to congregate in a few popular marine laboratories, there to run and howl with the pack, and would lead to greater independence in our scientific spirit and work.

Over against this suggestion of something the government might well do, I would place a suggestion of something the universities might well do. In the interests of their own work and of keeping it abreast of the times, they might make provision for sending their investigators each year to meetings such as this one, and to all national meetings in the field of the sciences that they cultivate: I mean, pay their traveling expenses. It would cost comparatively little and would help to keep both men and institutions alive.

Such means of getting together would provide opportunities for the exchange of experience, for learning new methods and for getting help from fellow specialists.

After all, we need to realize that cooperation in research has its serious limitations. Real research is nearly always the work of individuals. Nature does not yield up her secrets to a crowd or even to a committee, but only to her humble devotee, when working alone and apart. When a man is found working at a problem for which he is well trained and well equipped and in which he has both faith and zeal, the best way to cooperate with that man is to let him alone and keep out of his road.

Cooperation is limited in advance to getting oriented, and getting equipped. But after a discovery of a fundamental nature has been made, then cooperation is needed to learn the limits of its application. Life is a complex of changing factors, and environment is a complex of instable conditions. A good method is often good only locally and under certain conditions. Especially in field work in entomology it needs to be tested out zone by zone and province by province; and the coperation of many hands in many places is needed to find its limitations, and its true economic value.

Let us meet and exchange experiences. Progress in knowledge usually depends on our ability to take a hint from nature, as to where to look and what to look for: and the hint we may often obtain from the work of another. Betterment of methods oftenest grows out of comparison of results. Let me assure Dr. Howard that laboratory men are not unmindful of the limitations of laboratory methods, nor unwilling to go out in the field and acquaint themselves with the scientific problems the work of the bureau has raised, nor indisposed to do all they can to help solve them.

J. G. Needham

Cornell University

THE NATIONAL RESEARCH COUNCIL

ORGANIZATION OF THE NATIONAL RESEARCH COUNCIL[1]

PREAMBLE

The National Academy of Sciences, under the authority conferred upon it by its charter enacted by Congress, and approved by President Lincoln on March 3, 1863, and pursuant to the request expressed in an Executive Order made by President Wilson on May 11, 1918, hereto appended, adopts the following permanent organization for the National Research Council, to replace the temporary organization under which it has operated heretofore.

ARTICLE I.—PURPOSE

It shall be the purpose of the National Research Council to promote research in the mathematical, physical and biological sciences, and in the application of these sciences to engineering, agriculture, medicine and other useful arts, with the object of increasing knowledge, of strengthening the national defense, and of contributing in other ways to the public welfare, as expressed in the executive order of May 11, 1918.

ARTICLE II.—MEMBERSHIP

Section 1. The membership of the National Research Council shall be chosen with the view of rendering the Council an effective federation of the principal research agencies

[1] Approved by the National Academy of Sciences at its meeting on April 30, 1919.

in the United States concerned with the fields of science and technology named in article I.

Section 2. The council shall consist of (1) Representatives of national scientific and technical societies; (2) representatives of the government, as provided in the executive order; (3) representatives of other research organizations and other persons whose aid may advance the objects of the council.

ARTICLE III.—DIVISIONS

Section 1. The council shall be organized in divisions of two classes: (A) Divisions dealing with the more general relations and activities of the council; (B) divisions dealing with related branches of science and technology.

Section 2. The initial constitution of the divisions of the council shall be as follows: (A) Divisions of General Relations: (1) Government Division, (2) Division of Foreign Relations, (3) Division of States Relations, (4) Division of Educational Relations, (5) Division of Industrial Relations, (6) Research Information Service. (B) Divisions of Science and Technology: (7) Division of Physical Sciences, (8) Division of Engineering, (9) Division of Chemistry and Chemical Technology, (10) Division of Geology and Geography, (11) Division of Medical Sciences, (12) Division of Biology and Agriculture, (13) Division of Anthropology and Psychology.

Section 3. The number of divisions and the grouping of subjects in article III., section 2, may be modified by the executive board of the National Research Council.

Section 4. The Divisions of General Relations shall be organized by the Executive Board of the National Research Council (article IV., section 2).

Section 5. To secure the effective federation of the principle research agencies in the United States, provided for in article II., a majority of the members of each of the Divisions of Science and Technology shall consist of representatives of scientific and technical societies, chosen as provided for in article V., section 2. The other members of the Division shall be nominated by the executive committee of the division, approved by the executive board of the National Research Council, and appointed in accordance with article V., section 4.

