

cosis to be carried out in collaboration with Dr. L. U. Gardner, of the Saranac Lake Laboratory.

Professors George H. Parker and F. L. Hisaw, Harvard University, \$300 for the construction of two open sea live-cars (for keeping dogfish) to be used in their studies of color changes and of reproduction in elasmobranch fishes.

Dr. Roberts Rugh, Hunter College, New York City, \$125 for the purchase of materials to be used in a study of the relations and antagonisms of the pituitary and gonad hormones in Amphibia and Mammals.

Curtis W. Sabrosky, Michigan State College, East Lansing, \$300 in partial support of a visit to certain European museums as a basis of study preparatory to the writing, not for academic credit, of a monograph on the dipterous family Chloropidae.

Dr. A. W. Sellards, Harvard Medical School, a sum not to exceed \$325 for the purpose of having two colored plates (blocks) made to illustrate a paper on the histopathology of murine leprosy.

Dr. T. E. Sterne, Harvard College Observatory, \$300 to aid in building highly sensitive thermocouples for measuring thermal radiation of stars.

Inquiries and applications for grants should be addressed to the chairman of the Permanent Science Fund Committee, Professor John W. M. Bunker, Massachusetts Institute of Technology, Cambridge, Mass.

OFFICERS AND MEMBERS ELECTED BY THE NATIONAL ACADEMY OF SCIENCES

At the annual meeting of the National Academy of Sciences, held in Washington on April 26, 27 and 28, under the presidency of Dr. Frank R. Lillie, of the University of Chicago, Dr. Arthur L. Day, of the Geophysical Laboratory of the Carnegie Institution of Washington, was reelected vice-president for a further term of four years, Dr. H. S. Jennings, Henry Walters professor of zoology at the Johns Hopkins University, was reelected a member of the council, and Dr. Oswald Veblen, professor in the school of mathematics of the Institute for Advanced Study at Princeton, was elected to succeed Dr. Roger

Adams, head of the department of chemistry at the University of Illinois.

Dr. August Krogh, professor of zoophysiology in the University of Copenhagen, was elected a foreign associate.

Members of the academy were elected as follows:

Section of Mathematics:

John von Neumann, Institute for Advanced Study, Princeton.

Section of Astronomy:

Seth Barnes Nicholson, Mount Wilson Observatory, Pasadena; Otto Struve, Yerkes Observatory, Williams Bay, Wis.

Section of Physics:

Arthur Jeffery Dempster, University of Chicago.

Section of Engineering:

Oliver Ellsworth Buckley, Bell Telephone Laboratories, New York City.

Section of Chemistry:

Duncan Arthur MacInnes, Rockefeller Institute for Medical Research.

Section of Geology and Paleontology:

Donnel Foster Hewett, U. S. Geological Survey.

Section of Botany:

Charles Thom, U. S. Department of Agriculture.

Section of Zoology and Anatomy:

Francis Bertody Sumner, Scripps Institution of Oceanography, La Jolla; Carl Gottfried Hartman, department of embryology, Carnegie Institution of Washington, Baltimore; Calvin Blackman Bridges, California Institute of Technology.

Section of Pathology and Bacteriology:

Leo Loeb, Washington University, St. Louis; Ernest William Goodpasture, Vanderbilt University; George Richards Minot, Boston City Hospital.

Section of Anthropology and Psychology:

Edward Chace Tolman, University of California, Berkeley.

SCIENTIFIC NOTES AND NEWS

THE Royal Society of Canada has awarded the Flavelle Medal to Dr. Frank Dawson Adams, dean emeritus of the faculty of applied science at McGill University. The award is made in recognition of his researches in geology, particularly those concerned with the ancient metamorphic rocks of Canada and the flow of rocks under pressure.

DR. ARMIN O. LEUSCHNER, director of the Students' Observatory and chairman of the department of astronomy at the University of California, received the

honorary membership of the Rittenhouse Astronomical Society of Philadelphia at a special meeting held at the Franklin Institute on April 22. This was "in recognition of his outstanding contributions to the study of asteroids, comets and satellites." Following the ceremony Dr. Leuschner addressed the society on "The Long Range Prediction of the Motion of the Minor Planets."

