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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

PRELIMINARY ANNOUNCEMENT OF THE FIFTH CHICAGO MEETING

By Dr. F. R. MOULTON

PERMANENT SECRETARY

FROM September 22 to September 27, inclusive, the association will join with The University of Chicago in celebrating the fiftieth anniversary of its founding. The university has organized a program of addresses by distinguished scientists and scholars and an extensive series of symposia in the fields of the natural sciences and the humanities under the general title "New Frontiers in Education and Research." Outlines of the programs of these addresses and symposia were published in the July 4 issue of SCIENCE, pages 20-22.

This is the fifth meeting of the association in Chicago. The earlier meetings were held in 1868, 1908,

1920 and 1933, the latest in connection with the Century of Progress Exposition organized in celebration of a century of progress through science. The theme of the exposition was proposed by Dr. Michael I. Pupin, president of the association in 1925.

Persons attending the meeting in Chicago may arrange for convenient living accommodations in the Residence Halls of the university by writing the Director of the Fiftieth Anniversary Celebration for reservations. It is suggested that those desiring rooms on the university campus write promptly (not later than August 25) for reservations because the number that will be available is limited. Each applicant

should state precisely the period for which accommodations are desired. The rates are \$2.00 per day for room and breakfast or \$3.00 per day for room and all meals. There are several residence hotels within easy reach of the university, the principal ones being the Chicago Beach, the Del Prado, the Shoreland, the Windermere, the Aragon, the Broadview, the Fairfax, the Flamingo, the Hyde Park, the Plaisance and the Sherry, which can accommodate limited numbers of guests at minimum rates of \$2.50 to \$3.50 for single room and bath and of \$3.00 to \$5.00 for double room and bath. Reservations should be made directly with the hotels.

It is important, too, that all persons expecting to attend the celebration should inform the university not later than August 25 for which of the symposia they desire to register.

Since the university is about seven miles from the railroad passenger terminals near the center of the city, those arriving over eastern, southern and southwestern railroads should leave their trains at suburban stations on Sixty-third Street. The university may be conveniently reached from downtown Chicago by Illinois Central suburban trains, the downtown stations of which are east of Michigan Avenue in the direction of Lake Michigan.

HEADQUARTERS AND MAIL

Headquarters for the meeting will be in Ida Noyes Hall on the university campus. Persons attending the meeting should register (without charge) so that there will be a record of their local addresses for convenience in distributing mail and for use in getting into contact with them. Programs of the meeting will be distributed at the headquarters.

GENERAL SESSIONS

At each of its meetings, the association holds several general sessions at which distinguished scientists discuss subjects of wide interest. A number of such sessions have been arranged for, all except one by the university. Since they have already been announced in the July 4 issue of *SCIENCE*, page 22, a brief résumé of them will be sufficient. They begin on Monday afternoon, September 22, and continue through Friday, September 26.

The subjects of the general addresses are: (Monday) The Social Implications of Vitamins, by Dr. Robert R. Williams; (Tuesday) The Physiology of the Amino Acids, by Dr. Donald D. Van Slyke; (Wednesday) Spinors and Projective Geometry, by Dr. Oswald Veblen; Some Unsolved Problems of Theoretical Dynamics, by Dr. George D. Birkhoff; Textile Research in the Interest of the Consumer, by Dr. Ruth O'Brien; (Thursday) Tuberculosis as the

Chemist Sees It, by Dr. Florence B. Seibert; Glaciation and Submarine Valleys, by Dr. Reginald A. Daly; Advancing Frontiers in Nursing Education, by Dr. Isabel M. Stewart; The Historical Interpretation of Art and Literature, by Halvdan Koht; (Friday) Nuclear Transformations, by Dr. Ernest O. Lawrence; The Cosmical Abundance of the Elements, by Dr. Henry Norris Russell; The Significance of Choline as a Dietary Factor, by Dr. Charles H. Best; and Virus Infection of the Mammalian Foetus, by Dr. Ernest W. Goodpasture.

