

# SCIENCE

A WEEKLY JOURNAL DEVOTED TO THE ADVANCEMENT OF SCIENCE, PUBLISHING THE  
OFFICIAL NOTICES AND PROCEEDINGS OF THE AMERICAN ASSOCIATION  
FOR THE ADVANCEMENT OF SCIENCE.

FRIDAY, JULY 8, 1904.

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MSS. intended for publication and books, etc., intended for review should be sent to the Editor of SCIENCE, Garrison-on-Hudson, N. Y.

## THE INTERNATIONAL CONGRESS OF ARTS AND SCIENCE.

THE program has now been issued of the congress to be held as part of the Louisiana Purchase Exposition from September 19 to 25 of the present year. The purpose and plan of the congress are thus described:

The idea of the congress grows out of the thought that the subdivision and multiplication of specialties in science has reached a stage at which investigators and scholars may derive both inspiration and profit from a general survey of the various fields of learning, planned with a view of bringing the scattered sciences into closer mutual relations. The central purpose is the unification of knowledge, an effort toward which seems appropriate on an occasion when the nations bring together an exhibit of their arts and industries. An assemblage is, therefore, to be convened at which leading representatives of theoretical and applied sciences shall set forth those general principles and fundamental conceptions which connect groups of sciences, review the historical development of special sciences, show their mutual relations and discuss their present problems.

The speakers to treat the various themes are selected in advance from the European and American continents. The discussions will be arranged on the following general plan:

After the opening of the congress on Monday afternoon, September 19, will follow, on Tuesday forenoon, addresses on main divisions of science and its applications, the general theme being the unification of each of the fields treated. These

will be followed by two addresses on each of the twenty-four great departments of knowledge. The theme of one address in each case will be the fundamental conceptions and methods, while the other will set forth the progress during the last century. The preceding addresses will be delivered by Americans, making the work of the first two days the contribution of American scholars.

On the third day, with the opening of the sections, the international work will begin. About 128 sectional meetings will be held on the four remaining days of the congress, at each of which two papers will be read, the theme of one being suggested by the relations of the special branch treated to other branches; the other, by its present problems. Three hours will be devoted to each sectional meeting, thus enabling each hearer to attend eight such meetings, if he so desires. The program is so arranged that related subjects will be treated, as far as possible, at different times. The length of the principal addresses being limited to forty-five minutes each, there will remain at least one hour for five or six brief communications in each section. The addresses in each department will be collected and published in a special volume.

It is hoped that the living influence of this meeting will be yet more important than the formal addresses, and that the scholars whose names are announced in the following program of speakers and chairmen will form only a nucleus for the gathering of thousands who feel in sympathy with the efforts to bring unity into the world of knowledge.

The organization of the congress consists of:

*Director of Congresses.*—Howard J. Rogers.

*Administrative Board.*—Nicholas Murray Butler, president of Columbia University, chairman; William R. Harper, president of the University of Chicago; R. H. Jesse, president of the University of Missouri; Henry S. Pritchett, president

of the Massachusetts Institute of Technology; Herbert Putnam, librarian of Congress; Frederick J. V. Skiff, director of the Field Columbian Museum.

*Officers of the Congress.*—President: Simon Newcomb, retired professor U. S. N. Vice-Presidents: Hugo Münsterberg, professor of psychology in Harvard University; Albion W. Small, professor of sociology in the University of Chicago.

The speakers and chairmen in the subjects more especially covered by this journal are:

#### DIVISION A—NORMATIVE SCIENCE.

Speaker: Professor Josiah Royce, Harvard University.

##### *Department 1—Philosophy.*

Chairman: Professor Borden P. Bowne, Boston University. Speakers: Professor George T. Ladd, Yale University; Professor George H. Howison, University of California.

*Section a, Metaphysics.*—Chairman: Professor A. C. Armstrong, Wesleyan University. Speakers: Professor A. E. Taylor, McGill University, Montreal; Professor Alexander T. Ormond, Princeton University.

