

geology and biology. The Conkling Cave, Jornada Experimental Range and the industrial and other interests of El Paso and Juarez, Mexico, may be visited within a few hours. The Carlsbad Cavern trip requires an entire day.

The Mesilla Valley offers an environment rich in anthropological remains and historical landmarks. The White Sands National Monument contains 274 square miles of dazzling white gypsum sands and a lake of unusual setting and beauty. Conklin's Cave in Bishop's Cap of the Organ Mountains was used for years by Indians and Mexicans for shelter. The village of "La Mesilla," two miles southwest of Las Cruces, was settled by Mexican colonists in 1854. Excursions are planned to these points as well as to the Jornada Experimental Range, which embraces experimental projects of the U. S. Forest Service and the New Mexico Agricultural Experiment Station.

MEETING OF THE EXECUTIVE COMMITTEE OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE executive committee met in New York on March 15. The following members were present: Drs. Livingston, *chairman*; Caldwell, Cannon, Cattell, Compton, Long, Moulton and Wrather.

Among items of business of interest to scientific men transacted by the committee are the following:

The president of the University of Michigan having withdrawn the invitation to the association to meet at Ann Arbor in June, owing to war conditions and a change in the schedule of sessions at the university, it was voted to cancel the Ann Arbor meeting.

A committee of three, consisting of Drs. Long, *chairman*, Livingston and Moulton was appointed to have charge of making arrangements for a local committee for the New York meeting at the end of the present year.

On nomination of the Section Committee of the Section

on Chemistry, Dr. Hugh S. Taylor (M28, F28), Princeton University, was elected vice-president of the Section on Chemistry for 1942 in the place of Dr. Joel H. Hildebrand. Dr. Wade W. Oliver (M11, F27), Long Island College of Medicine, Brooklyn, N. Y., was elected vice-president of the Section on Medical Sciences for 1942, in the place of Dr. H. S. Gasser. On recommendation of the Executive Committee of the Section on Agriculture, Dr. W. A. Albrecht (M18, F24), University of Missouri, was elected secretary of the Section on Agriculture to fill the unexpired term of Dr. M. F. Morgan, resigned to serve as an officer in the U. S. Infantry. Dr. Sydney S. Negus was reappointed director of the Press Service for the New York meeting.

The status of the American Society of Plant Taxonomists was changed from an associated society to an affiliated society. The Washington Academy of Science was affiliated on the same basis as state academies.

The Permanent Secretary reported the approval of the Executive Committee by mail ballot of the publication of the Symposium on Relapsing Fever, organized and presented by the Section on Medical Sciences at the Dallas meeting.

On a request from the editors of "American Men of Science," the Executive Committee authorized the president (Dr. Compton) to appoint a committee, of which he will serve as chairman, to advise the editors regarding the subdivisions of science for classifying entries, the advisability of continuing the stars, and, if they are to be continued, the method of selecting them. The committee was requested to deliver its recommendations direct to the editors.

By a majority of 7 to 1, the Executive Committee authorized and directed the Office of the Permanent Secretary to publish and have mailed to all members of the association about the middle of each month an eight-page bulletin of the same general format as the journal SCIENCE.

It was voted to hold the next meeting of the Executive Committee in New York City at 10:00 A.M. on Sunday, October 18, unless in the interim an emergency requires that a meeting be held earlier.

SCIENTIFIC NOTES AND NEWS

THE twenty-fifth anniversary as dean of Columbia College of Dr. Herbert E. Hawkes, professor of mathematics, will be celebrated by alumni, faculty and undergraduates at a dinner to be given in his honor on April 16.

J. B. DAVIDSON, head of agricultural engineering at Iowa State College, has been elected a foreign member of the Royal Swedish Academy of Agriculture.

THE Jackson-Gwilt Medal and Gift of the British Royal Astronomical Society has been awarded to Dr. R. L. Waterfield "for his general contributions to astronomy, and in particular for his photographic work on eclipses and comets and his visual observa-

tions of planets." The medal will be presented to him on April 10 at the annual general meeting.

Nature reports that the Royal Society of Arts has awarded the annual Thomas Gray Memorial Trust Prize for an invention advancing the science or practice of navigation to T. E. Metcalfe, of Windsor, for a seaman's protective suit devised by him.

