interesting, and tell the least about temperature measurement. The temptation to write at length about the results rather than the methods of some very ingenious thermometry was too much for the physiologists and some of the engineers, but they do lend a variety that the old Pyrometry Volume lacked. The amount of information released by the metallurgical industries is disappointing, for reasons easily understandable in a year when commercial and national rivalries were rapidly becoming intensified. The section on thermometric metals and alloys, however, is timely and informative. In the engineering group the contributions from the petroleum industry are the best. The wide range of the subjects may be indicated by citing papers on the thermometry of lamp filaments, volcanoes and liquid helium.

A particularly valuable part of the book is the section of 32 pages devoted to tables, containing the most authoritative data now available to the thermometrist and including some that have not previously been published in current technical literature. This section of the book, bound in covers, is separately purchasable for $1.00.

Although the National Research Council made a grant of funds and twelve of the leading technical societies took an active part, both officially and through individual members, in organizing the symposium, the most effective help came from the thermometrists of the National Bureau of Standards, as is fitting for a volume intended to be an expanded sequel to Dr. Burgess's classic text and his earlier symposium.

The reviewer considers this volume indispensable for any technical or scientific library worthy of the name.

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THE UNIVERSITY OF CHICAGO'S FIFTIETH ANNIVERSARY SYMPOSIA

A CORDIAL invitation is extended to scholars and scientists to attend a series of symposia and lectures in connection with the celebration of the fiftieth anniversary of the University of Chicago.

Nearly all the symposia and lectures will be held during the five days, September 22–26, inclusive. The American Association for the Advancement of Science will meet at the University of Chicago during this period, and the program in the sciences will be under the joint auspices of the university and the association. It should be noted, however, that the symposia on Astronomical Spectra (Yerkes Observatory, Williams Bay, Wisconsin, September 10–13), Respiratory Enzymes and the Biological Action of the Vitamins (September 15–17) and the Training of Biologists (September 18–20) will be held in advance of the meetings of the association.

More than one hundred visiting scientists and scholars, in addition to approximately fifty members of the university's faculties, will participate in the program, the general theme of which will be "New Frontiers in Education and Research."

In view of the limited capacity of the university's lecture halls, it is important that every one who desires to attend the symposia and lectures communicate as soon as possible with the Director of the Fiftieth Anniversary Celebration, the University of Chicago, and indicate the particular sessions in which he is interested. A copy of the announcement containing detailed information of the program and of housing accommodations for visitors will be sent on request.

The program of the symposia, in condensed form, is as follows:

September 13–15. Astronomical Spectra. At Yerkes Observatory. Participants: R. Wildt, R. C. Williams, W. W. Morgan, J. P. Kuiper, P. W. Merrill, T. Dunham, Jr., H. N. Russell, D. H. Menzel, M. Schwarzchild, P. Swings, A. B. Wyse, Otto Struve.

September 15–17. Respiratory Enzymes and the Biological Action of the Vitamins. Organized jointly by the University of Wisconsin and the University of Chicago, with sessions at Madison September 11–13. The program at Chicago will be devoted largely to the vitamins, and is supported by a grant from Abbott Laboratories. For the program of this symposium, address T. R. Hogness, University of Chicago.

September 18–20. The Training of Biologists. Under the chairmanship of P. A. Weiss. Fifteen members of the faculty of the University of Chicago and ten scientists from other institutions will participate in round-table discussions.

September 22. Growth and Differentiation in Plants. Charles E. Allen, University of Wisconsin; Edmund W. Sinnott, Yale University; John W. Mitchell, U. S. Department of Agriculture; John M. Beal, University of Chicago. Ezra J. Kraus, *chairman.*

Approaches to Linguistics. Edgar H. Sturtevant, Yale University; Amado Alonso, University of Buenos Aires; Clarence H. Faust and Charles W. Morris, University of Chicago. Clarence E. Parmenter, *chairman.*

The Editing of a Text. Edwin C. Armstrong, Princeton University; Gustave O. Arlt, University of California at Los Angeles; Rae Blanchard, Goucher College; William Roach, University of Pennsylvania; and Charles H. Beeson and James R. Hulbert, University of Chicago. William A. Nitze, *chairman.*

Organic Chemistry. William A. Noyes, Jr., University of Rochester; Louis P. Hammett, Columbia University;

Linus C. Pauling, California Institute of Technology; James Franck, Frank H. Westheimer and George W. Wheland, University of Chicago.

