Southern California section of the Society of American Bacteriologists dealt with a sufficiently varied scope of material to satisfy the interests of those attending the session. Investigations by C. ZoBell, C. Feltham, T. D. Beckwith, E. Geary, C. Fish and R. Tracy pertaining to the metabolic activities of bacteria were reported. Encrustations on the bottoms of vessels increase their running expense; W. F. Whedon spoke on the rôle of marine microorganisms in the formation of a primary film on submerged surfaces. It is to such a film that invertebrates such as barnacles attach. The pathology of Aspergillus infection of penguins was described by L. F. Conti. These fowl were evidently infected in their native habitat, Peru. Fatalities occurred from this fungus a month after capture. Considerable discussion followed the paper of A. Hoyt on immunization of mice infected with the virus of rabies and that of Kessel and Stimpert on the antibody content of the serum of human cases of poliomyelitis, infected monkeys and normal people for neutralizing this virus.

Protection of the public from contaminated eating and drinking utensils is a current problem. Bacterial counts of wash and rinse water occur, not infrequently, in the millions. The best field procedure so far of value to the Los Angeles County Health Department was outlined by R. V. Stone. It includes three requirements: (1) A thermometer for checking the temperature of wash waters which should have a minimum of 120° F. (2) A sediment test for the physical demonstration that the water is dirty. (3) A chlorine test for checking the strength of chlorine rinses which should contain at least 100 p.p.m. A chlorine rinse is essential as hot water heaters usually fail to maintain efficiency during rush periods.

Western Society of Soil Science

(Report by J. C. Martin)

The Western Society of Soil Science held three half-day sessions at which were presented eighteen submitted papers in addition to a half-day joint session with the Western Section of the American Society of Plant Physiologists. The attendance ranged from forty to sixty persons.

In the opening half-day session the papers presented dealt with soil-profile development as studied in Utah by the Forest Service, soil-erosion studies by the Soil Conservation Service in cooperation with the University of Arizona and with the State College of Washington in which have been developed mathematical expressions of erodibility and in which it has been shown that the forces of perikinetic and orthokinetic coagulation operate in soil suspensions carried by streams. A mathematical expression for the removal of silt by irrigation water in relation to size of stream and slope of ground was proposed from the Utah Agricultural College. The importance of temperature variations on pressure potentials and rate of water uptake by soil columns with shallow water tables was discussed in the light of studies at the University of California.

During the second half-day the papers presented covered a wider range of soil investigations. Evidence pointing to the indispensability of iodine as a plant nutrient was offered from work done in Oregon; the effects of sorghum roots upon subsequent crop growth from the standpoint of their sugar content was discussed in the light of work done in California. In work reported from the University

of California, the absorption of potassium from suspensions of clay by excised barley roots was shown to be of some magnitude within a short time period and to be dependent on the degree of saturation of the clay with respect to that ion. The results of two years' work in the examination of leachings from "Russian type" lysimeters at Washington State College show that with annual precipitation of from 20 to 25 inches there has been appreciable leaching, some of which has been lateral in direction, and the magnitude of the nitrification processes has been indicated under different cropping systems. A new apparatus for the study of the effect of "puddling" soil on the binding of the soil moisture as developed at the University of Arizona was described and evidence presented to show that the "bound" water in soils is held, in part, in the form of a thixotropic gel. At the same institution certain correlations were shown between the rate of infiltration of water and the dispersion percentage of soil particles of 0.005 mm diameter.

During the last half-day's presentation of papers on measurement of oxidation-reduction potentials in alkaline calcareous soils as conducted at Arizona and also on the effects of soil-water ratios on the pH measurements in soils as studied at Arizona and the State College of Washington, much lively discussion developed. Microbial activities in the soil as studied at the State College of Washington point to the difference in the nature of the organic residue as being responsible for the development of divergent types of microflora in two important soils in that region. The examination of some typical range soils in Arizona showed the mountain meadows to be much richer in bacterial and actinomyces counts than the forested areas or the desert regions. The occurrence of algae in the soil and their important role in the economy of the soil as studied at Brigham Young University was presented as the closing paper; seasonal variation in the kinds of algae was shown to be evident as was decrease in numbers with depth of soil and with decrease in organic matter content of the soil.

The following officers were elected for the ensuing year: *President,* H. D. Chapman, University of California, Riverside; *Vice-President,* W. T. McGeorge, University of Arizona, Tucson; *Secretary-Treasurer,* J. C. Martin, University of California, Berkeley.

CONCURRENT MEETINGS OF ORGANIZATIONS NOT AFFILIATED WITH THE PACIFIC DIVISION, A.A.A.S.

AMERICAN ASSOCIATION OF PHYSICS TEACHERS

(Report by L. E. Dodd)

This young association, still in its first decade, is one of the newer affiliated societies of the American Association for the Advancement of Science. Appropriate therefore was its convening during the annual June meeting of the Pacific Division, A.A.A.S., its program thereby forming a part of the week's sessions of the larger association.

A luncheon on June 24 in charge of M. S. Allen, Long Beach Junior College, permitted the activities and plans of the American Association of Physics Teachers in the western United States to be discussed informally. Professor D. L. Webster, Stanford University, was called upon, and gave a stimulating impromptu talk. Participating in the discussion was A. A. Knowlton, Reed College, member of the national executive committee.

