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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE TWENTY-SIXTH ANNUAL MEETING OF THE PACIFIC DIVISION

Edited by Professor J. MURRAY LUCK

SECRETARY

THE twenty-sixth annual meeting of the Pacific Division, American Association for the Advancement of Science, was held at Salt Lake City, Utah, during the week of June 15, 1942. The meetings extended over six days.

It was a notable week and an occasion deserving of record. Despite the exigencies of war and the pressing obligations of an unparalleled emergency, almost 400 scientists of the far western states were able to gather together for the purpose of friendly intercourse and the ever-necessary exchange of information from many fields of scientific research.

The meetings were of a particularly high quality throughout. General sessions commenced on the morning of June 15 with a symposium on "The Great Basin, with Emphasis on Glacial and Post-Glacial Times," in which three papers were presented by men whose studies have been largely centered upon the problems under discussion. The three papers were as follows: "The Geological Background," Dr. Eliot Blackwelder; "The Zoological Evidence," Dr. C. L. Hubbs and Dr. R. R. Miller, and "Climatic Changes and Pre-White Man," Dr. Ernst Antevs. The papers presented were of great interest, and it was thought by many that this symposium was one of the finest in the history of Pacific Division meetings.

On Tuesday afternoon at 1:30 the general sessions continued with "Reviews of Current Research," a session which consisted of four papers designed to review recent contributions in various scientific fields. The reviews presented were "Relationship Between Molecular Configuration and Resonance," G. E. K. Branch; "Recent Advances in Entomology," G. F. MacLeod; "Recent Developments in the Field of Disinfection," E. C. McCulloch; "Recent Work on Virus Diseases of Plants," C. W. Bennett.

At four o'clock President and Mrs. Cowles received the members and guests of the division and associated societies in the Union Building on the university campus.

On Tuesday evening Professor D. R. Hoagland, president of the Pacific Division for the year 1941 to 1942, presented the first evening address, "Progress in Investigations of the Nutrition of Plants."

One of the most enjoyable social events of the week was the organ recital given in the Mormon Tabernacle on Wednesday afternoon by Alexander Schreiner. It was followed by a reception at the Lion House, historic residence of the pioneer leader, Brigham Young.

"Researches in Dendro-Chronology" was the title of the evening address presented by Dr. Andrew E. Douglass, of the University of Arizona, on Wednesday evening.

On Thursday afternoon open house was held in the Geological Museum and Archeological Museum, following which tea was served by the University of Utah Women's Club.

The concluding evening address on "Recent Developments in Photography" was presented on Thursday evening by Dr. C. E. K. Mees, of the Eastman Kodak Company, Rochester, N. Y.

Business sessions of the executive committee and the council of the Pacific Division, American Association for the Advancement of Science, were held during the week. E. O. Essig was elected to fill the unexpired term of T. G. Thompson, who resigned his position on the executive committee. H. U. Sverdrup was elected to the executive committee in succession to F. B. Sumner, retiring from office on completion of five years of service. B. M. Allen and J. F. Kessel were elected as members-at-large on the council for four-year terms, in succession to C. L. Utterback and H. A. Spoehr.

Dr. Linus Pauling, of the California Institute of Technology, was elected to the presidency of the division, in succession to Professor D. R. Hoagland. Professors R. E. Clausen and J. Murray Luck were re-elected vice-president and secretary-treasurer, respectively.

A resolution of gratitude was unanimously adopted for the generous hospitality of the local sponsoring organizations—the University of Utah, Utah State Agricultural College, Brigham Young University, Weber Junior College and the Utah Academy of Sciences, Arts and Letters. It was announced that the 1943 meeting would be held in Corvallis, Oregon, under the auspices of the Oregon State Agricultural College. Professor R. V. Chamberlin served as chairman of the Committee on Local Arrangements for the Salt Lake City meeting.

SESSIONS OF AFFILIATED SOCIETIES

The reports of the scientific sessions of participating societies follow.

American Association of Economic Entomologists Pacific Slope Branch

(Report by Roy E. Campbell)

The 27th annual meeting of the Pacific Slope Branch of the American Association of Economic Entomologists was very successful, even though the attendance was reduced because of restrictions on travel. As a matter of fact, the lessened attendance seemed to increase the interest and participation in the discussion of papers presented, which reported on a wide variety of entomological projects in different Pacific Slope states.

Dr. P. N. Annand, chief of the Bureau of Entomology and Plant Quarantine, gave an outstanding address on "Insect Problems Affecting Food Production." He stressed the importance of the various problems now facing the entomologists in connection with our national efforts to produce sufficient food for ourselves and our allies.