Section 6. The divisions of the council, with the approval of the executive board, may establish sections and committees, any of which may include members chosen outside the membership of the council.

ARTICLE IV.—ADMINISTRATION

Section 1. The affairs of each division shall be administered by a chairman, a vice-chairman and an executive committee, of which the chairman and the vice-chairman shall be ex-officio members; all of whom shall be elected annually by the division and confirmed by the executive board.

Section 2. The affairs of the National Research Council shall be administered by an executive board, of which the officers of the Council, the president and home secretary of the National Academy of Sciences, the president of the American Association for the Advancement of Science, the chairmen and vice-chairmen of the Divisions of Science and Technology, and the chairmen of the Divisions of General Relations shall be ex-officio members. The executive board may elect additional members, not to exceed ten in number, who, if not already members of the National Research Council, shall be appointed thereto, in accordance with article V., section 4.

Section 3. The officers of the National Research Council shall consist of a chairman, one or more vice-chairmen, a secretary and a treasurer, who shall also serve as members and officers of the executive board of the council.

Section 4. The officers of the National Research Council, excepting the treasurer, shall be elected annually by the executive board. The treasurer of the National Academy of Sciences shall be ex-officio treasurer of the National Research Council.

Section 5. The duties of the officers of the council and of the divisions shall be fixed by the executive board.

ARTICLE V.—NOMINATIONS AND APPOINTMENTS

Section 1. The government bureaus, civil and military, to be represented in the government division, and the scientific and technical societies, to be represented in the Divisions of Science and Technology of the National Research Council, shall be determined by joint action of the council of the National Academy of Sciences and the executive board of the National Research Council.

Section 2. Representatives of scientific and technical societies shall be nominated by the societies, at the request of the executive board, and appointed by the president of the National Academy of Sciences to membership in the council and assigned to one of its divisions.

Section 3. The representatives of the governments shall be nominated by the president of the National Academy of Sciences after conferences with the secretaries of the departments concerned, and the names of those nominated shall be presented to the President of the United States for designation by him for service with the National Research Council.

Section 4. Other members of the council shall be nominated by the executive committees of the divisions, approved by the executive board, and appointed by the president of the National Academy of Sciences to membership and assigned to one of the divisions.

Section 5. Prior to the first annual meeting of the council following January 1, 1919, all divisions shall be organized by appointment of their members in accordance with article II. and article V., sections 1 to 4.

Section 6. As far as practicable one third of the original representatives of each scientific and technical society and approximately one third of the other original members of each of the divisions of science and technology shall serve for a term of three years; one third for a term of two years, and one third for a term of one year, their respective terms to be determined by lot. Each year thereafter, as the terms of members expire, their successors shall be appointed for a period of three years.

Section 7. The government representatives shall serve for periods of three years, unless they previously retire from the government office which they represent, in which case their successors shall be appointed for the unexpired term.

Section 8. As far as practicable a similar rotation shall be observed in the appointment of the members of the Divisions of General Relations.

ARTICLE VI.—MEETINGS

Section 1. The council shall hold one stated meeting, called the annual meeting, in April of each year, in the city of Washington, on a date to be fixed by the executive board. Other meetings of the council shall be held on call of the executive board.

Section 2. The executive board and each of the divisions shall hold an annual meeting, at which officers shall be elected, at the time and place of the annual meeting of the council, unless otherwise determined by the executive board, and such other meetings as may be required for the transaction of business.

Section 3. Joint meetings of the executive board of the National Research Council and the council of the National Academy of Sciences shall be held from time to time, to consider special requests from the government, the selection of organizations to be represented in the National Research Council, and other matters which, in the judgment of the president of the National Academy, require the attention of both bodies.

ARTICLE VII.—PUBLICATIONS AND REPORTS

Section 1. An annual report on the work of the National Research Council shall be presented by the chairman to the National Academy of Sciences, for submission to Congress in connection with the annual report of the president of the academy.

Section 2. Other publications of the National Research Council may include papers, bulletins, reports and memoirs, which may appear in the *Proceedings* or *Memoirs* of the

National Academy of Sciences, in the publications of other societies, in scientific journals, or in a separate series of the Research Council.