*Section b, Philosophy of Religion.*—Chairman: Professor Thomas C. Hall, Union Theological Seminary, N. Y. Speakers: Professor Otto Pfleiderer, University of Berlin; Professor Ernst Troeltsch, University of Heidelberg.

*Section c, Logic.*—Chairman: Professor George M. Duncan, Yale University. Speakers: Professor Wilhelm Windelband, University of Heidelberg; Professor Frederick J. E. Woodbridge, Columbia University.

*Section d, Methodology of Science.*—Chairman: Professor James E. Creighton, Cornell University. Speakers: Professor Wilhelm Ostwald, University of Leipzig; Professor Benno Erdmann, University of Bonn.

*Section e, Ethics.*—Chairman: Professor George H. Palmer, Harvard University. Speakers: Professor William R. Sorley, University of Cambridge; Professor Paul Hensel, University of Erlangen.

*Section f, Aesthetics.*—Chairman: Professor James H. Tufts, University of Chicago. Speakers: Mr. Henry R. Marshall, New York City; Professor Max Dessoir, University of Berlin.

##### *Department 2—Mathematics.*

Chairman: Professor Henry S. White, Northwestern University. Speakers: Professor Maxime Bôcher, Harvard University; Professor James P. Pierpont, Yale University.

*Section a, Algebra and Analysis.*—Chairman: Professor E. H. Moore, University of Chicago. Speakers: Professor Emile Picard, The Sorbonne, member of the Institute of France; Professor Heinrich Maschke, University of Chicago.

*Section b, Geometry.*—Chairman: Professor William E. Story, Clark University. Speakers: M. Gaston Darboux, perpetual secretary of the Academy of Sciences, Paris; Dr. Edward Kasner, Columbia University.

*Section c, Applied Mathematics.*—Chairman: Professor Arthur G. Webster, Clark University, Worcester, Mass. Speakers: Professor Ludwig Boltzmann, University of Vienna; Professor Henri Poincaré, The Sorbonne, member of the Institute of France.

#### DIVISION C—PHYSICAL SCIENCE.

Speaker: Professor Robert S. Woodward, Columbia University.

##### *Department 9—Physics.*

Speakers: Professor Edward L. Nichols, Cornell University; Professor Carl Barus, Brown University.

*Section a, Physics of Matter.*—Chairman: Professor Samuel W. Stratton, director of the National Bureau of Standards, Washington. Speakers: Professor Robert W. Wood, Johns Hopkins University; Professor Francis E. Nipher, Washington University.

*Section b, Physics of Ether.*—Chairman: Professor Henry S. Carhart, University of Michigan. Speakers: Professor James Dewar, Royal Institution, London; Professor DeWitt B. Brace, University of Nebraska.

*Section c, Physics of the Electron.*—Chairman: Professor Charles R. Cross, Institute of Technology, Boston. Speaker: Professor Ernest Rutherford, McGill University, Montreal.

##### *Department 10—Chemistry.*

Chairman: Professor James M. Crafts, Massachusetts Institute of Technology. Speakers: Professor John U. Nef, University of Chicago; Professor Frank W. Clarke, chief chemist, U. S. Geological Survey.

*Section a, Inorganic Chemistry.*—Chairman: Professor John W. Mallet, University of Virginia. Speaker: Professor Henri Moissan, The Sorbonne, member of the Institute of France.

*Section b, Organic Chemistry.*—Chairman: Professor Albert B. Prescott, University of Michigan. Speakers: Professor Rudolf Fittig, University of Strassburg; Professor William A. Noyes, National Bureau of Standards.

*Section c, Physical Chemistry.*—Chairman: Professor Wilder D. Bancroft, Cornell University. Speakers: Professor J. H. Van't Hoff, University of Berlin; Professor Arthur A. Noyes, Massachusetts Institute of Technology.