SYMPOSIA PROGRAMS

For the convenience of members of the association, the symposia programs will be listed on the basis of their subjects in the order, so far as is possible, of the sections of the association.

SECTION ON MATHEMATICS (A)

Under the joint auspices of the section, the American Mathematical Society and the Mathematical Association of America, the annual Josiah Willard Gibbs Lecture will be delivered on September 3, by Sewall Wright, The University of Chicago, on "Statistical Genetics and Evolution." For further information about the programs of the societies, which meet in Chicago on September 2 to 6, see the July 11 issue of *SCIENCE*, page 36.

The section and the two affiliated mathematical societies sponsor the general session on Wednesday, September 24, at which Drs. Oswald Veblen and George D. Birkhoff will deliver addresses, the former on "Spinors and Projective Geometry" and the latter on "Some Unsolved Problems of Theoretical Dynamics."

SECTIONS ON PHYSICS (B) AND ASTRONOMY (D)

Cosmic Rays. Friday, September 26.

Contributors: Robert A. Millikan, California Institute of Technology; William P. Jesse, Marcel Schein and Ernest O. Wollan, The University of Chicago; Bruno Rossi, Cornell University; S. Chandrasekhar, The University of Chicago.

SECTION ON CHEMISTRY (C)

Organic Chemistry. Monday-Tuesday, September 22-23.

Contributors: William A. Noyes, Jr., University of Rochester; James Franck, The University of Chicago; Louis P. Hammett, Columbia University; Frank H. Westheimer, The University of Chicago; Linus C. Pauling, California Institute of Technology; George W. Wheland, The University of Chicago; Lawrence O. Brockway, University of Michigan; Simon H. Bauer, Cornell University; Francis O. Rice, Catho-

lie University of America; Morris S. Kharasch, The University of Chicago.

Surface Chemistry. Tuesday–Wednesday, September 23–24. In honor of Dr. William D. Harkins on the twenty-fifth anniversary of the publication of his first paper in the field.

Contributors: Fritz London, Duke University; William D. Harkins, The University of Chicago; John G. Kirkwood, Cornell University; Henry Eyring, Princeton University; Eugene Guth, University of Notre Dame; Henry B. Bull, Northwestern University Medical School; George H. A. Clowes, Eli Lilly and Company; Eli F. Burton, University of Toronto; Irving Langmuir and Vincent J. Schaefer, General Electric Company; George E. Boyd, The University of Chicago; Ernst A. Hauser, Massachusetts Institute of Technology; Adrian J. Grossman.

SECTION ON GEOLOGY AND GEOGRAPHY (E)

Frontiers of Knowledge in the Geologic Sciences. Thursday–Friday, September 25–26.

Leaders of discussions: Ralph E. Grim, Gilbert H. Cady, Illinois Geological Survey; Richard F. Flint, Yale University; A. I. Levorsen, Research Committee of the American Association of Petroleum Geologists.

SECTIONS ON THE ZOOLOGICAL SCIENCES (F) AND THE BOTANICAL SCIENCES (G)

The Respiratory Enzymes and the Biological Actions of the Vitamins. Thursday–Saturday, September 11–13, at Madison, Wisconsin, Monday–Wednesday, September 15–17, at Chicago, under the joint sponsorship of The University of Chicago and the University of Wisconsin. For information and reservations address Dr. T. R. Hogness, The University of Chicago.

The Training of Biologists. Thursday–Saturday, September 18–20. For information and reservations address Dr. Paul A. Weiss, The University of Chicago.

Growth and Differentiation in Plants. Ezra J. Kraus, The University of Chicago, *chairman*. Monday morning, September 22.

Contributors: Charles E. Allen, University of Wisconsin; John M. Beal, The University of Chicago; Edmund W. Sinnott, Yale University; John W. Mitchell, U. S. Department of Agriculture.