The discussion on the subject, "What can we as entomologists do to be of most service to our country?" was participated in by most of those present and brought out some very interesting viewpoints. It was shown that the entomologist has a place in the armed forces, where his services are really needed in connection with insect problems affecting the health of military units and the protection of food stores. It was also brought out that all our efforts, whether in research, extension or teaching, should be concentrated on the control of insects affecting food and other materials used by the military and civilian forces in connection with the war, and less attention given to purely scientific problems or technical research which can be postponed until after the war.

Two very fine colored motion pictures were shown, one by Dr. A. J. Cox, chief of the Division of Chemistry of the California Department of Agriculture, the subject of which was "The Story of Economic Poisons." This showed the making and application of our various economic poisons. The other motion picture was "Combat," by the General Chemical Com-

pany, showing the fight against insect pests and plant diseases in the principal fruit and vegetable producing areas of the country.

New officers elected were: *Chairman,* Merton C. Lane, Bureau of Entomology and Plant Quarantine, Walla Walla, Washington; *Vice-Chairman,* K. W. Gray, Oregon State College, Corvallis, Oregon; *Secretary-Treasurer,* Roy E. Campbell, Bureau of Entomology and Plant Quarantine, Alhambra, California.

American Association of Physics Teachers

(Report by Orin Tugman)

The American Association of Physics Teachers met on June 17. A paper was presented by Lynn W. Jones, of the University of Redlands, on "Correlations of Force and Field Intensity in Gravitational, Electrical and Magnetic Fields." The author of the paper not being present, the presiding officer of the meeting read the paper from manuscript supply. After discussion, the remaining time was devoted to the Symposium on the Role of the Physics Teacher in War Time. Dr. Willard Gardner, Utah State Agricultural College, Logan, Utah, read a paper on "Physics and Agriculture." This paper was a discussion on the relationships between agricultural food supplies and physics. Dr. Wayne B. Hales, Brigham Young University, Provo, Utah, read a paper on the "Significance of the Increased Demand for Physicists." In the discussion which followed it appeared to be a consensus of opinion that more publicity should be given to the deferment which may be allowed students of physics. It was pointed out that in many cases students are not aware of the proper procedure to secure deferment.

American Meteorological Society

(Report by G. K. Greening)

At the meeting of the American Meteorological Society from June 17 to 19, twenty-three papers were presented on a variety of subjects, divided into the following general groups: (1) Weather maps, forecasting, aeronautical meteorology; (2) agricultural meteorology and climatology; (3) theoretical and engineering meteorology, and (4) hydrology.

A new system for entering meteorological data on the daily weather map was explained by J. M. Lanning, of the Phoenix, Arizona, Weather Bureau Office. It is a three-dimensional system which gives not only length and breadth, but also depth to the weather map, and data relating to wind velocity and direction for various heights above the earth's surface are entered at certain set levels above the map by writing with ordinary ink on glass plates laid horizontally from wooden frames with a light near the bottom. Thus the use of a number of separate charts is eliminated, and it may be found that data other than that relating to air circulation can be entered on the plates.

Dr. Robert D. Fletcher, instructor in meteorology at the University of California at Los Angeles, discussed "Some Practical Relationships Involving the Vertical Wind Shear," concerning two relationships between the temperature field and change of wind with height. Assuming a geostrophic wind and that the slope of isobaric surfaces is small compared with that of isothermal surfaces, Dr. Fletcher arrived at an equation exactly similar in form to the geostrophic wind equation, but in which the pressure gradient is replaced by the temperature gradient, density by temperature and wind by the vertical wind shear.

Arnold Court, of the Los Angeles Weather Bureau Office, who was with the 1940–41 Byrd Antarctic Expedition, cited various proofs to show that there is no connection between air circulation in the Antarctic and in the rest of the world. Dr. Wayne B. Hales, of the Brigham Young University at Provo, demonstrated air mass movements and interactions by means of a Kodachrome motion picture, showing the movement of colored liquids in a density chamber.

Mathematical formulas from climatological data for determining the beginning and ending of the growing season and for predicting the occurrence of forest fires were explained by George L. McColm, Soil Conservation Service, Salt Lake City, and H. M. Shank, Forest Service, Ogden, Utah, respectively.

In the hydrology discussions A. R. Croft, of the Ogden Forest Service office, produced evidence indicating that the presence of foreign matter tends to increase the rapidity of snow melt, and J. Cecil Alter, of the Cincinnati Weather Bureau, presented a progress report on his investigation of the necessity for providing precipitation gauges with shields in order to secure an accurate catch.