*Section d, Physiological Chemistry.*—Chairman: Professor Wilbur O. Atwater, Wesleyan University. Speakers: Professor Albrecht Kossel, University of Heidelberg; Professor Russell H. Chittenden, Yale University.

##### *Department 11—Astronomy.*

Chairman: Professor George C. Comstock, director of the observatory, Madison, Wisconsin. Speakers: Professor Edward C. Pickering, director of Harvard Observatory; Professor Lewis Boss, director of Dudley Observatory.

*Section a, Astrometry.*—Chairman: Professor Ormond Stone, University of Virginia. Speakers: Dr. Oskar Backlund, director of the observatory, Pulkowa, Russia; Professor J. C. Kapteyn, University of Groningen, Holland.

*Section b, Astrophysics.*—Chairman: Professor George E. Hale, director of the Yerkes Observatory. Speakers: Professor William W. Campbell, director of the Lick Observatory; Professor Herbert H. Turner, F.R.S., University of Oxford.

##### *Department 12—Sciences of the Earth.*

Chairman: Professor Nathaniel S. Shaler, Harvard University. Speakers: Professor William M. Davis, Harvard University; Professor Thomas C. Chamberlin, University of Chicago.

*Section a, Geophysics.*—Chairman: Professor Christopher W. Hall, University of Minnesota. Speakers: Professor E. Wiechert, director Geophysical Institute, Göttingen; Dr. George F. Becker, geologist, U. S. Geological Survey.

*Section b, Geology.*—Chairman: Professor John C. Branner, Leland Stanford, Jr., University. Speakers: Sir Archibald Geikie, K.C.B., secretary of the Royal Society; President Charles R. Van Hise, University of Wisconsin.

*Section c, Paleontology.*—Chairman: Professor William B. Scott, Princeton University. Speakers: Dr. A. S. Woodward, F.R.S., British Museum of Natural History, London; Professor Henry F. Osborn, Columbia University.

*Section d, Petrology and Mineralogy.*—Chairman: Mr. Oliver C. Farrington, Field Columbian Museum, Chicago. Speakers: Professor F. Zirkel, University of Leipzig; Professor W. C. Brogger, University of Christiania.

*Section e, Physiography.*—Chairman: Mr. Henry Gannett, United States Geological Survey. Speakers: Professor Albrecht Penck, University

of Vienna; Professor Israel C. Russell, University of Michigan.

*Section f, Geography.*—Chairman: Professor George Davidson, University of California. Speakers: Dr. Hugh R. Mill, director British Rainfall Organization, London; Professor Georg Gerland, University of Strassburg.

*Section g, Oceanography.*—Chairman: Rear-Admiral Charles D. Sigsbee, United States Navy. Speakers: Sir John Murray, K.C.B., F.R.S., Edinburgh; His Highness, Albert, Prince of Monaco, Monaco.

*Section h, Meteorology.*—Chairman: Dr. Abbott L. Rotch, Blue Hill Observatory. Speaker: Professor Svante Arrhenius, University of Stockholm, Stockholm.

#### *Department 13—Biology.*

Chairman: Professor William G. Farlow, Harvard University. Speakers: Professor Jacques Loeb, University of California; Professor John M. Coulter, University of Chicago.

*Section a, Phylogeny.*—Chairman: Professor T. H. Morgan, Bryn Mawr. Speakers: Professor Hugo de Vries, University of Amsterdam; Professor Charles O. Whitman, University of Chicago.

*Section b, Plant Morphology.*—Chairman: Professor William Trelease, Washington University, St. Louis. Speakers: Professor Frederick O. Bower, University of Glasgow; Professor Karl F. Goebel, University of Munich.

*Section c, Plant Physiology.*—Chairman: Professor Charles R. Barnes, University of Chicago. Speakers: Professor Julius Wiessner, University of Vienna; Professor Benjamin M. Duggar, University of Missouri.

*Section d, Plant Pathology.*—Chairman: Professor Charles E. Bessey, University of Nebraska. Speaker: Professor Joseph C. Arthur, Purdue University.

