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

Rockefeller Foundation in the investigation of the virus of that disease.

Dr. Lewis volunteered for this service and sailed from New York on December 29, 1928, reaching Bahia on January 15. He devoted himself to the study of several important laboratory problems relating to yellow fever and the nature of its inciting microorganism, and although this study was interrupted by his sad and premature death, it is believed that the notes and records which he left will preserve his findings for the benefit of his coworkers and successors.

Dr. Lewis was born in Chicago, Illinois, on April 14, 1879, so that he was fifty years old at the time of his death. His father, Clinton H. Lewis, a physician of Milwaukee, Wisconsin, survives him, and a sister, Dr. Marian Lewis, who is also a practising physician in Milwaukee. He attended the University of Wisconsin and the College of Physicians and Surgeons in Milwaukee, finally completing his medical studies at the University of Pennsylvania, at which institution he took his medical degree in 1904.

Dr. Lewis married Miss Louise Durbin in 1906. Besides his widow, he leaves two children, Janet and Hobart Lewis.

While still an undergraduate at the University of Pennsylvania, Dr. Lewis decided upon a laboratory career, rather than a career in the practise of medicine. Hence he gave especial attention to bacteriology, in which he did advanced work under Dr. Alexander C. Abbott, and in pathology. After graduation he obtained the residency in pathology at the Boston City Hospital, thus coming under the tutelage of Dr. Frank B. Mallory. The next year he spent as assistant in the antitoxin laboratory of the Massachusetts State Department of Health under Dr. Theobald Smith. From 1906 to 1908 he held an Austin teaching fellowship in comparative pathology at the Harvard Medical School, and in 1908 he entered the Rockefeller Institute as assistant in pathology.

Dr. Lewis's connection with the Rockefeller Institute covers two periods: one extending from 1908 to 1910 at the laboratories in New York, and the other from 1923 until his death at the laboratories of the institute near Princeton. Between 1910 and 1923 he became director of laboratories of the Henry Phipps Institute and professor of experimental pathology at the University of Pennsylvania, Philadelphia.

The scientific work of Dr. Lewis, as exemplified in the numerous papers which he published, either alone or in association with coworkers, covers several important and distinct fields in pathology and bacteriology. Putting aside certain miscellaneous papers, which were the outcome of his services as pathologist to the Boston City Hospital, his interests in the research field of pathology may be divided into three periods: one in which he studied the phenomena of anaphylaxis, begun while assistant at the antitoxin laboratory, another in which he investigated with the writer the subject of epidemic poliomyelitis and the third in which he attacked the problems of chemotherapy and the influence of heredity in tuberculosis.

In these three fields Dr. Lewis made significant contributions. Together with Auer the demonstration was brought that acute anaphylactic death in the guinea-pig is caused by constriction of the muscular coats of the small bronchioles, and hence is of the nature of asphyxia. Together with Flexner the determination was made that experimental poliomyelitis in the monkey can be conveyed by inoculation from monkey to monkey through an indefinite series, and the inciting agent or microorganism of the disease belongs to the class of filter-passing viruses. This research which inducted, as it were, Dr. Lewis into the widening subject of the filter-passing viruses as incitants of disease in man and the lower animals, dominated his investigative interests during the Princeton connection with the Rockefeller Institute, and may be said to have been the motivating impulse which led him to volunteer for the yellow fever work in Brazil.

The Philadelphia period of Dr. Lewis's scientific activities was directly affected by his connection with the Henry Phipps Institute, although as Austin fellow he had already studied the relationship of bovine to human tubercle bacilli, and it is responsible for the important observations made by him in association with Sewall Wright on the hereditary factors in resistance to tuberculosis, as shown by experiments on pure-line strains of guinea-pigs.

The significant contributions to knowledge which have been selected from the many papers to which Dr. Lewis's name is attached suffice in themselves to bring out the quality and importance of the scientific work to which he devoted himself, but they do not exhaust the sum of observations which he made in related research fields of pathology and bacteriology.

Dr. Lewis was a member of the American Association of Pathologists and Bacteriologists, the Association of American Physicians, Sigma Xi, Alpha Omega Alpha and other scientific societies. He possessed a winning personality, and his untimely and tragic death while in the pursuit of knowledge of an insidious and destructive disease, has come as a great shock to his associates and many friends.

SIMON FLEXNER

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