

they are fitted and for which they are unsatisfactory investigated. Many of these facts are obtainable only if commercial firms offer their hearty cooperation and support. They are not trade secrets but pertain to specialized industries and are not usually available in published form.

These agricultural, botanical and industrial data, if brought together in a systematic manner, will have a lasting value and will serve as a basis for placing economic botany on the high plane of usefulness that industrial chemistry has held for many years. But they will not meet the practical requirements of economic life unless considered from the commercial viewpoint. They must be supplemented by all available statistics concerning the importation and exportation of each product, and the prices current through a term of years.

Finally, there must be a reference library department. Information is of little use unless it is systematized in such a manner that it is readily available. Adequate cross reference catalogues containing citations of the best literature must therefore be kept up to date.

This, in a general way, is the work which the Botanical Raw Products Committee must do to be in a position to act as an industrial service bureau. This is the work which, though it must be continuous, though it never reaches completion, is really preliminary to the main activities listed above. True service must come from actual contact with the technical problems of manufacturers and importers.

For the Committee, EDWARD M. EAST, *Chairman*.

NATIONAL RESEARCH COUNCIL

MEETINGS OF THE EXECUTIVE COMMITTEE

The thirtieth meeting of the Executive Committee convened in the offices of the Council in the Munsey Building, Washington, D. C., on September 13, 1917, and was called to order at 3.00 p.m. by the Vice-Chairman, Mr. Millikan.

Messrs. Bogert, Dunn, Millikan, Noyes and Vaughan were present, and, by invitation, Messrs. Durand, G. N. Lewis, Manning, and Mendenhall.

Discussion took place with regard to the advisability of extending the scope of the Research Council, so to have it serve, if practicable, as a means to bring about the coördination and centralization of research activities carried on in connection with the war in different bureaus of the Departments of the Government. Mr. Millikan outlined the development of the work of the Council in its capacity as an advisory agent for the scientific services of the Signal Corps and presented the following statement which has been prepared with the approval of the Chief Signal Officer as expressive of existing relations:

The Science and Research Division of the Signal Corps, established on July 16 under the direction of the National Research Council, of which Major Millikan is the Executive Officer,

is expected to keep in close touch with all of the divisions of the Signal Corps in which research is carried on or is needed. Its status and connections are shown in the accompanying diagram. Its functions are twofold.

1. To furnish personnel of the research sort to the other divisions when the situation warrants attaching men of this type to these divisions.

2. To have a personnel of its own which keeps in intimate contact with all research development work in other divisions, such as new methods, new devices, new instruments and distributes research problems to the research laboratories of the country, university, industrial or governmental, with which it is associated.

Officers in charge of various divisions and services of the Signal Corps in discharging responsibility for the effectiveness of their respective services are expected to make use of the Science and Research Division to the fullest possible extent.

By order of the Chief Signal Officer.

Upon motion this statement was approved by the Executive Committee.

Mr. Manning suggested that it might be desirable for the Council to address a communication to the chiefs of technical bureaus of the Government, offering assistance of the Council in securing adequate representation and cooperation in research. He thought it would be desirable for a scientific representative to be appointed on the general staff of the Army and to have subordinate representatives to aid in the correlation of the research work of the bureaus of the War and Navy Departments.

Mr. Millikan reported that the Engineering Foundation had appointed a special committee consisting of Messrs. Pupin, Goss and Rand to confer with the National Research Council with regard to relations which may appropriately exist between these organizations in the future. Upon motion a special committee or three members of the Research Council was correspondingly authorized to confer with the special committee of the Engineering Foundation on this subject. Mr. Millikan was appointed chairman of this committee and Mr. Carty as a member, these two gentlemen being given the power to name the third member of the committee.

The meeting adjourned at 4.20 p.m.

The thirty-first meeting of the Executive Committee convened in the offices of the Council, Munsey Building, Washington, D. C., September 19, 1917, and was called to order at 9.05 a.m. by the Chairman of the Committee, Mr. Carty.

Messrs. Carty, Dunn, Millikan, Noyes, Pearl, Stratton, Vaughan, and Welch were present, and by invitation, Messrs. Durand, Jewett, Manning, Mendenhall, Paton and Watson.

