of the work for which the grant was made, these reports being due each year by October 1. Such reports should be continued from year to year till the grant has been used up, and there should be a final report showing where the results of the research in question have been published. Reprints of scientific articles including such results should be sent in also.

The association desires that the very limited funds available for individual grants for research shall be used in the most efficient ways. Members who have research projects that require small additional financial support should not hesitate to make application for grants. Grants are generally of not more than five hundred dollars, usually of smaller sums.

GRANTS FOR RESEARCH, 1927

Approved by the Committee on Grants

Jakob Kunz, University of Illinois, Urbana, Ill. For assistance in measurements of the rate of change of magnetic flux in homogeneous fields $200

William H. Cole, Clark University, Worcester, Mass. For studies on application of the pyridine test 150

J. G. Frayne, Antioch College, Yellow Springs, Ohio. For studies on stages in the excitation of the arc spectrum of lead 300

S. O. Mast, Johns Hopkins University, Baltimore, Md. For studies on the influence of chemicals on structure, movement and responses in Amoeba 300

Henry B. Collins, Jr., U. S. National Museum, Washington, D. C. For archeological investigations on ancient village sites of the main Bering Sea islands 350

Knight Dunlap, Johns Hopkins University, Baltimore, Md. For studying mouth and eye muscles in emotion 300

Bruce Fink, Miami University, Oxford, Ohio. For research on lichens and preparation of a manual of lichens of the United States 300

Ann Morgan, Mt. Holyoke College, South Hadley, Mass. For investigation and study of the blood by means of supravital technique 150

OFFICERS ELECTED AT PHILADELPHIA

President

Arthur A. Noyes, California Institute of Technology, Pasadena, Calif.

The Vice-Presidents

Section A (*Mathematics*), Dunham Jackson, professor of mathematics, University of Minnesota, Minneapolis, Minn.

Section B (*Physics*), A. H. Compton, professor of physics, University of Chicago, Chicago, Ill.

Section C (*Chemistry*), Roger Adams, professor of organic chemistry, University of Illinois, Urbana, Ill.

Section D (*Astronomy*), Walter S. Adams, director of Mt. Wilson Observatory, Pasadena, Calif.

Section E (*Geology and Geography*), Charles Schuchert, professor of paleontology and emeritus professor of historical geology, Yale University, New Haven, Conn.

Section F (*Zoological Sciences*), C. E. McClung, professor of zoology and director of the Zoological Laboratory, University of Pennsylvania, Philadelphia, Pa.

Section G (*Botanical Sciences*), William Crocker, director of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y.

Section H (*Anthropology*), R. J. Terry, professor of anatomy, Washington University, St. Louis, Mo.

Section I (*Psychology*), Knight Dunlap, professor of experimental psychology, Johns Hopkins University, Baltimore, Md.

Section K (*Social and Economic Sciences*), W. S. Leathers, professor of preventive medicine, Vanderbilt University, Nashville, Tenn.

Section L (*Historical and Philological Sciences*), Harry Elmer Barnes, professor of historical sociology, Smith College, Northampton, Mass.

Section M (*Engineering*), A. N. Talbot, professor of municipal and sanitary engineering, in charge of theoretical and applied mechanics, University of Illinois, Urbana, Ill.

Section N (*Medical Sciences*), G. Canby Robinson, professor and dean of the School of Medicine, Vanderbilt University, Nashville, Tenn.

Section O (*Agriculture*), L. E. Call, agronomist, Kansas Experiment Station, and professor of agronomy, Kansas State Agricultural College, Manhattan, Kans.

Section Q (*Education*), Arthur I. Gates, professor of education, Teachers College, Columbia University, New York, N. Y.

Secretary of Section H (*Anthropology*)

Fay Cooper Cole, associate professor of anthropology, University of Chicago, Chicago, Ill.

Elected Members of the Council, for 4-Year Term

L. E. Dickson, University of Chicago, Chicago, Ill.

David White, U. S. Geological Survey, Washington, D. C.

Members of the Executive Committee, for 4-Year Term

J. McKeen Cattell, Garrison-on-Hudson, N. Y.

Henry B. Ward, University of Illinois, Urbana, Ill.

Members of the Committee on Grants for Research for 4-Year Term

W. Lash Miller (for Chemistry), 8 Hawthorne Ave., Toronto, Canada.

Oswald Veblen (for Mathematics), Princeton University, Princeton, N. J.