*Section e, Ecology.*—Chairman: Professor Conway MacMillan, University of Minnesota. Speakers: Professor Oskar Drude, Kön. Technische Hochschule, Dresden; Professor Charles Flahault, director of the Botanic Institute, Montpellier, France.

*Section f, Bacteriology.*—Chairman: Professor Harold C. Ernst, Harvard University. Speakers: Professor Edwin O. Jordan, University of Chicago; Professor Theobald Smith, Harvard University.

*Section g, Animal Morphology.*—Chairman: Dr. Leland O. Howard, Department of Agriculture, Washington, D. C. Speakers: Professor Charles B. Davenport, University of Chicago; Professor Alfred Giard, The Sorbonne, member of the Institute of France.

*Section h, Embryology.*—Chairman: Professor Simon H. Gage, Cornell University. Speakers: Professor Oskar Hertwig, University of Berlin; Professor William K. Brooks, Johns Hopkins University.

*Section i, Comparative Anatomy.*—Chairman: Professor James P. McMurrich, University of Michigan. Speakers: Professor Max Fürbringer, University of Heidelberg; Professor Yves Delage, The Sorbonne, member of the Institute of France.

*Section j, Human Anatomy.*—Chairman: Professor George A. Piersol, University of Pennsylvania. Speakers: Professor Wilhelm Waldeyer, University of Berlin; Professor H. H. Donaldson, University of Chicago.

*Section k, Physiology.*—Chairman: Dr. S. J. Meltzer, New York. Speakers: Professor Max Verworn, University of Göttingen; Professor William H. Howell, Johns Hopkins University.

#### *Department 14—Anthropology.*

Chairman: Professor Frederic W. Putnam, Harvard University. Speakers: Dr. W. J. McGee, President American Anthropological Association, Washington, D. C.; Professor Franz Boas, Columbia University.

*Section a, Somatology.*—Chairman: Dr. Edward C. Spitzka, New York City. Speakers: Professor L. Manouvrier, School of Anthropology, Paris; Dr. George A. Dorsey, Field Columbian Museum, Chicago.

*Section b, Archeology.*—Chairman: Mr. William H. Holmes, Chief of the Bureau of Ethnology, Washington, D. C. Speakers: Señor Alfred Chavero, director of the National Museum, Mexico; Professor Edouard Seler, University of Berlin.

*Section c, Ethnology.*—Chairman: Miss Alice C. Fletcher, President of the Washington Anthropological Society. Speakers: Professor Karl von den Steinen, University of Berlin; Professor A. C. Haddon, University of Cambridge.

#### DIVISION D—MENTAL SCIENCE.

Speaker: President G. Stanley Hall, Clark University, Worcester, Mass.

#### *Department 15—Psychology.*

Chairman: Professor Noah K. Davis, University of Virginia. Speakers: Professor J. Mark Baldwin, Johns Hopkins University; Professor J. McKeen Cattell, Columbia University.

*Section a, General Psychology.*—Chairman: Professor Charles A. Strong, Columbia University. Speakers: Professor Harald Hoeffding, University of Copenhagen; Professor James Ward, University of Cambridge, England.

*Section b, Experimental Psychology.*—Chairman: Professor Edward A. Pace, Catholic Uni-

versity of America. Speakers: Professor Hermann Ebbinghaus, University of Breslau; Professor Edward B. Titchener, Cornell University.

*Section c, Comparative and Genetic Psychology.*—Chairman: Professor Edmund C. Sanford, Clark University, Worcester, Mass. Speakers: Principal C. Lloyd Morgan, University College, Bristol; Professor Mary W. Calkins, Wellesley College.

*Section d, Abnormal Psychology.*—Chairman: Professor Moses Allen Starr, Columbia University. Speakers: Dr. Pierre Janet, professor at the Sorbonne, Paris; Dr. Morton Prince, Boston.