At the recent convention in Philadelphia of the Electrochemical Society, the Acheson Medal and Prize

of \$1,000 was presented to Dr. Frederick Mark Becket, president of the Union Carbide and Carbon Research Laboratories, Inc., for his contributions to metallurgy. The Weston Fellowship of \$1,000 was awarded to Garth L. Putnam, of Seattle, for an investigation of methods of depositing alloys of active metals from aqueous solution. The work will be done at Columbia University under the direction of the secretary of the society, Dr. Colin G. Fink. William A. Johnson, of Pittsburgh, was awarded the prize to young authors for a paper published jointly with Professor Allison Butts, entitled "Studies on Overvoltage."

THE American Chemical Society Prize of \$1,000 has been awarded for 1937 to Dr. E. Bright Wilson, Jr., assistant professor of chemistry at Harvard University, for his experimental work in physical chemistry. The award, which is bestowed annually upon a chemist who is under thirty-one years of age and is of unusual promise, will be presented formally to Dr. Wilson at the ninety-fourth meeting of the society to be held in Rochester, N. Y., from September 6 to 10. The prize, which is maintained by Dr. A. C. Langmuir, of Hastings-on-Hudson, N. Y., and his brother, Dr. Irving Langmuir, provides for "recognition of the accomplishment in North America of outstanding research in pure chemistry by a young man or woman, preferably working in a college or university." The chairman of the jury of award was Dean Frank C. Whitmore, of Pennsylvania State College, president-elect of the society.

THE Medal of the Explorers Club, New York City, has been awarded to Rear Admiral Richard E. Byrd, in recognition of his "achievements in Arctic and Antarctic exploration." The presentation was made by Dr. Vilhjalmur Stefansson, president of the club, at a dinner given on April 20. The speakers included Thomas J. Watson, president of the International Business Machines Corporation; David Sarnoff, president of the Radio Corporation of America; Dr. Roy Chapman Andrews, director of the American Museum of Natural History; Captain Robert A. Bartlett, and Lowell Thomas. Sir Hubert Wilkins acted as toastmaster.

DR. THOMAS C. POULTER, director of the Armour Institute of Technology, Chicago, who was second in command of the Byrd Antarctic expedition of 1933-35, was presented on April 27 with a special gold medal by the National Geographic Society. Dr. Gilbert Grosvenor, president, made the presentation in the presence of Rear Admiral Richard E. Byrd. A luncheon followed. On the Byrd expedition Dr. Poulter's work included geophysical investigations, studies of ice conditions, magnetic soundings and observation of meteors and auroral phenomena.

CHARLES M. B. CADWALADER has been elected president of the Academy of Natural Sciences of Philadelphia. He succeeds the late Effingham B. Morris, who served as president from 1928 until his death last January. Since 1928 Mr. Cadwalader has held the office of managing director.

OFFICERS of the Electrochemical Society, which opened its meeting on April 28 in Philadelphia, were elected as follows: *President*, William G. Harvey, Aluminum Company of America; *Vice-presidents*, L. D. Vorce, New York City; R. L. Baldwin, Niagara Falls, N. Y.; O. W. Storey, Chicago, Ill; *Managers*, W. W. Winship, New York City; E. M. Baker, University of Michigan, and Sherlock Swann, Jr., University of Illinois; *Treasurer*, Robert M. Burns, New York City; *Secretary*, Dr. Colin G. Fink, Columbia University.

THE following officers were elected at the annual meeting of the American Society for Experimental Pathology: *President*, C. Phillip Miller, Chicago; *Vice-president*, Morton McCutcheon, Philadelphia; *Secretary and Treasurer*, Paul R. Cannon, Chicago; *Incoming Member of the Council*, Shields Warren, Boston. The next meeting of the society will be held in Baltimore in conjunction with the meetings of the Federation of American Societies for Experimental Biology.

DR. FREDERICK H. SAFFORD, of the University of Pennsylvania, has retired after serving for thirty-four years. He has been appointed emeritus professor of mathematics.

DR. RALPH LINTON, of the University of Wisconsin; Dr. George Herzog, of Yale University, and Dr. William Duncan Strong, senior ethnologist of the Bureau of American Ethnology of the Smithsonian Institution at Washington, will become in the autumn members of the department of anthropology of Columbia University. Dr. Franz Boas, who retired as head of the department with the title of professor emeritus on June 30 of last year, joined the faculty as lecturer in 1896 and became professor of anthropology in 1899.

DR. OTTO KRAYER, professor of pharmacology at the American University of Beirut, Syria, formerly of the University of Dusseldorf and the University of Berlin, has been appointed associate professor of pharmacology at the Harvard Medical School for five years beginning next September.

IVAN C. CRAWFORD, dean of the College of Engineering at the University of Idaho since 1923, has been appointed dean of the School of Engineering and Architecture at the University of Kansas. He succeeds Dean George C. Shaad, who died last July.