Environment and Education. Ernest Alexander, Institute of Psychoanalysis; Margaret Mead, American Museum of Natural History; Ernest W. Burgess and W. Lloyd Warner, University of Chicago. Robert J. Havighurst, *chairman.*

The Public Social Services: Fifty Years of Progress. Martha Eliot, Children's Bureau, U. S. Department of Labor; Florence Allen, judge of the U. S. Circuit Court of Appeals, Cincinnati, Ohio; Carter Goodrich, Columbia University; and Helen R. Wright, University of Chicago. Edith Abbott, *chairman.*

September 23. Life at High Altitudes and Aviation Medicine. Carlos Monge, University of San Marcos (Lima, Peru); David B. Dill, U. S. Army Air Corps; E. S. Guzman Barron, University of Chicago. Anton J. Carlson, *chairman.*

Levels of Integration in Biological and Social Systems. Libbie H. Hyman, American Museum of Natural History; James W. Buchanan, Northwestern University; Herbert S. Jennings, the Johns Hopkins University and the University of California at Los Angeles; Ralph W. Gerard, William Burrows, Thomas Park and Warder C. Allee, University of Chicago. William H. Taliaferro, *chairman.*

Interpretation and Criticism of Art and Literature. Charles R. Morey, Princeton University; Lily Bess Campbell, University of California at Los Angeles; Van Meter Ames, University of Cincinnati; Bernard Weinberg, Washington University; Elder Olson, Illinois Institute of Technology; Henri Frankfort, G. Haydn Huntley, Robert Vigneron and Norman F. MacLean, University of Chicago. Ronald S. Crane and Ulrich A. Middledorf, *chairmen.*

Organic Chemistry. Lawrence O. Brockway, University of Michigan; Francis O. Rice, Catholic University of America; Morris S. Kharasch, University of Chicago.

Surface Chemistry. Fritz London, Duke University; John G. Kirkwood, Cornell University; Henry Eyring, Princeton University; William D. Harkins, University of Chicago.

The Changing Bases of National Economy. John M. Clark, Columbia University; Frank H. Knight and Theodore O. Yntema, University of Chicago. Paul H. Douglas, *chairman.*

Management's Adjustment to the Changing National Economy. Willard L. Thorp, Dun and Bradstreet; Lewis C. Sorrell, Raleigh W. Stone and James W. Young, University of Chicago. William N. Mitchell, *chairman.*

The Conceptual Structure of Educational Research. Thomas R. McConnell, University of Minnesota; Douglas E. Scates, Duke University; Frank N. Freeman, University of California. Guy T. Buswell, *chairman.*

September 24. Visual Mechanisms. Selig Hecht, Columbia University; Ernst Gellhorn, University of Illinois; Samuel H. Bartley, Washington University; Karl S. Lashley, Harvard University; Arlington C. Krause, Heinrich Kluver, Theodore J. Case and Stephen Polyak, University of Chicago.

Levels of Integration in Biological and Social Systems. Clarence R. Carpenter, Pennsylvania State College and the School of Tropical Medicine (Puerto Rico); Alfred L. Kroeber, University of California; Alfred E. Emerson and Robert E. Park, University of Chicago. Robert Redfield, *chairman.*

Philosophic Procedures in the Arts and Sciences. Robebtr L. Calhoun, Yale University; Clarence I. Lewis, Harvard University; George Gentry, University of Texas; Friedrich Kessler, Frank H. Knight, and Charles Hartshorne, University of Chicago. Richard P. McKeen, *chairman.*

Surface Chemistry. Eugene Guth, University of Notre Dame; Henry B. Hull, Northwestern University; George H. A. Clowes, Eli Lilly and Company; Eli F. Burton, University of Toronto; Irving Langmuir and Vincent J. Schaefer, General Electric Laboratories; Ernst A. Hauser and A. J. Grossman, Massachusetts Institute of Technology; George E. Boyd, University of Chicago.

Measurement and Experiment. Samuel S. Wilks, Princeton University; Louis L. Thurstone, University of Chicago. William F. Ogburn, *chairman.*

Civilizations in Transition. Michael I. Rostovtzeff, Yale University; Hu Shih, ambassador of China to the United States; Robert H. Lowie, University of California. Louis Gottschalk, *chairman.*

September 25. Thoracic Diseases. Evarts A. Graham, Washington University; John Alexander, University of Michigan; Clayton G. Loosli, William E. Adams, Robert G. Bloch and Oswald H. Robertson, University of Chicago. Dallas B. Phemister, *chairman.*

Problems in Historical Materials. William L. Westermann, Columbia University; Alfred P. Dorjahn, Northwestern University; Ray Frantz, University of Nebraska; Leon C. MacKinney, University of North Carolina; S. R. Tompkins, University of Oklahoma; Richard P. McKeon and Bernadotte E. Schmitt, University of Chicago. Wilbur K. Jordan, *chairman.*

Frontiers of Knowledge in the Geologic Sciences. Ralph E. Grim and Gilbert H. Cady, Illinois Geological Survey; Reginald A. Daly, Harvard University.

The Place of Law in Society. Charles H. McIlwain, Harvard University; Hans Kelsen, formerly Geneva (Switzerland) Graduate Institute of International Studies and Prague (Czecho-Slovakia) German University; Robert H. Lowie, University of California. Charles E. Merriam, *chairman.*

September 26. Sex Hormones. Edward A. Doisy, St. Louis University; John S. L. Browne, McGill University; Carl R. Moore, Allan T. Kenyon and Fred C. Koch, University of Chicago. Frank R. Lillie, *chairman.*

Immunological Mechanisms. Linus Pauling, California Institute of Technology; Thomas M. Rivers, hospital of the Rockefeller Institute; William Bloom, Paul R. Cannon, and William H. Taliaferro, University of Chicago. George F. Dick, *chairman.*

Archeology as a Tool in Humanistic and Social Studies. Robert L. Engberg, American School for Oriental Research at Jerusalem; Michael I. Rostovtzeff, Yale University; William L. Westermann, Columbia University; Harold R. Willoughby, Neilson C. Debevoise, and Richard A. Parker, University of Chicago. Albert T. Olmstead, *chairman.*

Administrative Agencies: Recommendations of the Attorney-General's Committee. John F. Dulles, of the New York Bar; Walter Gellhorn, Columbia University; John Dickinson, University of Pennsylvania. Wilbert G. Katz, *chairman.*

Frontiers of Knowledge in the Geologic Sciences. Richard F. Flint, Yale University; A. I. Levorsen, American Association of Petroleum Geologists.