The minutes of the regular monthly meeting of the Committee of August 22 and of special meetings of the Committee of September 5 and September 13 were read and approved.

The Executive Officer reported:

1. That a lease for the year ending August 31, 1918, was signed by the

Executive Officer of the Council on September 10 for rooms 323 to 335, both inclusive, in the Munsey Building, Washington, D. C.

2. That Messrs. Dunn and Noyes have been added as members of the special committee of the Council, appointed at its meeting of September 13, to confer with a committee of the Engineering Foundation with regard to future relations between these organizations.

3. That Dr. L. R. Williams and Dr. R. P. Strong, members of the Foreign Service Committee of the Council, have submitted extensive reports with reference to their observations abroad on sanitary and medical questions. Copies of Dr. Williams' report have been distributed to officials of the Government, of the American National Red Cross, of the Rockefeller Institute for Medical Research and of the General Medical Board of the Council of National Defense, and numerous papers and documents which accompanied the report have been deposited with the last named organization. Steps are being taken to make a similar distribution of Dr. Strong's report and a similar disposition of his material.

4. That an additional amount of \$5,000 has been deposited by the Carnegie Institution of Washington in the Riggs National Bank to the credit of the National Research Council from the appropriation of \$50,000 made for this purpose by the Carnegie Corporation of New York.

5. That the Chairman of the Committee on Gases used in Warfare has reported that the Surgeon General of the Navy has designated P. A. Surgeon Joseph R. Phelps, U. S. N., on duty in the Bureau of Medicine and Surgery, as a member of this Committee to take the place of Medical Director James D. Gatewood, U. S. N., detached, and that the Chief of Engineers, U. S. A., has designated Captain Earl J. Atkinson, Corps of Engineers, to represent the office of the Chief of Engineers at meetings of the Committee on Gases used in Warfare.

A financial statement was presented, showing expenditures and balances available in the three bank accounts of the Council.

After explanation by Mr. Welch, it was voted that, acknowledging receipt of reports submitted by members of the Foreign Service Committee, the Executive Committee extends its appreciation of the admirable work accomplished by the separate members of this Committee.

Mr. Paton, upon invitation, submitted a report with regard to the proposed coöperative work of the Sub-committee on Psychiatry on the subject of shell shock and the desirability of the maintenance of intensive work of this character abroad.

Mr. Millikan presented an outline of the present activities of the Physics and Submarine Committees of the Council and explained the features of the work of the Council in coöperation with the U. S. Signal Corps, particularly as evidence of desirable relations which may similarly be established with other bureaus of the War and Navy Departments.

He reported that the following recommendations have been submitted to the Chief Signal Officer:

1. That First Lieutenant John Q. Stewart, A. S. Signal O. R. C. be placed on active duty and detailed to Princeton for work in the sound-ranging service.

2. That Mr. Bertram A. Sherry be commissioned as First Lieutenant in the Aviation Section, to assist in the development of the Aerological Service.

3. That in connection with requests received from France for the detail of twenty-five scientists to work in French laboratories,

(a) Major R. W. Wood proceed to France to work in coöperation with Langevin or else under the direction of the Interministerial Commission.

(b) Messrs. Roy W. Chestnut and Samuel Sewall now in Paris be commissioned as Lieutenants and assigned to the laboratory of Professor Perrin, Director of Inventions.

(c) Dr. Leonard Loeb be commissioned as a lieutenant and sent to France for assignment to service by the Interministerial Commission.

He also reported that further recommendations with regard to the detail of men in physics and radio-telegraphy for services in France would be deferred until a report may be received from Maj. Wood with regard to the urgent need for such men and that requests for men in bacteriology, chemistry and hygiene have been provided for through the office of the Surgeon General.

A communication from E. M. East, Chairman of the Botanical Raw Products Committee, was read, urging the allotment of funds by the Council to assist the work of this Committee and the need of securing closer relations with governmental activities. Upon motion of Mr. Noyes, an allotment of \$100.00 was made for use by the Botanical Raw Products Committee.

