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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE SECOND BERKELEY MEETING OF THE PACIFIC DIVISION

By Dr. ARTHUR G. VESTAL, Secretary

THE thirteenth annual meeting of the Pacific Division, together with fifteen associated societies and one other organization, met at the University of California at Berkeley, June 19 to 22, 1929. Five hundred and twenty-one persons registered at the headquarters office, and it is estimated that two hundred others attended some of the programs. The afternoon and evening of Wednesday, June 19, were devoted to the general program of the division, beginning with research announcements, in which progress during the year in certain fields was recounted, with emphasis on work done in the Pacific Coast area. Mathematics and astronomy were represented by Donald H. Menzel, Lick Observatory, physics by Raymond T. Birge, University of California, and chemistry by Joel H. Hildebrand, University of California. It was of interest as illustrating the interdependence of these sister sciences that it was impossible to keep any one of the accounts of current research within the field it was designed to cover. One of the notable groups of researches reported involved all these fields, with close cooperation among men working at different institutions and in different sciences. Recent accomplishments in botany were reported by O. L. Sponsler, University of California at Los Angeles. He used a statistical treatment which showed clearly the proportional activities of the several divisions of botanical study. A. R. Moore, University of Oregon, selected two aspects of zoological study to illustrate progress in that science. These aspects are the modern experimental work upon development of animals and the influences of endocrines.

Shortly afterward two reels of the latest arrangement of African mammal films by Mr. and Mrs. Martin Johnson were shown, in which the enormous size of some of the herds of game animals, the close views of lions and fine pictures of the less commonly seen animals, such as hunting-dogs, were memorable. A third reel showed the Congo pigmies. The division is indebted to Mr. Johnson for his kindness in lending the films.

From 5 to 6:30 P. M. Dr. W. W. Campbell, president of the university, and Mrs. Campbell were at home to members of the association. In the evening Dr. Campbell gave a short address of welcome, recounting events in the early history of the Pacific Division. To this welcome Vice-president E. G. Martin responded, then introduced the president of the division, Dr. Walter S. Adams, director of the Mt. Wilson Observatory, who gave the address of the evening, on "The Astronomer's Measuring-rods." He described graphically the astronomer's methods of gaging the distances of stars and the dimensions of the universe, and showed how greatly the scope of these methods may soon be extended with the superior light-gathering power of new great telescopes. A general reception by the university, at Stephens Union, followed Dr. Adams' address.

Thursday and Friday were the two busy days for programs of individual societies. The soil scientists had held sessions on Monday and Tuesday, in advance of the other groups, and the Aquarium Society had a program on Wednesday morning. Reports of the individual societies will be found on later pages.

The general program of the chemists on Thursday afternoon, with three invitation papers on subjects of general interest, are mentioned in the report of the Chemical Society. The Thursday evening address before the Pacific Division was by Dr. James W. McBain, of Stanford University. He illustrated by diagrams, microphotographs, specimens and simple experiments the structural peculiarities of colloidal and amorphous matter. A brief business session of the division followed Dr. McBain's address. A resolution was presented expressing the loss to the division occasioned by the death of Winthrop Webster Sargeant, its secretary from 1918 to 1927. Another resolution expressed gratitude to the University of California for its hospitable provision of every need for the meeting, and a third gave the opinion of the members that importation of scientific instruments should be free of duty for educational and research institutions. Mr. Bernard Benfield was reelected to the executive committee of the division. A meeting of the affiliation committee (representatives of associated societies) followed the general session of the division.

Dr. Franz X. Schaffer, of Vienna, was unable to reach this country in time to present the Friday evening address as originally scheduled. Dr. S. F. Light, of the University of California, was asked to take his place. He presented a very interesting general account of termites. The increasingly destructive activities of these insects are engaging the efforts of a group of workers at the University of California, among whom Dr. Light is prominent.

Among the excursions planned for the Berkeley meeting, that to Lick Observatory on Mt. Hamilton, which left Berkeley Friday afternoon, was notable. About forty persons took part, arriving on the mountain well before dark. Later they saw through thirty-six-inch and twelve-inch refractors the Hercules star cluster, the giant double star Antares, Saturn and the moon. Other excursions were made to Strawberry Cañon and the Berkeley Hills and to Mt. Diablo.

The reports of the societies which held meetings at Berkeley in affiliation with the Pacific Division now follow.

American Mathematical Society

(Report by B. A. Bernstein, Associate Secretary)

Three sessions were held: Thursday morning, Thursday afternoon and Friday morning. The attendance was about sixty, including thirty-three members of the society. Forty-eight papers were presented, including an address given at the request of the program committee by Professor James Pierpont, of Yale University, on "Non-Euclidean Geometry in Retrospect." The sessions were presided over at various times by President E. R. Hedrick, and by Professors M. W. Haskell, W. L. Hart, James Pierpont and Harry Bateman. A luncheon at the Women's Faculty Club was arranged for members and their guests between the two Thursday sessions.