THE University of London has conferred the degree of doctor of science on Dr. G. W. Scott Blair, National Institute for Research in Dairying; Dr. A. H. Cook, Imperial College of Science and Technology; C. L. Hewett, Royal Cancer Hospital (Free) and the Sir John Cass Technical Institute; Alexander King, Im-

perial College of Science and Technology; M. A. Phillips, Battersea Polytechnic; Dr. Eugene Rothstein, Imperial College of Science and Technology; Dr. Frank Smithson, Birkbeck College, and Professor F. R. Winton, university professor of pharmacology in University College.

DR. CHARLES F. BÖDECKER, of Columbia University, has been elected president of the International Association for Dental Research. Other officers elected are: Dr. Philip Jay, the University of Michigan, *President-elect*; Dr. H. Trendley, dean, U. S. Public Health Service, *Vice-president*, and Dr. E. H. Hatton, of Northwestern University, *Secretary*.

It is stated in *Nature* that Colonel S. J. Thompson, governing director of Messrs. John Thompson, Ltd., Wolverhampton (water tube boilers, motor frame pressings, etc.), has been elected president of the British Institution of Mechanical Engineers, London, in succession to W. A. Stanier, chief mechanical engineer of the London Midland and Scottish Railway, whose term of office has expired.

DR. W. W. C. TOPLEY, secretary of the Agricultural Research Council, formerly professor of bacteriology and immunology at the University of London, director of the division of bacteriology and immunology of the London School of Hygiene and Tropical Medicine, has been elected to an honorary fellowship of St. John's College.

DR. JAMES H. ELDER, of the department of psychology of the University of Virginia, has become assistant professor of psychology at the Louisiana State University.

DR. A. C. HARDY, professor of zoology and oceanography at University College, Hull, has been appointed to the regius chair of natural history at the University of Aberdeen. He will become honorary director of oceanographical investigations at Hull. Dr. Hardy's work on the North Sea plankton will be continued by C. E. Lucas, chief of the research staff, who will be in charge.

DR. EDWARD BERNECKER, general medical superintendent of the hospitals of New York City, has been appointed by Mayor LaGuardia to succeed Dr. Willard C. Rappleye as commissioner of hospitals. He has been connected with the hospital department for twenty-seven years.

DR. WILLIAM M. LEPLEY, assistant professor of psychology at the Pennsylvania State College, has received a commission as Captain in the U. S. Army Air Corps. He left the college on March 1 for Kelly Field, Texas, where he expects to be associated with the classification work.

BROOKE DOLAN, II, research associate in mammal-

ogy in the Academy of Natural Sciences of Philadelphia, has been commissioned a lieutenant in the U. S. Army Air Corps. Mr. Dolan has explored and collected for the academy in Western China and Tibet, being the collector and donor of the panda group.

DR. ELIOT ROUND CLARK, professor of anatomy in the University of Pennsylvania School of Medicine, Philadelphia, delivered on January 16 the sixth Adam M. Miller Memorial Lecture at the Long Island College of Medicine. It was entitled "The Behavior of Cells and Tissues in the Living Mammal as Observed through the Microscope."

DR. H. SPENCER JONES, Astronomer Royal of Great Britain, delivered the Symons Memorial Lecture of the Royal Meteorological Society on March 18. He spoke on "The Atmosphere of the Planets."

THE fifth series of the John Wyckoff Lectures at the New York University College of Medicine was delivered on March 24 and 25 by Dr. Richard P. Strong, professor emeritus of tropical medicine at the Harvard Medical School. His subject was "Tropical Diseases and the War." The first lecture discussed dysentery, typhus fever and plague, and the second, trypanosomiasis and onchocerciasis. These lectures were established by the Phi Delta Epsilon Fraternity in 1937 in memory of the late Dean John Wyckoff.

DR. HERBERT M. EVANS, Morris Hertzstein professor and director of the Institute of Experimental Biology of the University of California, is giving from March 24 to May 18 Sigma Xi lectures at the following colleges and universities: Louisiana State University, the University of Georgia, St. Louis University, the University of Missouri, the University of Minnesota, Michigan State College, Bucknell University, the University of Maryland, the University of Pittsburgh, Northwestern University, Kansas State College, Western Reserve University, the Ohio State University, the College of Medicine of the University of Illinois, the University of Colorado, the University of Utah, the State College of Washington, the University of Oregon and the University of Washington.