Cosmic Rays. Robert A. Millikan, California Institute of Technology; Bruno Rossi, Cornell University; William P. Jesse, Marcel Schein, Subrahmanyan Chandrasekhar and Ernest O. Wollan, University of Chicago.

The Place of Ethics in Social Science. Richard H. Tawney, University of London (tentative); Charles H. McIlwain, Harvard University; Jacques Maritain, Catholic Institute of Paris, Columbia University; Robert M. Hutchins, University of Chicago. John U. Nef, *chairman.*

In addition to the symposia, there will be the following lectures:

September 22. The Social Implications of Vitamins. Robert R. Williams, Bell Telephone Laboratories.

September 23. The Physiology of the Amino Acids. Donald D. Van Slyke, Rockefeller Institute for Medical Research.

September 24. Spinors and Projective Geometry. Oswald Veblen, Institute for Advanced Study. *Some Unsolved Problems of Theoretical Dynamics.* George D. Birkhoff, Harvard University. *Textile Research in the Interest of the Consumer.* Ruth O'Brien, U. S. Bureau of Home Economics.

September 25. The Historical Interpretation of Art and Literature. Halvan Koht, former Secretary of State of Norway. *Tuberculosis as the Chemist Sees It.* Florence B. Seibert. The Henry Phipps Institute. *Glaciation and Submarine Valleys.* Reginald A. Daly, Harvard University. *Advancing Frontiers of Nursing Education.* Isabel M. Stewart, Columbia University.

September 26. The Significance of Choline as a Dietary Factor. Charles H. Best, University of Toronto. *Virus Infection of the Mammalian Foetus.* Ernest W. Goodpasture, Vanderbilt University. *Nuclear Transformations.* Ernest O. Lawrence, University of California. *The Cosmical Abundance of the Elements,* Henry N. Russell, Princeton University.

The program of symposia and lectures will be followed immediately by an Academic Festival, September 27–29, the principal events of which will include an Alumni Assembly, a Service of Thanksgiving and Commemoration, a Reception of Delegates, a Festival Concert and a Convocation, at which honorary degrees will be conferred.

SPECIAL ARTICLES

THE AGGLUTINATION OF RED CELLS BY ALLANTOIC FLUID OF CHICK EMBRYOS INFECTED WITH INFLUENZA VIRUS

WHEN the allantoic fluid from chick embryos previously infected with strains of influenza A virus was being removed, it was noted that the red cells of the infected chick, coming from ruptured vessels, agglutinated in the allantoic fluid. Since red cells in the allantoic fluid of chick embryos inoculated with sterile materials did not agglutinate at all, it seemed that this agglutination phenomenon might be the result of infection with influenza virus in the chick.

To demonstrate the agglutination phenomenon in the infected chick embryos, the egg shell was opened over the air sac. The outer chorio-allantoic membrane was torn away, and several large blood vessels were purposely ruptured. Fifteen to 30 seconds were allowed for the embryo to bleed into the allantoic fluid before the contents of the allantoic sac were emptied into a petri dish. If the embryo had been infected with influenza virus, macroscopic agglutination of the red cells occurred within 15 to 30 seconds in the petri dish. If the agglutination did not appear promptly, it usually did not occur at all, and the differentiation between positive and negative eggs was easy. Virus titrations and serum neutralization tests were then set up in eggs, with this agglutination phenomenon as an index of infection. Egg-passage viruses and ferret sera were used in these tests. One tenth cc of the material was inoculated into the allantoic sac of 11-day old embryos which were then allowed to incubate for 2 days. The eggs were opened by the method described above, and positive and negative reactions were recorded. By using eggs in the same way that mice are used in serum titrations and virus titrations, it was found that serum neutralization tests and virus neutralization tests could be performed. The end points were as sharp as those obtained in the mouse test. The agglutination reaction worked equally well with strains of influenza A or B virus and with swine influenza virus. Cross neutralization tests were then set up with these viruses, which gave results consistent with the specificity of these strains as established in mice. A neutralization test with acute and convalescent serum from a case of influenza A demonstrated a rise in antibody titer in the convalescent serum which was consistent with the rise obtained in similar tests in mice.

Throat washings have been passed in eggs, and while this phase of the work is in a preliminary stage, we have so far isolated two strains of influenza A virus directly from throat washings and obtained the agglutination phenomenon in the chick embryo on the second passage. The virus from these throat washings was set up in a neutralization test with A and B antiserum in