SECTIONS ON THE BIOLOGICAL SCIENCES (F, G) AND ON THE SOCIAL AND ECONOMIC SCIENCES (K)

Levels of Integration in Biological and Social Systems. Tuesday–Wednesday, September 23–24.

I. Organismic Aspects. Warder C. Allee, The University of Chicago, *chairman*.

Contributors: Libbie H. Hyman, American Museum of Natural History; James W. Buchanan, Northwestern University; Ralph W. Gerard, The University of Chicago.

II. Group of Population Aspects. William H. Taliaferro, The University of Chicago, *chairman*.

Contributors: William Burrows, The University of Chicago; Herbert S. Jennings, Johns Hopkins University and University of California at Los Angeles; Thomas Park and Warder C. Allee, The University of Chicago.

III. The Comparative Study of Societies. Robert Redfield, The University of Chicago, *chairman*.

Contributors: Alfred E. Emerson, The University of Chicago; Clarence R. Carpenter, Pennsylvania State College; Alfred L. Kroeber, University of California; Robert E. Park, The University of Chicago.

SECTIONS ON THE BIOLOGICAL SCIENCES (F, G) AND ON THE MEDICAL SCIENCES (N)

Problems in Aerobiology. Monday–Tuesday, September 22–23. This symposium, organized by Sections F, G and N, consists of two parts, the first dealing with exterior wind-borne biological units and the second with interior wind-borne biological units. The details of the program will be announced in a later issue of SCIENCE.

SECTIONS ON PSYCHOLOGY (I) AND ON THE MEDICAL SCIENCES (N)

Visual Mechanisms. Karl S. Lashley, Harvard University, and Selig Hecht, Columbia University, *chairmen*. Wednesday, September 24.

Contributors: Selig Hecht, Columbia University; Arlington C. Krause, The University of Chicago; Ernst Gellhorn, University of Illinois; Heinrich Klüver, The University of Chicago; Theodore J. Case, The University of Chicago; Samuel H. Bartley, Washington University; Stephen Polyak, The University of Chicago; Karl S. Lashley, Harvard University.

SECTION ON SOCIAL AND ECONOMIC SCIENCES (K)

The Public Social Services: Fifty Years of Progress. Edith Abbott, The University of Chicago, *chairman*. Monday morning, September 22.

Contributors: Helen R. Wright, The University of Chicago; Martha Eliot, U. S. Children's Bureau; Carter Goodrich, Columbia University.

The Changing Bases of National Economy. Paul H. Douglas, The University of Chicago, *chairman*. Tuesday morning, September 23.

Contributors: John M. Clark, Columbia University; Frank H. Knight and Theodore O. Yntema, The University of Chicago.

Management's Adjustment to the Changing National Economy. William N. Mitchell, The University of Chicago, *chairman*. Tuesday afternoon, September 23.

Contributors: Willard L. Thorp, Dun and Bradstreet, Inc.; Lewis C. Sorrell, Raleigh W. Stone and James W. Young, The University of Chicago.

Measurement and Experiment. William F. Ogburn, The University of Chicago, *chairman*. Wednesday afternoon, September 24.

Contributors: Samuel S. Wilks, Princeton University; Louis L. Thurstone, The University of Chicago.

Civilizations in Transition. Louis Gottschalk, The University of Chicago, *chairman*. Wednesday afternoon, September 24.

Contributors: Michael I. Rostovtzeff, Yale University; His Excellency Hu Shih, Ambassador of China to the United States; Robert H. Lowie, University of California.

The Place of Law in Society. Charles E. Merriam, The University of Chicago, *chairman*. Thursday afternoon, September 25.

Contributors: Robert H. Lowie, University of California; Charles H. McIlwain, Harvard University; Hans Kelsen, University of Vienna and Harvard University.

The Place of Ethics in Social Science. John Ulric Nef, The University of Chicago, *chairman*. Friday morning, September 26.