PROFESSOR JOHN T. STARK has been appointed chair-

man of the department of geology and geography of Northwestern University in place of Professor Charles H. Behre, who has asked to be relieved of the chairmanship to devote more time to research. Professor Stark will return to the university in September after a year spent in a field study of the geology of the Southern Pacific area and attendance at the International Geological Congress in Moscow in July. Professor Behre has been granted a year's leave of absence to attend the congress and to study European zinc deposits.

DR. W. M. WHYBURN, associate professor of mathematics at the University of California at Los Angeles, has been appointed acting chairman of the department of mathematics, to succeed Dr. Earle R. Hedrick, who was recently elected provost of the university.

DR. THOMAS B. COOLEY, professor of pediatrics at the Wayne University College of Medicine, Detroit, and chief of staff at the Children's Hospital of Michigan, has been named executive secretary to the council for pediatric research of the American Academy of Pediatrics. The council, which was established in 1935, will include, besides Dr. Cooley, Dr. Kenneth D. Blackfan, *chairman*, and Dr. Fritz B. Talbot, both of Boston; Dr. Alexis F. Hartman, St. Louis; Dr. Irvine McQuarrie, Minneapolis, and Dr. Oscar M. Schloss, New York City.

THE *Journal* of the American Medical Association reports that a special board has been appointed to advise the United States Conference of Mayors in the appointment of public health officers. Dr. Joseph W. Mountin, of the U. S. Public Health Service, is chairman of the board. Other members are: Drs. Allen W. Freeman, dean of the Johns Hopkins University School of Hygiene and Public Health; Wilson G. Smillie, professor of public health administration in the Harvard School of Public Health, recently appointed professor of public health and preventive medicine at Cornell University Medical College, New York City; Drs. Huntington Williams, health commissioner of Baltimore, and John L. Rice, health commissioner of New York City.

PROFESSOR DR. F. X. SCHAEFFER, emeritus curator for geology and paleontology of the Natural History Museum of Vienna, is spending the spring and summer in California. He is at Pomona College for the month beginning on April 24, lecturing on topics in structural and historical geology, and will spend the week beginning on May 24 at Stanford University, giving five lectures on topics ranging from alpine structure to the Pleistocene glaciations of central Europe. Later he will become a member of the faculty of the summer session of the University of California at Berkeley.

DR. HENRY V. HOWE, director of the School of Geology of the Louisiana State University, and Dr. Richard J. Russell, professor of geography, will sail on May 22 for Russia, where they expect to attend the International Geological Congress to be held in Moscow from July 20 to 29. Dr. Howe will represent the American Association of Petroleum Engineers, and Dr. Russell will be a delegate from the Louisiana State University.

DR. ROBERT A. MILLIKAN, director of the Norman Bridge Laboratory of Physics of the California Institute of Technology, will lecture under the auspices of the American-Scandinavian Foundation at the Universities of Stockholm, Upsala, Oslo, Lund and Copenhagen during May.

AT Northwestern University, Professor Reginald A. Daly, of Harvard University, gave recently a series of six Harris Foundation lectures under the general title, "The Crust of the Earth."

DR. ROBERT BROOM, paleontologist of the Transvaal Museum, Pretoria, South Africa, gave a lecture on April 22 before a joint meeting of the New York Academy of Sciences and the American Museum of Natural History. His subject was "The Origin and Rise of Prehistoric and Recent Man."

SIR THOMAS HOLLAND delivered the Huxley Memorial lecture at the Imperial College of Science and Technology, South Kensington, on May 4. His subject was "The Permanence of Oceanic Depressions and Continental Elevations."

IN SCIENCE for April 30, the announcement of election to membership in the American Philosophical Society, Class III—Social Sciences, contains an unfortunate error in naming three foreign nominees as having been elected. There was no election of foreign members in this class at this meeting.

THE New York State Geological Association will hold its thirteenth annual meeting at Syracuse and vicinity on May 14 and 15. Professor Louis W. Ploger, president, and his associates at Syracuse University are planning two excursions, which will cover the stratigraphic section represented in the classic areas of central New York and which will illustrate the development of the physiographic features of the lake plain and plateau.