#### *Department 16—Sociology.*

Chairman: Professor Frank W. Blackmar, University of Kansas. Speakers: Professor George E. Vincent, University of Chicago; Professor Franklin H. Giddings, Columbia University.

*Section a, Demography.*—Chairman: Professor D. Collin Wells, Dartmouth College. Speakers: Professor Walter F. Willcox, Cornell University; Professor Harald Westergaard, University of Copenhagen.

*Section b, Social Structure.*—Chairman: Professor Frederick W. Moore, Vanderbilt University. Speakers: Professor Ferdinand Toennies, University of Kiel; Field Marshal Gustav Ratzenhofer, Vienna.

*Section c, Social Psychology.*—Chairman: Professor Charles A. Ellwood, University of Missouri. Speakers: Professor Jean G. de Tarde, Collège de France, member de l'Institut, Paris; Professor Edward A. Ross, University of Nebraska.

#### DIVISION E—UTILITARIAN SCIENCES.

Speaker: President David Starr Jordan, Leland Stanford, Jr., University.

#### *Department 17—Medicine.*

Chairman: Dr. William Osler, Johns Hopkins University. Speakers: Dr. William T. Councilman, Harvard University; Dr. Frank Billings, Rush Medical College.

*Section a, Public Health.*—Chairman: Dr. Walter Wyman, surgeon-general of the U. S. Marine Hospital Service. Speakers: Professor William T. Sedgwick, Massachusetts Institute of Technology; Dr. Ernest J. Lederle, Commissioner of Health, New York City.

*Section b, Preventive Medicine.*—Chairman: Dr. Joseph M. Mathews, president of the State Board of Health, Louisville, Kentucky. Speakers: Professor Ronald Ross, F.R.S., School of Tropical Medicine, University College, Liverpool; Professor Angelo Celli, University of Rome.

*Section c, Pathology.*—Chairman: Professor Simon Flexner, director of the Rockefeller Insti-

tute. Speakers: Professor Felix Marchand, University of Leipzig; Professor Johannes Orth, University of Berlin.

*Section d, Therapeutics and Pharmacology.*—Chairman: Dr. Hobart A. Hare, Jefferson Medical College. Speakers: Sir Lauder Brunton, F.R.S., London; Professor Mathias E. O. Liebreich, University of Berlin.

*Section e, Internal Medicine.*—Chairman: Professor Frederick C. Shattuck, Harvard University. Speakers: Professor Clifford Allbutt, F.R.S., University of Cambridge; Professor William S. Thayer, Johns Hopkins University.

*Section f, Neurology.*—Chairman: Professor Lewellys F. Barker, University of Chicago. Speakers: Professor Shibusaburo Kitasato, University of Tokio; Professor James J. Putnam, Harvard University.

*Section g, Psychiatry.*—Chairman: Dr. Edward Cowles, Boston. Speakers: Professor Th. Ziehen, University of Berlin; Dr. Charles L. Dana, New York City.

*Section h, Surgery.*—Chairman: Professor Carl Beck, Post Graduate Medical School, New York. Speaker: Professor Nicholas Senn, Rush Medical College, Chicago.

*Section i, Gynecology.*—Chairman: Professor Howard A. Kelly, Johns Hopkins University. Speakers: Dr. L. Gustave Richelot, member of the Academy of Medicine, Paris; Professor John C. Webster, Rush Medical College, Chicago.

*Section j, Ophthalmology.*—Chairman: Dr. George C. Harlan, Philadelphia, Pa. Speaker: Dr. Edward Jackson, Denver, Col.

*Section k, Otology and Laryngology.*—Chairman: Professor William C. Glasgow, Washington University, St. Louis. Speakers: Sir Felix Semon, C.V.O., physician extraordinary to the king, London; Dr. J. Solis-Cohen, Jefferson Medical College.

*Section l, Pediatrics.*—Chairman: Professor Thomas M. Rotch, Harvard University. Speakers: Professor Theodore Escherich, University of Vienna; Professor Abraham Jacobi, Columbia University.