The afternoon program under the chairmanship of Professor Webster was divided into two parts. In the first group, the following five invited papers were presented: (a) "Equations of State for Physics Teachers," by W. P. Boynton, Oregon State College, Corvallis. He summarized an intensive study, giving a more generalized equation, with lantern slides of models of different thermodynamic surfaces. (b) "The Flying Laboratory," by A. A. Knowlton, which described his experimental study of the cause for an airplane's losing the guiding radio beam. This has been "a contributing factor in a considerable number of all major crashes of transport planes." (c) From the view-point of a high-school teacher, Roy W. McHenry, Escondido, California, discussed "The Physics Problem in High Schools." Four current problems are: lack of material equipment; the recent trend in shortening the time of classes; extremely wide range of abilities among the students, together with their lack of a reasonably adequate mathematical preparation; and the frequent limitations and handicaps of high-school physics teachers. These points aroused lively comments from the audience. (d) Relating the high school to the college, Paul S. Epstein, California Institute of Technology, presented "Mathematics in the Secondary School as Related to College Physics." Professor Epstein's analysis and suggestions were basic and enlightening. His paper, to be published in detail, will surely be read with interest and profit by many. (e) Ernest O. Lawrence, University of California, Berkeley, with outstanding achievements in current experimental research into the atom by means of his invention, the cyclotron, discussed "Relation of the Cyclotron to Present-day Courses in College Physics." Professor Lawrence gave a clear outline of how the present-day teacher should present to students the behavior of electrons in this effective type of modern apparatus.

The second group consisted of seven contributed papers, of which the first was by M. S. Allen, Long Beach Junior College, on "The Evaluation and Guidance of Functional Student Progress." The need for improving the student attitude toward physics was stressed, and suggestions were made as to how this might be done. He urged also helping the student to

maintain a balance, by not neglecting development of himself as a well-rounded individual, capable of meeting the larger social requirements. G. G. Kretschmar, Walla Walla College, offered practical suggestions, illustrated by slides, in "A Small Optics Shop as an Aid in Conducting an Intermediate Laboratory Course in Optics." J. L. Bohn and F. H. Nadig, Temple University (introduced by E. C. Watson), described "Hydrodynamic Apparatus for Demonstrations in Radioactivity," giving the necessary equations for the designs, illustrated with slides. Prepared papers read by title because of shortness of time in the one-half-day sessions were: "An Electrical Circuit Containing a Spark Gap," by W. P. Boynton; "An Approach for Introducing the Characteristics of Measurement," by L. E. Dodd; and "An Improved Method for Mapping Electric Fields," by H. C. Burbridge, Fresno State College.

A "Progress Report on the A.A.P.T. 'Manual of Demonstration Experiments,'" written by the editor-in-chief, R. M. Sutton, Haverford College, was read in his absence by a member of the editorial staff for the manual. This up-to-date and comprehensive manual for physics demonstration lecturers will describe about 1,200 experiments, in about 550 pages, with over 400 illustrations. More than 200 teachers contributed material. Having been three years in preparation, it is scheduled to appear in August, from the press of McGraw-Hill. Incidental to this progress report was an exhibit of specimen pages of the manual, selected from the printer's page-proof.

It is expected that most, if not all, of the papers will be published in early forthcoming issues of the association's journal, *The American Physics Teacher*.

The program committee comprised H. A. Kirkpatrick, Occidental College, R. H. Tileston, Pomona College, and L. E. Dodd (chairman), University of California at Los Angeles.

AMERICAN ANTHROPOLOGICAL ASSOCIATION, PACIFIC DIVISION

(Report by Malcolm J. Rogers)

The sessions of the American Anthropological Association, which extended over a period of three days, had a daily average attendance of fifty. Eighteen papers in all were read, nine of which dealt with integrating topics which were presented during the symposium on "The Problem of Culture Sequence on the West Coast." This theme was broadened somewhat by papers from adjacent fields. Ernst Antevs presented geological evidence bearing on the antiquity of the Cochise Complex of Arizona and E. B. Sayles the archeological aspects. A summary report on the culture sequence as known in the Nevadan field was presented by M. R. Harrington.

The most recent stratigraphic studies made in California, with a territorial range from Central California to Lower California, disclosed some major agreements and much localized pattern differentiation of a minor nature within the food-gathering horizon. The universal priority of the metate over the mortar was strongly indicated, but Ralph L. Beals, who summarized the symposium papers, was not in accord that the point was proved. In a reconstruction of the cultural prehistory of Southern California, Malcolm Rogers postulated two major horizons, a food-gathering one and an earlier hunting horizon. In connection with the latter horizon he offered evidence for a short chronology to replace the pluvial date which had hitherto been advanced for the appearance of man in California.

In the field of social anthropology, Edwin M. Loeb suggested psychological explanations for conditions obtaining in kin marriage and exogamy, and Peveril Meigs presented unique ethnological data regarding the Kiliwa Indians of Lower California.

VISION IN NATURE AND VISION AIDED BY SCIENCE; SCIENCE AND WARFARE.[1] II

By The Rt. Hon. LORD RAYLEIGH
PRESIDENT OF THE ASSOCIATION

The value to science as well as to daily life of the gelatine dry plate or film can hardly be overestimated. Take, for instance, the generalized principle of relativity, which attempts with considerable success to reduce the main feature of the cosmical process to a geometrical theory. The crucial test requires us to investigate the gravitational bending of light, by photographing the field of stars near the eclipsed sun. For this purpose the gelatine dry plate has been essential: and here, as we have seen, we get into complicated questions of bio-chemistry. This is to my mind a beautiful example of the interdependence of different branches of science and of the disadvantages of undue specialization (or should I say generalization?). We may attempt to reduce the cosmos to the dry bones of a geometrical theory, but in testing the theory we are compelled to have recourse again to the gelatine which we have discarded from the dry bones!

To come back, however, to the development of the

[1] Concluding part of the address of the President of the British Association for the Advancement of Science, Cambridge, August, 1938.