American Phytopathological Society, Pacific Division

(Report by C. E. Yarwood)

In the absence of the president and vice-president, the meetings were presided over by B. L. Richards, of the Utah Agricultural College. Twenty-two members were present from Arizona, California, Idaho, Utah, Wyoming, Washington, D. C., and Brazil. The meetings were organized into three sessions, at which sixteen volunteered papers were presented, and one symposium, at which eight invitational papers were presented.

H. S. Fawcett and A. A. Bitancourt discussed the host morphology and orchard distribution of the psorosis virus disease of citrus. C. W. Bennett re-

ported that curly top virus would live up to seven years in dried host tissues. W. G. Solheim found that certain natural illuminating gases found in Wyoming were relatively non-toxic to green plants. L. C. Cochran reported that peach trees affected with certain viruses tend to recover after the first acute symptoms of the disease. E. C. Blodgett described Coryneum blight on several stone fruits. Eubanks Carsner found that high temperatures could limit the occurrence of sugar beet downy mildew. W. J. Virgin reported that some storage diseases of carrots could be reduced by starting the storage period during the cool weather. B. Dundas found that lima bean powdery mildew is apparently caused by a *Microsphaera* and not by an *Erysiphe*. V. P. Sokoloff reported attempts to control citrus red scale by means of a soil bacillus. P. A. Ark reported control of crown gall by seed treatment, and described an important bacterial scab of carrot roots. Catherine Roberts showed the morphological similarity between *Taphrina* and *Torulopsis*. Dean Pryor found that big vein of lettuce could develop over a wide range of controlled soil moisture levels. C. E. Yarwood reported that hop downy mildew was reduced by using string supports treated with bordeaux.

At the symposium on "Breeding for Resistance to Plant Diseases," organized by H. Loran Blood, breeding onions for resistance to downy mildew, pink root and thrips was discussed by G. N. Davis; the development of powdery mildew-resistant cantaloupes was reported by Dean Pryor; curly top-resistant beans were reported by W. J. Virgin; mosaic-resistant beans were discussed by M. E. Anderson; breeding snap beans for resistance to powdery mildew and rust was discussed by B. Dundas; the performance of curly top-resistant sugar beets was reported by F. V. Owen, and limitations in the control of peach viruses by breeding was discussed by L. C. Cochran.

At the dinner meeting, B. L. Richards reported studies of the Western X disease of stone fruits.

Officers for the coming year are: *President,* L. D. Leach, University of California, Davis; *Vice-President,* B. L. Richards, Utah Agricultural College, Logan; *Secretary-Treasurer,* C. E. Yarwood, University of California, Berkeley; and *Councilor,* Glenn A. Huber, Washington Agricultural Experiment Station, Puyallup.

American Society for Horticultural Science

(Report by John H. MacGillivray)

Horticulture was represented on the "Breeding for Resistance to Plant Diseases" symposium by Glen N. Davis, who discussed onions, and D. E. Pryor and T. W. Whitaker, who outlined the progress in developing powdery mildew resistance in cantaloupes. Research has been progressing on both of these cooperative projects for over ten years. In both cases significant contributions of economic value have been made to our vegetable industry.

W. W. Aldrich gave the annual address at the Horticulturists dinner on "Irrigation in Horticulture To-day." Dr. Aldrich summarized our present knowledge on this subject based on experimental evidence and observations on a wide range of horticultural plants, climatic and soil conditions. He discussed these data from the standpoint of methods which may be used to determine when horticultural plants should be irrigated.

G. C. Hanna presented evidence that ten year yields on asparagus are better for determining the yielding ability of parent plants than shorter periods in a breeding program. Crown characteristics at time of planting failed to give evidence of future yielding ability. G. A. L. Mehlquist gave the necessary scientific background for the production of *Primula obconica* seed which can not be imported at the present time. H. E. Hayward and E. M. Long presented evidence that Elberta peaches gave different growth responses when grown on Lowell and Shalil rootstocks in high chloride and/or sulfate solutions. Roy W. Nixon reported on the effect of thinning treatments on the amount of "shrivel" in the Halway date. Light, medium and heavy pruning on the top regeneration of the Valencia orange was discussed by S. H. Cameron and R. W. Hodgson.