Mr. Pearl submitted a communication from Irving W. Bailey, Chairman of the Sub-committee on Forestry of the Botany Committee urging reconsideration of the action of the Executive Committee in appointing this Sub-committee and recommending a proposed enlargement in the scope of the work in forestry under the auspices of the Research Council by the creation of a special Forestry Committee with appropriate sub-committees, so as to encourage desirable coöperation in research with existing agencies. The relation of this proposed Forestry Committee with the Botanical Raw Products Committee and with work in botany and agriculture was also discussed, and, upon motion of Mr. Vaughan, it was finally decided to refer these questions with power to a special committee consisting of Messrs. Pearl, Chairman, Bailey, Coulter, East and Millikan, the decisions of this Committee to be reported at the next regular meeting of the Executive Committee.

Discussion took place concerning coöperative relations which may appropriately exist between the Council and the National Food Administration, in order that members of the Council who are actively interested in food research problems may be prepared to urge such coöperation whenever an appropriate time arrives.

Messrs. Millikan and Stratton submitted brief reports relative to recent developments in procuring an adequate supply of optical glass for purposes of the Government.

Upon nomination of Mr. Durand, Chairman of the Engineering Committee, the following Sub-committee on Protective Body Armor was appointed:

Bashford Dean, Chairman, Col. E. B. Babbitt, G. O. Brewster, G. K. Burgess, W. F. Durand, Henry M. Howe, Edward H. Litchfield, Clarence Mackay, Ambrose Monell, Thomas Robins, David B. Rushmore, Capt. A. T. Simonds, Alexander McM. Welsh and W. H. Wilmer.

He also rendered a report with regard to the prospective activities of this Sub-committee in undertaking coöperative work with the Government concerning advisable types of individual armor.

Mr. Watson presented a statement concerning the activities of the Psychology Committee, which led to a discussion of methods employed in the selection of men for aviators. Upon his recommendation, with the endorsement of the Executive Officer of the Council, a second allotment of \$100.00 was voted for use by the Psychology Committee for maintenance of its office in the Munsey Building.

Mr. Pearl submitted a report with regard to the work of the Agriculture Committee and stated that the Council of National Defense had made an appropriation for the necessary expenses of this work. He also stated that, with the approval of the Secretary of Agriculture, this Committee is now recognized as the official coördinating body for agricultural research in the United States.

Mr. Durand reported that the special committee on the Patent Office situation had conferred with the new Commissioner of Patents. He submitted the following recommendations:

That the National Research Council undertake to organize a committee for the purpose of making a preliminary survey of the problems presented by the work of the U. S. Patent Office. The purpose of this committee would be the following:

1. To make a preliminary study of the character and scope of the investigations needed for an adequate study of the problems presented by the work of the Patent Office.
2. To recommend means adequate for carrying forward such a study.
3. To consider and recommend whether such investigations should be undertaken at the present time and under war conditions, or whether they should be deferred to a later time and under peace conditions.

After discussion it was decided to take a broad view of the functions which such a committee might be expected to assume, and upon motion the present committee appointed to deal with this subject, consisting of Messrs. Durand, Millikan and Stratton, was given power to enlarge its membership to deal with the problems presented in accordance with the above recommendations.

Mr. Dunn submitted a report concerning the relations of the Engineering Committee of the Council to other agencies engaged in engineering work and in the performance of functions which may be similar in character to those undertaken by this Committee, and Mr. Durand submitted a brief outline

of the activities of the Engineering Committee as explained to members of this Committee at its recent meeting in New York.

Discussion took place concerning the preparation and publication of literature regarding the work of the Council, and upon motion, it was decided to issue two pamphlets in such form that they may be suitably bound or fastened together; one of these pamphlets to contain a complete list of the officers and members of the Council and of the members of committees and sub-committees; the other pamphlet to contain a description of the organization and scope of the Council with explanatory statements relative to the purposes and activities of its committees.

Upon recommendation of Dr. Hale, Chairman of the Council, conveyed by telegraph, an appropriation of \$1000.00 was authorized for the submarine work being carried on at the San Pedro Station of the Navy Department under the direction of Dr. Hale.