MEMBERSHIP OF DIVISIONS

MEMBERS of divisions of the National Research have been appointed as follows:

DIVISION OF PHYSICAL SCIENCES

Chairman: C. E. Mendenhall.

Acting Chairman until June 30: A. O. Leuschner.

Executive Committee: C. E. Mendenhall, *Chairman,* William Bowie, A. O. Leuschner, *Acting Chairman,* R. A. Millikan, H. N. Russell E. B. Wilson.

Representatives of Societies—American Astronomical Society: W. W. Campbell, H. N. Russell, Joel Stebbins. *American Physical Society:* H. A. Bumstead, William Duane, Irving Langmuir, Ernest Merritt, R. A. Millikan, E. B. Wilson. *American Mathematical Society:* E. W. Brown, L. E. Dickson, H. S. White.

Members at Large, nominated by the division: J. S. Ames, L. A. Bauer, William Bowie, Henry Crew, C. F. Marvin, Max Mason, M. I. Pupin, S. W. Stratton, A. Trowbridge.

DIVISION OF ENGINEERING

Chairman: Henry M. Howe.

Vice-chairman and acting chairman: Galen H. Clevenger.

Executive Committee: Henry H. Howe, *chairman,* Comfort A. Adams, Galen H. Clevenger, *vice-chairman,* D. S. Jacobus, E. G. Spilsbury.

Representatives of Societies—American Society of Mechanical Engineers: Arthur M. Greene, W. F. Goss,[1] D. S. Jacobus.[1] *American Institute of Electrical Engineers:* Comfort A. Adams, F. B. Jewett,[1] W. R. Whitney. *American Institute of Mining Engineers:* Hennon Jennings, Philip N. Moore, Joseph W. Richards.[1] *American Society of Civil Engineers:* Anson Marston, H. H. Porter,[1] George S. Webster. *American Society for Testing Materials:* A. A. Stevenson. *American Society of Illuminating Engineers:* Edward P. Hyde. *Western Society of Engineers:* Arthur N. Talbot. *Society of Automotive Engineers:* Charles F. Kettering.

Members at Large, nominated by the division: Henry M. Howe, Galen H. Clevenger, Edward Dean Adams,[1] John J. Carty, Gano Dunn, Van H. Manning, Charles F. Rand,[1] E. G. Spilsbury, Bradley Stoughton,[1] S. W. Stratton, Ambrose Swasey, William R. Walker.

[1] Member of Engineering Foundation.

DIVISION OF CHEMISTRY AND CHEMICAL TECHNOLOGY

Acting chairman until June 30: E. W. Washburn.

Chairman, July 1, 1919 to June 30, 1920: W. D. Bancroft.

Vice-chairman: Julius Stieglitz.

Executive Committee: E. W. Washburn, *Acting chairman,* W. D. Bancroft, *Chairman-elect,* Julius Stieglitz, *Vice-chairman,* A. B. Lamb, A. A. Noyes, C. L. Alsberg.

Representatives of Societies—American Chemical Society: C. L. Alsberg, W. D. Bancroft, C. G. Derick, J. M. Francis, E. C. Franklin, W. F. Hillebrand, John Johnston, Julius Stieglitz, J. E. Teeple. *American Electrochemical Society:* Colin G. Fink. *American Institute of Chemical Engineers:* Hugh K. Moore. *American Ceramic Society:* Albert V. Bleininger. *Members at large, nominated by the division:* C. H. Herty, G. A. Hulett, A. B. Lamb, A. A. Noyes, C. L. Parsons, E. W. Washburn.

DIVISION OF GEOLOGY AND GEOGRAPHY

Vice-chairman and acting chairman: E. B. Mathews.

Executive Committee: E. B. Mathews, *Vice-chairman,* Isaiah Bowman, A. H. Brooks, J. M. Clarke, N. M. Fenneman, David White.

Representative of Societies—Association of American Geographers: W. M. Davis, N. M. Fenneman, J. Russell Smith. *American Geographical Society:* Isaiah Bowman. *Geological Society of America:* J. M. Clarke, Whitman Cross, R. A. Daly, H. E. Gregory, A. C. Lawson. *Paleontological Society:* T. Wayland Vaughan. *National Geographical Society:* Gilbert Grosvenor.

Members at Large, nominated by the division: Ralph Arnold, Eliot Blackwelder, A. H. Brooks, A. L. Day, Ellsworth Huntington, Douglas W. Johnson, E. B. Mathews, R. A. F. Penrose, Jr., David White.