American Society of Ichthyologists and Herpetologists, Western Division

(Report by Richard S. Croker)

The meetings of the Western Division, American Society of Ichthyologists and Herpetologists, consisted of two symposia, a round table discussion and a half-day session of general papers. The high light of the meetings was the symposium entitled "The Great Basin with Emphasis on Glacial and Post-Glacial Times," which was arranged jointly by the society and the American Association for the Advancement of Science. Eliot Blackwelder spoke on the geological background, describing the evolution of the Great Basin and its surrounding mountains. Carl L. Hubbs, presenting a paper prepared jointly with Robert R. Miller, showed that the present distribution of fishes in isolated parts of the Great Basin substantiates the assertions of geologists regarding the history of this area. Ernst Antevs discussed the changes in climate of this area and how they affected the ancient inhabitants, as well as how the study of former inhabited sites indicates early climatic conditions.

The second symposium, "Problems of Management

of Trout Waters," emphasized conditions in the Inter-Mountain Region. Marion J. Madsen spoke on the objectives of management, chief of which is to "provide satisfactory fishing for the largest number of anglers at the most reasonable cost." James W. Moffett discussed environment and management, with emphasis on the fact that each body of water is a separate problem and that neither the general survey nor the intensive study is the sole approach. James R. Simon spoke on administrative considerations in the methods of management. He stated that "hatcheries still have a place in trout management but that the exaggerated claims for their success must be revised in view of the efficiency of natural reproduction."

A round table discussion on reptiles, "Seasonal Behavior Patterns," was led by A. M. Woodbury. The points discussed included the effects of temperature, humidity, light and other factors on such habits as denning and solitary hibernation, feeding, migration, breeding, etc.

Papers read at the general session included those on fish pigment by F. B. Sumner, fossil fish scales by L. R. David, proportion of scale length to fish length by L. D. Townsend and H. L. Connor, aboriginal use of fisheries by G. W. Hewes and the shark fishery by R. S. Croker.

Officers of the Western Division of the society for the ensuing year are: *President,* W. C. T. Herre, Stanford University; *Vice-President,* Raymond B. Cowles, University of California, Los Angeles; *Secretary,* Richard S. Croker, California Division of Fish and Game, Terminal Island, California.

(To be concluded)

THE RESOURCES OF THE CONTINENTS[1]

By Dr. KIRTLEY F. MATHER

PROFESSOR OF GEOLOGY, HARVARD UNIVERSITY

ANY consideration of the changes that are likely to occur during the next few years in the social and political life of man must include the inescapable fact that the demands upon mineral resources are certain to increase. Not only in war but also in peace, human efficiency and comfort are increasingly dependent upon metallic ores, mineral fuels and the products of the ground. No matter what may be the nature of the new order for which men fight and plan and work, it can become a reality only if it is adjusted both to the peculiarities of human nature and to the characteristics of the physical resources available in this terrestrial environment. It is worth while, therefore, for all concerned with the fate of man to give careful thought to the nature and distribution of the raw materials with which Mother Earth's storehouse is stocked.

These basic requisites for modern civilization occur under certain well-defined geological conditions. Their distribution is by no means haphazard or unpredictable. Now that the general geological structure of all the continents is known and the specific occurrence of many valuable mineral deposits has been studied, it is possible to estimate with some degree of accuracy the total stores of the more important metals, fuels and other minerals that are available for human use, and to compare the relative wealth of the several continents with regard to mineral resources.

It may help in making such a survey to group the rocks of the earth's crust in three categories. First there are the very old, and generally much contorted or compressed rocks of the Basement Complex or Pre-Cambrian terrane. These include vast bodies of granite and other igneous rocks, many of them intensely metamorphosed, as well as sedimentary rocks that likewise have been greatly altered by heat and pressure during the many vicissitudes of crustal movement and volcanic eruption that have affected them throughout the long ages of subsequent geologic time. These ancient rocks contain many rich bodies of metallic ores, such as those yielding gold, silver, copper, nickel and iron. Nowhere do they contain coal, petroleum or the ores of such metals as aluminum and magnesium.

There are extensive areas of Pre-Cambrian rocks in every continent, and no large unit of these rocks has thus far failed, when adequately prospected, to be the source of essential metals. The Canadian Shield surrounding Hudson Bay in North America is matched by the Scandinavian Shield of northwestern Europe and the Angara Shield of north-central Siberia in Asia. In the southern hemisphere, the Brazilian Shield of South America is matched by the extensive bodies of Pre-Cambrian rock in south and central Africa and the Basement Complex of Australia.

The second group of rocks in this very loose classification of mine includes the sedimentary formations of Cambrian and post-Cambrian age. These may be flat-lying beds beneath the plains and in the plateaus or they may be wrinkled into mountains like the

[1] World-wide broadcast of the American Philosophical Society and WRUL, Philadelphia, July 17, 1942.