THE PRESIDENT-ELECT

Arthur A. Noyes, the newly elected president of the American Association for the Advancement of Science, was born at Newburyport, Mass., on September 13, 1866, being the son of Amos and Anna Page (Andrews) Noyes. His collegiate work was done in the Massachusetts Institute of Technology, from which he was graduated with the degree of S.B. in 1886 and with the degree of S.M. in 1887. He was assistant in

analytical chemistry in his alma mater in 1887–88 and then went to Leipzig, where he studied with Wilhelm Ostwald. He received the Ph.D. degree from the University of Leipzig in 1890.

From the Leipzig laboratories Dr. Noyes returned to America with great enthusiasm for the new science of physical chemistry, which was just coming into being in Europe, mainly through the great work of Ostwald. In the Massachusetts Institute of Technology he was instructor in organic chemistry from 1892 to 1894, assistant and associate professor of theoretical chemistry from 1894 to 1899 and became professor of theoretical chemistry in 1899, holding that position till 1919, when he went to his present post at the California Institute of Technology.

After his return from Europe Dr. Noyes gathered about him at the Massachusetts Institute a group of earnest research workers, and it was the work of these men that, under his leadership, led to the foundation of physical chemistry in America. Noyes is called the father of American physical chemistry. He and his coworkers rapidly developed an accuracy and precision in methods that far surpassed those of the European workers in the new science at that time. The application of the law of mass action to the theory of solutions and to all phases of chemistry is one of his greatest contributions. Many eminent chemists who received early guidance and inspiration from Dr. Noyes call him the most successful American teacher of chemistry. He has always won the devotion of his students and colleagues, not only by his able and brilliant leadership but also by his unselfishness in aiding and advancing those who have been so fortunate as to work with him.

The new president of the association was director of the Research Laboratory of Physical Chemistry in the Massachusetts Institute from 1903 to 1907 and from 1909 to 1919, being acting president of the institute from 1907 to 1909. The great importance of his influence in American chemistry may be indicated by the attainments of men who worked with him as students and colleagues in his long and influential period at the Massachusetts Institute—such men as W. R. Whitney, Robert B. Sosman, E. W. Washburn, W. C. Bray, Richard C. Tolman, Charles A. Kraus, Duncan A. MacInnes, Frederick G. Keyes, G. N. Lewis, W. K. Lewis, W. D. Harkins, Walter A. Patrick. In 1913, Dr. Noyes took up the work of organizing chemical research at the newly founded California Institute of Technology and he has devoted all his time since 1920 to that institute, where he is professor of chemistry and director of the Gates Chemical Laboratory. He has made that laboratory one of the most prominent of the many important centers of chemical research in America.

Dr. Noyes was one of the original members of the National Research Council when it was organized in 1916 and his work in connection with the council may be considered as of an importance to American science paramount to his influence as an investigator and educator. His clear thought and advice have played an outstanding part in shaping the general policies and character of the Research Council, of which he is still one of the most useful members. His official record in the council is highly significant: original member, 1916; original member, executive committee, 1916; member, committee on rules and procedure, 1916; chairman, committee on nitric acid, 1916; member, executive board, from the beginning of war organization to present; chairman, interim committee, 1918; acting chairman, National Research Council, 1918; member, committee on building plans, 1918 to present; member, organization committee, 1918; member, executive committee, division of chemistry and chemical technology, 1918; member, division of chemistry and chemical technology (from its permanent organization), 1919–23; member, executive committee of that division, 1919–20; member, committee on promotion of fellowship in physics and chemistry, 1919; member, research fellowship board, 1919–21; member, division of foreign relations, representing the American Academy of Arts and Sciences, 1919–21.

The research contributions of Noyes may be briefly and inadequately summarized under the three following headings:

(1) Development of a system of qualitative analysis for the rare elements, based on studies extending over thirty years, with the aid of many associates and assistants.

(2) Researches on the properties of solutions, with special reference to the ionic theory, also with the aid of many coworkers, involving about forty publications from 1890 to the present.

(3) Studies on the laws of chemical reaction rates, 1894–1900.

As has been said, Noyes has been extraordinarily influential as a teacher. Perhaps his farthest-reaching and most ramifying influence is felt to-day in the teaching methods and procedure in use in chemical laboratories and classrooms throughout North America and far beyond. These advances in method are presented in a group of text-books, some of which have appeared in many editions, some being issued with the collaboration of joint authors, and in numerous journal articles on scientific education. The most important of the books just mentioned are: "Qualitative Chemical Analysis," "A System of Qualitative Chemical Analysis for the Rare Elements," "Class Reactions and Identification of Organic Substances," "Chemical Principles" (a new problem-method of

presentation of physical chemistry, with emphasis on the few fundamental principles of the science) and "General Principles of Physical Science."