DIVISION OF BIOLOGY AND AGRICULTURE

Chairman: C. E. McClung.

Vice-chairman: L. R. Jones.

Executive Committee: C. E. McClung, *Chairman,* L. R. Jones, *Vice-chairman,* I. W. Bailey, F. R. Lillie, G. R. Lyman, H. F. Moore, A. F. Woods.

Representatives of Societies—American Society of Agronomy: Charles V. Piper. *American Society of Bacteriologists:* Samuel C. Prescott. *Botanical Society of America:* William Crocker, A. S. Jones. *Ecological Society of America:* W. M. Wheeler. *American Society of Economic Entomologists:* P. J. Parrott. *Society of American Foresters:* Barrington Moore. *American Genetics Association:* G. N. Collins. *American Society for Horticultural Science:* U. P. Hedrick. *American Phytopathological Society:* G. R. Lyman. *Society of American Zoologists:* M. F. Guyer, F. R. Lillie, G. H. Parker.

Members-at-large, nominated by the division: I. W. Bailey, B. E. Livingston, C. E. McClung, C. F. Marbut, A. G. Mayor, H. F. Moore, J. R. Murlin, W. Osgood, A. F. Woods.

RESEARCH FELLOWSHIPS

The National Research Council announces its first appointments to national research fellowships in physics and chemistry. The fellowships are supported by the Rockefeller Foundation and the object of the National Research Council in maintaining a system of research fellowships is to promote fundamental research in physics and chemistry primarily in educational institutions of the United States. Fellowships are awarded to persons who have demonstrated a high order of ability in research for the purpose of enabling them to conduct investigations at educational institutions which make adequate provision for research in physics or chemistry. The National Research Council has received approximately forty applications. The following initial appointments have been made:

In Chemistry

F. R. Bichowsky, of Washington, D. C., A.B. (Pomona, '12), Ph.D. (California, '16). Physical chemist at the geophysical laboratory of the Carnegie Institute of Washington since 1916. Mr. Bichowsky plans to conduct researches at the University of California.

Emmett K. Carver, of New York City, A.B. (Harvard, '14), Ph.D. (Harvard, '17). Formerly assistant to the director of the Wolcott Gibbs Memorial Laboratory at Harvard; captain, Chemical Warfare Service, U. S. A.

W. H. Rodebush, Ph.D. (California, '17), at present research chemist for the United States Industrial Alcohol Company, of Baltimore, Md. Mr. Rodebush will conduct researches at the University of California on A Study of the Specific Heats and Other Properties of Substances at Low Temperatures.

In Physics

Leonard B. Loeb, of New York City, B.S. (Chicago, '12), Ph.D. (Chicago, '16). Formerly assistant physicist at the Bureau of Standards, Washington, D. C.; lieutenant, Aviation Service, U. S. A. Mr. Loeb will conduct his researches at the University of Chicago.

Robert A. Patterson, of Bristol, Connecticut, A.B. (Yale, '11), Ph.D. (Yale, '15). Formerly instructor in physics at Yale University; major, Field Artillery, U. S. A.

George P. Paine, of Madison, Wisconsin, A.B. (Harvard, '05), Ph.D. (Wisconsin, '18). Instructor in engineering mathematics, University of Wisconsin. Mr. Paine will conduct his researches at Harvard University and at Blue Hill Meteorological Observatory.

It is expected that additional appointments will be announced in the near future. The members and acting members of the Research Fellowship Board are as follows: Wilder D. Bancroft, Henry A. Bumstead, Simon Flexner, George E. Hale, Elmer P. Kohler, A. O. Leuschner, Robert A. Millikan, Arthur A. Noyes, E. W. Washburn.

THE INDUSTRIAL FELLOWSHIPS OF THE MELLON INSTITUTE[1]

The annual report of Director Raymond F. Bacon of the Mellon Institute of Industrial Research[2] records a general extension of the institute's activities during the past year.

[1] For previous reports on the status of the system of cooperation between science and industry in operation at the Mellon Institute, see Duncan, Science, N. S., Vol. XXXIX. (1914), 672; Bacon, *ibid.*, XLIII. (1916), 453; *ibid.*, XLV. (1917), 399; and Weidlein, *ibid.*, XLVII. (1918), 447.

[2] The full report is published in *J. Ind. Eng. Chem.*, 11, 371–374, 1919.