Contributors: Robert Maynard Hutchins, The University of Chicago; Richard H. Tawney (tentative), University of London; Charles H. McIlwain, Harvard University; Jacques Maritain, Catholic Institute of Paris and Columbia University.

Administrative Agencies—Recommendations of the Attorney-General's Committee. Wilber G. Katz, The University of Chicago, *chairman*. Saturday evening, September 27.

Contributors: John Foster Dulles, the New York Bar; Walter Gellhorn, Columbia University; John Dickinson, University of Pennsylvania.

SECTION ON HISTORICAL AND PHILOLOGICAL SCIENCES (L)

Approaches to Linguistics. Clarence E. Parmenter, The University of Chicago, *chairman*. Monday morning, September 22.

Contributors: Edgar H. Sturtevant, Yale University; Amado Alonso, University of Buenos Aires; Clarence H. Faust and Charles W. Morris, The University of Chicago; Vincent J. Flynn, College of St. Thomas; William C. Korfmacher, St. Louis University.

The Editing of a Text. William A. Nitze, The University of Chicago, *chairman*. Monday afternoon, September 22.

Contributors: Edward C. Armstrong, Princeton University; Charles H. Beeson and James R. Hulbert, The University of Chicago; Gustave O. Arlt, University of California at Los Angeles; Rae Blanchard, Goucher College; William Roach, University of Pennsylvania.

Interpretation and Criticism of Art and Literature. Ronald S. Crane and Ulrich A. Middeldorf, The University of Chicago, *chairmen*. Tuesday, September 23.

Contributors: Henri Frankfort, The University of Chicago; Charles R. Morey, Princeton University; Lily Bess Campbell, University of California at Los Angeles; G. Haydn Huntley, Robert Vigneron and Norman F. Maclean, The University of Chicago; Van Meter Ames, University of Cincinnati; Bernard Weinberg, Washington University; Elder Olson, Illinois Institute of Technology.

Philosophic Procedures in the Arts and Sciences. Richard P. McKeon, The University of Chicago, *chairman*. Wednesday, September 24.

Contributors: Robert L. Calhoun, Yale University; Friedrich Kessler and Frank H. Knight, The University of Chicago; Clarence I. Lewis, Harvard University; Charles Hartshorne, The University of Chicago; George V. Gentry, University of Texas.

Problems in Historical Materials. Wilbur K. Jordan, The University of Chicago, *chairman*. Thursday morning, September 25.

Contributors: William L. Westermann, Columbia University; Richard P. McKeon and Bernadotte E. Schmitt, The University of Chicago; Ray W. Frantz, University of Nebraska; Alfred P. Dorjahn, Northwestern University; Loren C. MacKinney, University of North Carolina; Stuart R. Tompkins, University of Oklahoma.

Archeology as a Tool in Humanistic and Social Studies. Albert Ten Eyck Olmstead, The University of Chicago, and William L. Westermann, Columbia University, *chairmen*. Friday morning, September 26.

Contributors: Robert L. Engberg, American School for Oriental Research at Jerusalem; Michael I. Rostovtzeff, Yale University; Neilson C. Debevoise, The University of Chicago; Harold R. Willoughby, The University of Chicago; Richard A. Parker, The University of Chicago.

SECTION ON THE MEDICAL SCIENCES (N)

The Theobald Smith Award in Medical Sciences. Monday afternoon, September 22. Each year at its annual meeting the association determines the recipient of its Theobald Smith Award for the ensuing year. The award consists of a bronze medal and one thousand dollars in cash, provided by the Eli Lilly Company of Indianapolis, Indiana. The recipient

presents a paper and receives the award at the summer meeting of the association following the annual meeting at which it was voted. The recipient of the award for 1941 is Herald R. Cox.

"Cultivation of Rickettsiae of the Rocky Mountain Spotted Fever, Typhus, and Q Fever Groups in the Embryonic Tissues of Developing Chicks," Herald R. Cox, Rocky Mountain Laboratory, Hamilton, Montana.