THE American Geophysical Union will hold its twenty-third annual meeting in the Hall of Government, George Washington Union, Washington, D. C., on April 3 and 4. In addition to the regular scientific sessions of the eight sections, there will be an evening lecture session on Friday, April 3, at which the fourth award of the William Bowie Medal will be made and an address by the president of the union, Dr. W. C. Lowdermilk, on "The American Geophysical Union in its Relation to the Present World Situation," will be given. This will be followed by an illustrated lecture by Dr. Bradford Washburn, director of the New

England Museum of Natural History, entitled "Recent Explorations in the Mountains and Glaciers of Alaska."

THE eighteenth meeting of the American Heart Association will be held on June 5 and 6, at Chalfonte-Haddon Hall, Atlantic City, N. J.

THE thirty-fifth annual meeting of the American Home Economics Association will be held in Boston from June 21 to 24 under the presidency of Dr. Gladys Branégan, dean of the Division of Household and Industrial Arts, Montana State College, Bozeman. The one hundredth anniversary of the birth of one of the founders of the association, Ellen H. Richards, home economist, for many years a member of the department of chemistry of the Massachusetts Institute of Technology, will be commemorated at the meeting.

THE personnel of the field party which the Armour Research Foundation is sending to Argentina at the end of the month to make an industrial survey of the country has been announced. This survey will be coordinated with a further study of projects by the entire staff of the foundation, which is affiliated with the Illinois Institute of Technology. Dr. Francis Godwin, assistant director of the foundation, will lead the field party. He will work in the field of chemical engineering; Dr. John A. Schellenberger, director of biochemistry for the Rohm and Haas Company, in the field of agricultural biochemistry; and Dr. John A. Hopkins, who has leave of absence from the Iowa State College at Ames, in the field of agricultural and industrial engineering. It is estimated that the work will require from six months to a year. Buenos Aires has been designated as headquarters, but the party will travel and work throughout the entire country. Dr. Martin H. Heeren will direct the coordination of interrelated activities in Chicago.

THE *Journal* of the American Medical Association states that a group of Latin American physicians and scientific workers met recently in Buenos Aires under the presidency of Dr. Angel H. Roffo, director of the Instituto de Medicina Experimental of Buenos Aires, to organize a Pan American Scientific Confederation for the discussion of scientific Pan American problems.

THE Federal Civil Service Commission announces that the number of technologists on the employment lists now established is not sufficient for war-time needs. Accordingly, it has recently slightly modified the requirements for these opportunities for Government employment. Salaries for the positions range from \$2,000 to \$5,600 a year. Applications may be filed at the Washington office until further notice. By technologist is meant a person experienced in "the

necessary production, engineering and scientific research work essential for the successful operation of an industrial plant, where such plant operation is based upon a thorough and expert knowledge of a branch of an applied science," such as explosives, fuels, plastics, rubber, minerals or textiles. For the Junior positions (\$2,000 a year), applicants will no longer have to take a written test, and, as before, no written test will be given for the higher positions. The maximum age limit for all the grades has been raised to 60 years.

THE employment bureau of the Society of American Bacteriologists has been transferred to Princeton and placed under the direction of Dr. Frank H. Johnson. In view of the present circumstances, leading to frequent changes in positions, special efforts have been made to enlarge the facilities and to enable the bureau to operate efficiently in aiding both employers with vacancies to fill, and applicants for positions in bacteriology and related fields, to secure prompt and satisfactory placements. The bureau will continue on its non-profit basis, which requires only a very small percentage of the salary of successful applicants for jobs, as a means of defraying operating expenses.

THERE is a demand for information as to current wildlife research being conducted throughout the United States. In order to supply this the U. S. Fish and Wildlife Service will endeavor to assemble and release annually such information in condensed form. It is therefore suggested that there be sent, before June 1, to the Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C., titles of research in progress with the year of probable completion and the name and address.

DR. CHARLES H. BROWN, librarian of Iowa State College and president of the American Library Association, announces that American libraries will be allowed to purchase \$250,000 worth of scientific and technical books and magazines from Nazi-controlled Europe. The United States Government, working through the joint committee on importations, which represents seven national library associations, will allow purchase of technical material vital to the war effort. Both the American and the British Governments have agreed to the purchases by the library committee.