THE seventh annual Field Conference of Pennsylvania Geologists will be held in Bradford, Pa., on May 28, 29 and 30. The field trips will embrace a study of stratigraphy, structure and paleontology in the Upper Devonian, Mississippian and Lower Pennsylvanian in the Bradford quadrangle and in the Venango oil fields country. A physiographic trip west into the Lake Erie region will be made to study Presque Isle, modern beach phenomena and the elevated shore lines of glacial lakes Warren and Whittle-

sey. A visit will be made to a modern oil refinery and to oil leases where oil is being recovered by the water-flood and by air and gas repressuring. Copies of the final notice may be had by writing to Dr. Arthur B. Cleaves, secretary, Topographic and Geologic Survey, Harrisburg, Pa.

THE Minnesota Academy of Science held its fifth annual meeting at the University of Minnesota on April 17, with some 300 in attendance. At this meeting a new section, Science Education, planned for those whose interests lie primarily in the teaching of the sciences, was added to the two sections, physics and biology, into which the academy had hitherto been divided. In relation to this movement a Junior Academy of Science plan was initiated. The meeting opened with a general session, at which the speakers were Dean Walter C. Coffey and Drs. D. H. Davis, Irving McQuarrie and A. N. Wilcox, all of the University of Minnesota. The three sections held sessions for the reading of technical papers. In a public lecture before the entire group, Dr. H. K. Hayes, chief of the Division of Agronomy and Plant Genetics, University of Minnesota, closed the session with an illustrated talk, entitled "Some Observations on Life in China." The officers for 1938 include: *President*, Dr. W. S. Cooper, University of Minnesota; *Vice-president*, Professor E. T. Tufte, St. Olaf College; *Secretary-Treasurer*, Dr. H. K. Wilson, University of Minnesota; *Councilors*, Professor G. W. Friedrich, St. Cloud Teachers College; Dr. Louis H. Powell, St. Paul Institute; Dean E. M. Freeman, University of Minnesota; Dr. H. E. Essex, the Mayo Foundation. The academy will hold its next annual meeting at St. John's University, Collegeville, on April 23, 1938.

AN International Congress on the Testing of Materials was opened in London at the Institution of Civil Engineers on April 19. According to a report in the *London Times*, the congress, which was organized by the International Association for Testing Materials, was opened by Sir William Bragg, president of the Royal Society. Visitors from twenty-five countries were in attendance. In connection with this meeting a Joint Committee on Materials and Their Testing was set up to act as the British national organization for these matters. Representatives of twenty-two technical

institutions and societies will serve on the joint committee, which has been formed on the understanding that it shall not absorb or replace in any way the activities of existing technical organizations. At the conclusion of the congress this committee took over the work of the British committee that had hitherto been entrusted with the activities in Great Britain of the International Association for Testing Materials. The chairman of the joint committee is Dr. H. J. Gough, and the secretary is C. W. J. Taffs, of the Institution of Mechanical Engineers. An exhibition of testing plant and apparatus was held at the Institution of Civil Engineers throughout the week in conjunction with the congress. The Department of Scientific and Industrial Research provided the largest group of exhibits, illustrating testing methods recently devised or developed in the department.

THE Australian Government has announced, according to *Nature*, that the work of the Council for Scientific and Industrial Research is to be extended in the interests of secondary industry generally. Since its establishment in 1926, the council has restricted its attention to problems of the primary producing industries, though no such restriction is imposed upon it by the Act under which it is constituted. It has always been assumed that an extension was only a matter of time in view of the contraction of world markets for primary products and the consequent pressure to increase the home market by expanding secondary industries. A recent decision to establish aircraft and motor production in the Commonwealth has intensified a growing demand for an extension of national scientific research, and an influential committee, including leading engineers and industrialists, is now at work preparing a definite scheme of work. Existing institutions will be utilized wherever possible, but it is fully recognized by the government that considerably increased financial obligations must be carried by it. A first step is to establish an agency for the maintenance of accurate fundamental standards of measurement and for the testing of master gauges for controlling precision manufacture. It is intended that in all developments intimate contact shall be maintained with, and guidance sought from, established British institutions engaged on work of the same type.

DISCUSSION

ON THE SIGNIFICANT FIGURES OF LEAST SQUARES AND CORRELATIONS

DR. F. R. MOULTON in the issue of *SCIENCE* for December 25, 1936, pointed out that the number of significant figures in the solution of a set of linear equations can not exceed the number of significant figures in the determinant A of the coefficients. By evaluating this determinant it is possible to make

certain statements in advance concerning the reliability of the solution for the unknowns. I propose to add some thoughts to those expressed by Dr. Moulton, also to say a word further on the question raised by Dr. Joseph Berkson in *SCIENCE* for November 13, 1936.

A large class of problems in which these matters assume considerable theoretical and practical impor-