The president-elect has been a member of the American Association for the Advancement of Science since 1896, a fellow since 1897. He was secretary of Section C (Chemistry) for 1900, a member of the executive committee of the association from 1920 to 1923 and he had previously served for years as a member of the council and of the committee on policy, which, before the reorganization in December, 1919, corresponded to the present executive committee. He is now president of the Pacific Division of the association. He has received the following honorary degrees: LL.D., University of Maine, 1908, and Clark University, 1909; Sc.D., Harvard University, 1909, Yale University, 1913, and University of Pittsburgh, 1915. He is a member of the National Academy of Sciences, of the American Philosophical Society, of the American Chemical Society (president for 1904), of the Deutsche Chemische Gesellschaft and of the Bunsen Gesellschaft; he is a fellow of the American Academy of Arts and Sciences and an honorary fellow of the Royal Society of Edinburgh. He was awarded the Willard Gibbs Medal, of the American Chemical Society, in 1915. He has been a research associate of the Carnegie Institution of Washington from 1921 to the present. He edited the *Review of American Chemical Research* from 1895 to 1910 and was editor of the Proceedings of the National Academy of Sciences for 1915–16.

Dr. Noyes had been active and greatly influential in the development of the American Association for the Advancement of Science, of which he is now president. He is specially interested in the following three lines of work in which the association is engaged, these being stated in his own words:

> (1) In popularizing science, in creating better appreciation among the intelligent public of the spirit and methods of science and of the tremendous intellectual and practical importance of extending by research the bounds of knowledge. (2) In acting as an agency for the federation and broadening of scientific work, by bringing together (especially at the annual meetings) the various scientific societies and leading scientific men in different fields. (3) In directly encouraging and aiding research, as by the formulation and promotion of large projects of investigation and by assistance to and recognition of individual investigators. In the last of these lines the association shares the field with other scientific organizations. In the first two, however, it has somewhat unique opportunities, and I think its efforts should be specially directed toward the fuller realization of these opportunities.

The newly elected president's term extends to the end of the Nashville meeting next winter and, as retiring president, he is to deliver the most important address at the fifth New York meeting, the following year.—B. E. L.

THE PHILADELPHIA SESSIONS OF SECTIONS AND SOCIETIES

Brief reports from the secretaries of the association sections and from the secretaries of the societies that met with the association at Philadelphia have been brought together in the following pages, arranged according to the association sections. The permanent secretary is very grateful to the secretaries who sent the reports.

SECTION A (MATHEMATICS)

Vice-president and chairman, E. V. Huntington; *retiring vice-president,* W. H. Roever; *secretary,* R. C. Archibald, Brown University, Providence, R. I. With the section met the American Mathematical Society (*president,* G. D. Birkhoff; *secretary,* R. G. D. Richardson, Brown University, Providence, R. I.), and the Mathematical Association of America (*president,* D. Jackson; *secretary,* W. D. Cairns, Oberlin, Ohio).

(*Report received from R. C. Archibald*)

Section A held one joint session on Thursday morning with the affiliated organizations, the American Mathematical Society, and Mathematical Association of America. Professor Huntington presided and three papers were presented, the first by Professor Birkhoff, the retiring president of the society, the second by Professor Roever, the retiring chairman of Section A, and the third by Professor Murnaghan representing the Mathematical Association of America. The papers were all of a remarkably high standard of excellence, and for the first, "A Mathematical Critique of some Physical Theories," the $1,000 prize was awarded by the American Association for the Advancement of Science. This paper is to be published in full in the *Bulletin of the American Mathematical Society.* An abstract of the paper is as follows:

Geometry is the simplest branch of physics. The whole of ordinary Euclidean geometry can be regarded as the unfolding of a single law, namely, that embodied in the Pythagorean theorem. The physical significance of geometry lies in its application to the comparison of material bodies; in this way arises the concept of "space" attached to a reference body.—In classical physics "space" was taken as the container of particles, and rigid and elastic bodies. Illustrations were given to show that the ordinary laws of motion of classical physics are incomplete and lead to difficulties: for instance, if two equal elastic spheres