DATA compiled by the Council on Dental Education of the American Dental Association show that in 1933-34 there were 38.3 per cent. of students entering dental schools with less than two years of college preparation, 35.6 per cent. with two years and 26.1 per cent. with three or more years. In 1939-40, all the 39 dental schools of the United States reached a

uniform requirement of two years of college work before entering the dental course. As a result the data for 1941 show no entering students with less than two years, 53 per cent. with two years and 47 per cent. with more than two years of college training. Almost half of the entering students in 1939-40 have educational qualifications beyond the minimum recommended in 1935 by the Curriculum Survey Committee of the American Association of Dental Schools (two years) and in excess of the two-year requirement of the Council on Dental Education of the American Dental Association as announced for the year 1941-42.

UNDER the Australian federal system, public education is a function of the state governments, and the six universities look to these bodies for financial support. Five years ago, however, the Commonwealth Government undertook a share of this responsibility by providing £30,000 a year to meet costs of research in the natural sciences and in economics, and of training young graduates in research technique. The funds are administered by the Council for Scientific and Industrial Research in consultation with the Vice-chancellors' Conference. The Commonwealth has now announced, according to *Nature*, its intention to raise its contribution to £40,000 a year, beginning this year, on condition that at least £9,000 a year be de-

voted to social science studies bearing on problems of post-war reconstruction.

ACCORDING to *Nature* a new step in the rationalization of the British fine chemical industry has been taken by the formation of the Therapeutic Research Corporation of Great Britain, Ltd., the directors of which are Lord Trent, of Boots Pure Drug Company, Ltd.; C. A. Hill, of the British Drug Houses, Ltd.; H. Jephcott, of Glaxo Laboratories, Ltd.; T. B. Maxwell, of May and Baker, Ltd.; and T. R. G. Bennett, of the Wellcome Foundation, Ltd. Although each of the directors of the new corporation is managing director of his own concern, it is not an amalgamation of these five firms. Each will retain its freedom of action in its special field, but will contribute to the common research pool; in effect, a much extended research team now becomes available for work on new drugs, and overlapping effort should be eliminated. It is also hoped to secure the interest and cooperation of research workers in academic institutions. The corporation will have at its command in the various chemical, physiological and bacteriological laboratories the choice of many different lines of approach to its problems and the call on the extensive scientific personnel and equipment of the five companies which are collaborating.

DISCUSSION

A GROUP THEORY DILEMMA OF SOPHUS LIE AND FELIX KLEIN

THE study of group theory as an autonomous subject began with the development of the theory of permutation groups which were then more commonly called substitution groups and are still sometimes denoted by this name. This development was mainly actuated by the usefulness of these groups in the study of the theory of equations as is indicated by the title of the first book on group theory, viz., "*Traité des substitutions et des équations algébriques*," by M. Camille Jordan (1870). Since the only non-intrinsic condition which a set of distinct permutations must satisfy in order to be a group is that it contains the product of every two and the square of every one in the set it resulted that many people at first assumed that this is the only condition which an arbitrary set of distinct elements must satisfy in order to be a group. This assumption was supported by the fact that many other sets of well-known elements which satisfy this condition intrinsically satisfy the other necessary conditions in order to be a group in the modern sense of this term.

This circumstance throws light on various early remarks relating to group theory and, in particular, on what we call here a group theory dilemma of Sophus Lie and Felix Klein, two of the most widely known

names in the history of group theory as well as in the history of modern mathematics. On page 163 of volume 1 (1888) of his work entitled "*Theorie der Transformationsgruppen*," in three large volumes, Sophus Lie (1842-1899) said that the transformations $x' = ax$, where the absolute value of a is less than unity, constitute a group which contains neither the identity nor the inverse of any one of its elements. It is clear that the same conclusions might have been reached for similar reasons by assuming that the absolute value of the number a in the given transformations is always greater than unity since these transformations also include the product of every two of them irrespective of whether they are equal or unequal.

As definite evidence of the common inadequate notion of group at that time from the modern standpoint it may be noted that about five years later Felix Klein (1849-1925) stated on page 66 of volume 43 of the *Mathematische Annalen*, of which he was then editor, that Sophus Lie had first pointed out that for groups of infinite order it was not a consequence of the group concept that the inverse of each element of a group appears in the group. He acknowledged then that in his now well-known Erlangen Programm (1872) he tacitly made this assumption but that it should have been explicitly stated as a part of the particular groups then considered by him. It is a very interesting fact in the history of group theory that less than