American Physical Society

(Report by L. B. Loeb, Secretary for the Pacific Coast)

The one hundred and fifty-eighth regular meeting of the Physical Society was held in Berkeley, California, Friday and Saturday, June 21 and 22, 1929. The Friday morning program of invitation papers was held jointly with the Astronomical Society of the Pacific. Application of wave mechanics in determining form and intensity of spectral lines of hydrogen was elucidated by D. H. Menzel. R. T. Birge gave the most probable values of the fundamental physical constants derived from recent experimental investigations and spoke briefly of the art of computing. Extension of the solar spectrum into the infra-red to

11,000 Å. by means of improved spectrographic methods was described by H. D. Babcock. I. S. Bowen reported recent work in determining the character of the lines in the spectra of gaseous nebulae. C. E. St. John listed the elements not yet identified or questionable in the sun's atmosphere. Four thousand two hundred and seven additional lines in the region covered by Rowland's tables have been accounted for, and 1,129 new lines have been added in the infra-red.

Following these sessions, a joint luncheon for members of the two societies was held at the Women's Faculty Club. The Friday afternoon and Saturday morning sessions included forty-two papers. Titles and abstracts for most of these are printed in the *Bulletin* of the American Physical Society (Vol. 4, No. 3, issued June 7, 1929).

The one hundred and sixtieth meeting of the Physical Society will be held at Stanford University December 7, 1929 (possibly beginning December 6).

AMERICAN METEOROLOGICAL SOCIETY

(Report by Burton M. Varney, Secretary for the Berkeley Meeting)

Two sessions for the reading of papers were held on Friday, June 21. Marsden Manson reemphasized his view that earth heat as a climatic factor during geologic time can not be disregarded, in spite of strong evidence to the contrary. A. F. Gorton analyzed statistically the performance of certain indices of California seasonal rainfall. He finds evidence of recurrences in rainfall and in temperature in periods which generally approximate multiples of the simple solar period. L. E. Blochman discussed, on the basis of particular instances for the Pacific Coast, the difficulties confronting the long range forecaster. E. A. Beals spoke upon the need for a meteorological record from Dutch Harbor, Alaska, as an aid to studying offshoots from the Siberian winter high pressure in their bearing on long range weather forecasting. E. H. Bowie dealt with the west coast atmospheric fault between cold humid air over the Pacific Ocean and hot dry air over the west coast states, in relation to certain cyclonic storms of summer over the western states. L. G. Gray described the plan to be operated this summer in California whereby a truck equipped with instruments and radio will be dispatched to points near forest fires for issuing local forecasts as an aid in fire-fighting. The striking achievements of the Guggenheim Experimental Airway Service between Los Angeles and San Francisco were described by T. R. Reed as an example of successful cooperation between meteorology and aviation. Also in connection with commercial flying, D. M. Little discussed the meteorological needs of a first-class airport. Mapping the weather on a world-wide basis was discussed by B. J. S. Cahill, who has devised a butterfly map projection to coordinate mapping by all weather services upon a uniform base. Ernest Eklund presented a map and list of all known series of evaporation measurements for California as an aid to the study of water losses from surfaces of snow, lakes, rivers, etc. H. M. Stafford described the project recently made possible by legislative enactment for a state-wide snow survey to obtain more accurate estimates of prospective water supply. Recent rapid growth of weather reporting by radio from ships on the Pacific was described by W. J. Hutchison, showing how greatly such reports aid in predicting the movements of storm and fine weather circulations. C. C. Allen summarized the highly successful frost forecasting by the Weather Bureau for fruit-growers in the Upper San Joaquin Valley, an especially difficult region. Floyd Young presented results achieved in correlating shipments of citrus fruits from California with prospective demands in eastern markets as determined by weather conditions forecast for eastern states.

AMERICAN CHEMICAL SOCIETY—PACIFIC INTERSECTIONAL MEETING

(Report by George S. Parks, Chairman of the Program Committee)

The second Pacific intersectional meeting of the Chemical Society was held in Berkeley on Thursday and Friday, June 20 and 21. Eight western sections (Arizona, California, Northwestern Utah, Oregon, Puget Sound, Sacramento, Southern California and Washington-Idaho border) took part jointly in this meeting, which was attended by approximately 170 chemists. Dr. George W. Sears, of the University of Nevada, was chairman of the executive committee and Dr. George S. Parks, of Stanford University, served as chairman of the unified program committee. The program included a general session for all chemists on Thursday afternoon, with three invitation addresses. There were also meetings of three groups of divisions: Group I, the divisions of analytical chemistry and of physical and inorganic chemistry; Group II, the divisions of agricultural, biological and organic chemistry, and Group III, the division of chemical education. On Thursday evening a chemists' dinner, attended by about one hundred, was held at the Stephens Union, after which the members adjourned to Wheeler Hall to hear Professor McBain's address on "Structure in Amorphous and Colloidal Matter."