The meeting adjourned at 12.45.

The thirty-second meeting convened in the offices of the Council in the Munsey Building, Washington, D. C., on Friday, October 19, 1917, and was called to order at 9.05 a.m. by the Chairman of the Committee, Mr. Carty.

Messrs. Bogert, Carty, Chittenden, Conklin, Dunn, Manning, Millikan, Noyes, Stratton and Walcott, and, by invitation, C. A. Adams, Durand, Kellerman, Mendenhall and Yerkes were present.

The minutes of the regular monthly meeting of the Committee of September 19 were approved as prepared and distributed to the members of the Committee.

The Executive Officer reported:

1. That the Chairman of the Council has appointed Mr. Manning a member of the Executive Committee and has asked Mr. Welch to serve as an ex-officio member. Upon instruction, the name of Dr. Gatewood, former director of the Army Medical School, has been removed from the list of members of the Council and of its Military Committee, on account of assignment for duty away from Washington.

2. That the U. S. Navy Department has requested the National Research Council, the Naval Consulting Board and the American Institute of Electrical Engineers to submit nominations from which one hundred electrical engineers may be selected and commissioned as lieutenants, junior grade, in the U. S. Naval Reserve Force; and that Mr. Pupin and Mr. Hutchinson have been appointed by the Executive Officer to represent the Council on a joint committee of these three organizations for the purpose of performing the functions required by the Navy Department.

A financial statement was presented showing expenditures and balances available in the bank accounts of the Council.

Botanical Raw Products Committee.—A letter from the Chairman of this Committee was read and, upon motion, he was authorized to invite a member

of the firm of Arthur D. Little, Incorporated, of Boston to become a member of the Botanical Raw Products Committee, and to extend a similar invitation to Dr. W. W. Stockberger, in charge of the division of Drug Plant Investigations of the U. S. Department of Agriculture.

Chemistry Committee.—Upon recommendation of the Chairman of this Committee, the name of the Sub-committee on Dyestuffs was changed to read Sub-committee on Dyestuffs and Textiles, and the name of the Sub-committee on Nitrogen Fixation was changed to read Sub-committee on Nitrates and Ammonia. Furthermore the following were added to the membership of the Chemistry Committee:

GEORGE A. BURRELL, Assistant to the Director, U. S. Bureau of Mines.

WILLIAM F. HILLEBRAND, Chief Chemist, U. S. Bureau of Standards.

CHARLES L. PARSONS, Chief Chemist, U. S. Bureau of Mines.

JAMES F. NORRIS, Professor of General Chemistry, Massachusetts Institute of Technology.

JOEL H. HILDEBRAND, Associate Professor of Chemistry, University of California.

JOHN JOHNSTON, Research Department, American Zinc, Lead and Smelting Co.

and membership in the Sub-committee on Nitrates and Ammonia was appointed as follows:

ARTHUR A. NOYES, *Chairman*.

FREDERICK G. KEYES, Associate Professor of Physico-Chemical Research, Massachusetts Institute of Technology.

ALFRED H. WHITE, Professor of Chemical Engineering, University of Michigan.

The resignation of Mr. W. V. Vawter as a member of the Sub-committee on Chemistry of Fuels was accepted.

Geology and Paleontology Committee.—Upon request of the Chairman, the following were added as members of this Committee:

EDWARD B. MATHEWS, State Geologist of Maryland.

FRANK W. DEWOLF, State Geologist of Illinois.

and a Sub-committee on the Geology of Cantonments and Topographical Instruction in Training Camps was authorized with the following membership:

FRANK W. DEWOLF, *Chairman*, President, Association of American State Geologists.

WALLACE W. ATWOOD, Professor of Physiography, Harvard University.

ISAIAH BOWMAN, Secretary, American Geographical Society.

MARIUS R. CAMPBELL, Geologist, U. S. Geological Survey.

WILLIAM O. HOTCHKISS, State Geologist of Wisconsin.

DOUGLAS W. JOHNSON, Professor of Geography, Columbia University.

LAWRENCE MARTIN, Professor of Geography and Physiography, University of Wisconsin.