#### *Department 18—Technology.*

Chairman: Chancellor Winfield S. Chaplin, Washington University, St. Louis. Speakers: Professor Henry T. Bovey, F.R.S., McGill University, Montreal; Mr. John R. Freeman, Providence, R. I.

*Section a, Civil Engineering.*—Chairman: Professor William H. Burr, Columbia University. Speakers: Dr. J. A. L. Waddell, consulting engineer, Kansas City; Mr. Lewis M. Haupt, consulting engineer, Philadelphia.

*Section b, Mechanical Engineering.*—Chairman: President Alexander C. Humphreys, Stevens Institute of Technology. Speakers: Professor A. Riedler, Königliche Technische Hochschule, Berlin; Professor Albert W. Smith, Leland Stanford, Jr., University.

*Section c, Electrical Engineering.*—Chairman: Professor Arthur E. Kennelly, Harvard University. Speakers: Signor G. Marconi, Italy; Professor Michael I. Pupin, Columbia University.

*Section d, Mining Engineering.*—Chairman: Mr. John Hays Hammond, New York City. Speakers: Professor Robert H. Richards, Massachusetts Institute of Technology; Professor Samuel B. Christy, University of California.

*Section e, Technical Chemistry.*—Chairman: Professor Charles F. Chandler, Columbia University. Speakers: Professor Otto N. Witt, Königliche Technische Hochschule, Berlin; Professor William H. Walker, Massachusetts Institute of Technology.

*Section f, Agriculture.*—Chairman: Honorable James Wilson, Secretary of Agriculture, Washington. Speakers: Professor Léon Lindet, National Agronomic Institute, Paris; Professor Liberty H. Bailey, Cornell University.

#### THE THIRTIETH GENERAL MEETING OF THE AMERICAN CHEMICAL SOCIETY.

THE thirtieth general meeting of the American Chemical Society was held in Providence, R. I., during Tuesday, Wednesday and Thursday, June 21–23, the place of meeting being Rockefeller Hall, on the campus of Brown University. At the opening session President Wm. H. P. Faunce, of the university, delivered an address of welcome, and this was followed by a response on behalf of the society by its president, Professor A. A. Noyes. The members of the local section gave themselves without reserve to providing for the comfort of the visitors, and their hospitality received full appreciation. Luncheons were served in Sayles Memorial Hall on Tuesday and Wednesday by the courtesy of two local companies, T. P. Shepard & Co., and the Rumford Chemical Works. The University Club extended its house privileges to all members of the society during the entire

meeting, and on Tuesday evening entertained them at a most enjoyable informal reception. On Thursday afternoon, the members of the local section invited the visitors to attend a Rhode Island clambake at the Pomham Club, on the shore of Narragansett Bay. This ‘crowning event’ of the meeting was closed by a series of impromptu speeches, when Professor J. H. Appleton, the chairman of the local committee, proved himself a very entertaining toastmaster.

In addition to the regular morning sessions, an open lecture was delivered on Wednesday evening by Dr. H. W. Wiley, of Washington. This was the first public announcement of the results obtained in his important series of experiments upon the effect of the food preservatives, boric acid and borax, on metabolism. A summary of these results appeared in all the leading newspapers in the issue of June 23.

At the close of the last session a hearty vote of thanks was extended to Professor Appleton and his associates and to the various local organizations by whom courtesies were shown to the visiting members. The list of manufacturing concerns that opened their doors to the various afternoon excursion parties is too numerous to be included here.

The number of members in attendance was 128, of whom 104 were visitors. The next meeting will be held in Philadelphia, beginning December 27.

#### REPORTS FROM INSTITUTIONS.

A new feature was the presentation of reports from various institutions upon the research work which has been in progress during the past year. Lack of space forbids the reprinting of these reports in full, and the following brief summaries, which may serve to give a general idea of the progress of such work, are by no means exhaustive. It should also be said, in justice to those who presented the reports, that