At the general session Dr. C. W. Porter, of the University of California, gave the first address on "Molecular Rearrangement." He presented an excellent review of a number of organic transformations,

including the Hofman and Beckmann rearrangements. In connection with the latter he showed that earlier and generally accepted ideas must be revised in the light of recent studies. Dr. Linus Pauling, of the California Institute of Technology, next discussed "The Structure of Complex Inorganic Crystals." Although from formula considerations many of these compounds, such as the silicates for instance, appear extremely complicated, Dr. Pauling showed how the known structures satisfied the requirements of a set of principles based upon the assumption of a coordinated arrangement of anions about each cation at the corners of an approximately regular polyhedron. Dr. H. K. Benson, of the University of Washington, concluded this general session with a discussion of "Chemistry in Relation to the Industries of the Pacific Coast." In his talk he considered in some detail the training of chemical engineering students, an especially important problem for the rapidly expanding chemical industry of the far west.

Group I held three half-day sessions at which thirty papers were presented. These contributions were all of high quality, but lack of space prevents a complete and adequate discussion of them here. However, by way of example, a few, selected almost at random, will be mentioned. Freed and Spedding, working in a comparatively new field—magneto-chemistry—presented strong evidence for the existence of electronic isomers in solution and in the solid state. McBain and Tanner in a study of the adsorption of gases upon a plane platinum surface have developed a most ingenious sorption balance, sensitive to 4 (10^{-9}) gm. Ramsperger, Nordberg and Tolman gave an interesting discussion of the decomposition of nitrogen pentoxide at low pressures. Giauque and Johnston, in what appealed to many as the most interesting paper of the meeting, presented the results of an investigation of some of the properties of oxygen. Using very accurate spectroscopic data recently obtained by Babcock, they find evidence for the existence, in extremely small proportions, of two isotopes of oxygen, masses 17 and 18.

Group II held two half-day meetings at which twenty-two papers were presented. Noteworthy among these were the two papers by Young and Lucas on the synthesis and properties of butenes, the paper by Morgan and Field on the effect of drying and of sulphur dioxide on vitamins A and C in fruits, and the discussion of the effect of oxygen upon the reaction between ethylene and chlorine by Stewart and Smith.

The division of chemical education held one session, at which Vierling Kersey, California state superintendent of public instruction, addressed the group. A round-table discussion of chemistry problems in the secondary schools evoked a very spirited discussion, particularly on the question of teachers' credentials.

At a short business session, Professor O. F. Stafford, of the University of Oregon, was appointed chairman of the program committee and Professor J. H. Norton, of the Sacramento Junior College, chairman of the executive committee for the third Pacific intersectional meeting which is to be held next year at Eugene, Oregon.

ASTRONOMICAL SOCIETY OF THE PACIFIC

(Report by Maud W. Makemson)

In research announcements on Wednesday, astronomy was represented by D. H. Menzel, who cited the confirmation of the relativity deflection of light and displacement of spectra toward the red as an outstanding contribution, stressing also the agreement between de Sitter's modification of the relativity theory and observations of distant nebulae.

Nine papers were presented at the Thursday morning session, held at the Students' Observatory. R. G. Aitken gave results of statistics of 296 double stars, the components of which have shown distinct evidence of relative motion since he first observed them. Radial velocities of 742 stars taken with a one-prism spectrograph have been catalogued by Adams, Joy, Sanford and Strömberg at Mt. Wilson. They compare favorably with Lick measures. Spectroscopic observations of four extra-galactic nebulae were described by M. L. Humason, who with F. G. Pease deduced apparent radial velocities from 3,800 to 7,800 km sec. away from the sun. A paper by Hubble dealing with intensities in nebulae was also read by Humason. The desirability of deriving the solar motion from the proper motions of southern stars was stressed by R. H. Tucker, who paid tribute to the work of B. A. Gould on the Cordoba zones. From a study of magnitudes, spectral types and color indices of the Scutum Cloud, C. J. Krieger obtained values of 1,140 light years for the diameter, 1,500 to 3,000 for the depth and 5,000 light years for the separation of the cloud from the local system. R. J. Trumpler depicted the open star clusters as forming a lens-shaped system, comparable in size and distribution with the local system, and estimated the diameter of the latter at 12,000 light years. Results of an analysis of 870 stars, cited by J. S. Plaskett, can be explained by the rotation of the galaxy about a distant but condensed center. Discrepancies between observed and deduced temperatures of the subsolar points of the moon and Mercury were interpreted by E. Pettit and S. B. Nicholson.