Life at High Altitudes and Aviation Medicine. Anton J. Carlson, The University of Chicago, *chairman*. Tuesday morning, September 23.

Contributors: Carlos Monge, University of San Marcos, Peru; David Bruce Dill, U. S. Army; E. S. Guzmán Barrón, The University of Chicago.

Thoracic Diseases. Dallas B. Phemister, The University of Chicago, *chairman*. Thursday morning, September 25.

Contributors: Clayton G. Loosli and William E. Adams, The University of Chicago; Evarts A. Graham, Washington University; John Alexander, University of Michigan; Oswald H. Robertson and Robert G. Bloch, The University of Chicago.

Sex Hormones. Frank R. Lillie, The University of Chicago, *chairman*. Friday morning, September 26.

Contributors: Carl R. Moore and Allan T. Kenyon,

The University of Chicago; Edward A. Doisy, St. Louis University; John S. L. Browne, McGill University; Fred C. Koch, The University of Chicago.

Immunological Mechanisms. George F. Dick, The University of Chicago, *chairman*. Friday morning, September 26.

Contributors: William Bloom, The University of Chicago; Linus C. Pauling, California Institute of Technology; Thomas M. Rivers, The Rockefeller Institute for Medical Research.

THE SECTION ON EDUCATION (Q)

Environment and Education. Robert J. Havighurst, The University of Chicago, *chairman*. Monday morning, September 22.

Contributors: Ernest W. Burgess, The University of Chicago; Franz Alexander, Institute for Psychoanalysis, Chicago; W. Lloyd Warner, The University of Chicago; Margaret Mead, American Museum of Natural History.

The Conceptual Structure of Educational Research. Guy Thomas Buswell, The University of Chicago, *chairman*. Tuesday afternoon, September 23.

Contributors: Thomas R. McConnell, University of Minnesota; Douglas E. Seates, Duke University; Frank N. Freeman, University of California.

COLLOIDS IN ASTRONOMY AND METEOROLOGY

By JEROME ALEXANDER

NEW YORK, N. Y.

THE slight, irregular motion of tiny particles approximating the limits of microscopic resolvability was named in honor of Robert Brown, a Scotch botanist, who first drew attention to this phenomenon in 1827. Since non-living particles exhibit Brownian motion, there were many speculations as to its cause. It was often called "pedesis," because the particles seemed to "walk" about, and as early as 1896 Sir William Ramsay connected it up with the kinetic theory by expressing the view that there was a gradual transition between particles in gases or in solution, and particles in suspensions. The discovery of the ultramicroscope in 1903 by Richard Zsigmondy brought visual proof of the correctness of this view, for it brought into *visibility* particles as small as 5 m μ (five millionths of a millimeter). Since such submicroscopic particles are smaller than the wave-lengths of visible light, they can not be resolved, although they may be seen as "points" of varying degrees of luminosity and of Brownian activity. Calculations by Perrin, Einstein, Smoluchowski and others proved that the nature of the motion seen was what the kinetic theory de-

manded for particles of this size. Similarly, in the astronomical field, the discs of the sun and the moon may be resolved visually, and even small telescopes will resolve the larger planets; but not even the most powerful telescopes can resolve any of the fixed stars.

While no natural arbitrary limits exist for particles in what we now term the colloidal state of dispersion, these limits are, roughly, between 100 and 5m μ ; that is, they begin just about the zone of microscopic resolvability and run down to dimensions commonly attributed to large molecules. It must be emphasized that particle size, that is, degree of subdivision or dispersion, is the criterion for colloidity, and that consequently, any substance, irrespective of its chemical constitution, may exist in the colloidal state. It is even possible to have colloidal crystals, and Scherrer demonstrated by x-ray analysis that colloidal gold particles at the lower ranges of the colloidal dimensions are crystalline.

As particles become smaller and smaller, the Brownian motion, just noticeable at the lower microscopic limits, increases very greatly in speed and