The afternoon session opened with a discussion of the relationship of absolute magnitude, period and spectral type among Cepheid variables by Adams,

Joy and Humason. H. S. Mendenhall interpreted the observed variation in the system velocity of Beta Cephei in terms of the orbital motion of the bright component, having a period of twenty years. Evidence that Polaris and an invisible companion are revolving about a common center in a period of 29.6 years was presented by J. H. Moore. The extraordinary behavior of 160 bright lines in the spectrum of B. D. LL 4673, in which each chemical element appears to be a law unto itself, was discussed by Paul W. Merrill. Recent photographs of Jupiter, Saturn, Mars, Venus and Mercury, made at Lowell Observatory, and a description by E. C. Slipher, were presented by R. T. Crawford. D. H. Menzel discussed the temperatures of the nuclei of planetary nebulae determined by L. A. Berman from the spectral energy distribution. Investigation by A. Unsold of the thermal excitation of atoms in the sun shows that highly excited atoms are far more abundant than in thermal equilibrium. That the recent maximum in sun-spot activity passed in 1927 was of the broad type, lower and less pronounced than in 1917, was shown by Elizabeth Sternberg. N. T. Bobrovnikoff explained that the repulsive forces near the nucleus of Halley's comet are two to six times the gravitational force of the sun; those in the tail are twenty to one hundred times as great. Extension of the spectrum of the night sky into the orange and red regions has revealed a remarkable group of strong emission lines, according to V. M. Slipher. Conclusion of the research surveys of 1,091 minor planets by A. O. Leuschner and H. Thiele was announced. Comparisons by Maude W. Makemson and A. O. Leuschner of theory and observation for twelve Watson minor planets indicate the accuracy of the Berkeley calculations. R. H. Sciobereti explained a transformation of the fundamental equation for determining the geocentric distance in Leuschner's short method for the purpose of constructing a nomograph useful in all cases. Mrs. C. H. Smiley disproved the assertion of European astronomers that in the case of Minor Planet 1900 GA, the older orbit methods produced more accurate results than the short method. Possible identity of Comet 1929a and Minor Planet (525) Adelaide, as indicated by the work of Anne S. Young, was announced.

Thirty astronomers attended the dinner at the Claremont Country Club on Thursday evening.

The joint session with the American Physical Society, which was held on Friday morning, consisted of five invitation papers. These are mentioned in the report of the Physical Society on an earlier page.

SEISMOLOGICAL SOCIETY OF AMERICA

(Report by S. D. Townley, Secretary)

Two sessions of the Seismological Society were held on Thursday, June 20. N. H. Heck presented a résumé of answers of seismologists to the proposal to substitute the Mercalli-Cancani for the Rossi-Forel scale of earthquake intensities. Six were in favor, six against and seven doubtful. M. W. Allen's study of 1,250 California earthquakes revealed that lunar earth-tides probably influence the time of shock occurrence, and that the position of the fault plane is also a factor. L. S. Jacobson gave an account of research undertaken at Stanford University by placing models on a shaking table. A preliminary examination of the dynamic similitude problem was given. S. D. Townley reported on the new seismometer stations in the San Francisco Bay region. The Wood-Anderson seismometers recorded two hundred earthquakes at Stanford University in seventeen months, and 257 at Lick Observatory in fifteen months. Only a few of these were strong enough to be felt. T. J. Maher described operations of the Coast and Geodetic Survey in collecting earthquake data in California. Several hundred volunteer observers have been obtained.

Several papers dealt with the question of "preparedness." Lloyd Griffith spoke on the "Preparedness of the Oil Companies for a Major Disaster in the Los Angeles Basin" and showed moving pictures of two great oil fires. L. B. Cheminant described the independent high-pressure water system which has been installed for fire protection in San Francisco, and J. W. Ford described a self-contained generating station at San Jose by which the pumps of the water system can be operated in case of failure of the usual source of electric energy. S. B. Morris and C. E. Pearce described a gravity dam for the water system of Pasadena, California, designed to resist earthquakes.

R. R. Martel told of the effects of earthquakes on buildings with a flexible first story. C. R. Harding outlined the precautions that are being taken to provide earthquake-resisting features in the design of the twelve million dollar Southern Pacific bridge over Suisun Bay. Earthquake resistance of buildings from the standpoint of the building code was dealt with by H. D. Dewell, and from the underwriters' point of view by H. M. Engle.

(To be concluded)

OBITUARY

PAUL ADIN LEWIS

DR. PAUL A. LEWIS, associate member of The Rockefeller Institute for Medical Research, attached to its department of animal pathology near Princeton, N. J., died of yellow fever at Bahia, Brazil, on June 30, while engaged under the auspices of the