GEORGE OTIS SMITH, Director, U. S. Geological Survey.

An allotment of \$100 was also authorized for miscellaneous expenses incident to the work of the Geology and Paleontology Committee and its Sub-

committees, payments to be made in accordance with instructions of the Chairman of the said Committee.

Physiology Committee.—Upon request of the vice-chairman of this Committee, Sub-committees were authorized and members thereof were appointed as follows:

Sub-Committee for Investigations upon the Physiology of Shock

- W. B. CANNON, *Chairman*, Professor of Physiology, Harvard University.
 JOSEPH ERLANGER, Professor of Physiology, Washington University.
 C. C. GUTHRIE, Professor of Physiology and Pharmacology, University of Pittsburgh.
 YANDELL HENDERSON, Professor of Physiology, Yale University.
 D. R. HOOKER, Associate Professor of Physiology, Johns Hopkins University.
 H. C. JACKSON, Professor of Physiology, New York University and Bellevue Hospital Medical School.
 D. R. JOSEPH, Professor of Physiology, St. Louis University Medical School.
 F. H. PIKE, Associate Professor of Physiology, Columbia University.
 T. SOLLMANN, Professor of Pharmacology, Western Reserve University.
 C. J. WIGGERS, Assistant Professor of Physiology, Cornell University Medical School.

Sub-Committee on Control of Hemorrhage

- W. H. HOWELL, *Chairman*, Professor of Physiology, Johns Hopkins University.
 JAY MCLEAN, Student, Johns Hopkins Medical School.

Sub-Committee on Solution Adapted for Transfusion After Hemorrhage

- L. J. HENDERSON, *Chairman*, Assistant Professor of Biological Chemistry, Harvard University.
 CECIL H. DRINKER, Instructor in Physiology, Harvard University Medical School.

Sub-Committee on Fatigue in Industrial Pursuits

- FREDERICK S. LEE, *Chairman*, Professor of Physiology, Columbia University.

Psychology Committee.—Upon recommendation of the Chairman, the following members were added to the Psychology Committee:

- JAMES R. ANGELL, Professor of Psychology, University of Chicago.
 WALTER D. SCOTT, Director of Bureau of Salesmanship Research, Carnegie Institute of Technology.

Upon motion, the Executive Committee voted to accept the resignation tendered by J. McKeen Cattell of Columbia University as a member of the Psychology Committee.

Forestry Committee.—The special committee appointed at the meeting of the Executive Committee of September 19, 1917, to submit recommendations relative to an adequate organization to represent the interests of forestry and its relation to work in botany and agriculture submitted a report, after the discussion of which it was voted, upon motion, to approve the organization of a special Forestry Committee of the Council with the understanding that recommendations concerning membership in such a committee would be submitted at a subsequent meeting.

Physics Committee.—Mr. Millikan reported with reference to development of work in meteorology and sound-ranging and mentioned the highly organized work of the Council relative to submarines; and Mr. Mendenhall submitted a report of progress concerning work in aeronautic instruments, with particular reference to the subject of photographic lenses.

A communication from Dr. Hale was read relative to the question of international scientific relations after the war. Extended discussion of this subject followed.

Mr. Millikan referred to a communication from the Chairman of the Council respecting the question of financial assistance from the Government, in view of the co-operative investigations which have been undertaken by the Council in the interests of the Government. Discussion which followed led to the consideration of the question of possible development of the Council which may become necessary as a result of the extension of these activities; and in this connection Mr. Bogert submitted an oral report relative to the work of the special committee which had been appointed by the Executive Committee to consider questions of organization. This special committee was thereupon discharged.

Upon motion, a Sub-committee to consist of five members, of which the Chairman of the Council shall be Chairman and the Chairman of the Executive Committee a member, was authorized to consider and report at a future meeting of the Executive Committee, with reference to the advisability of securing further financial assistance from the Government in the work of the Council, with regard to recommendations concerning advisable changes in the organization of the Council with a view to increasing its usefulness for future work, and with reference to the relations which members of the Council and of its committees may appropriately maintain with the U. S. Government should such individuals be directly associated with industrial and commercial interests from which the Government is receiving assistance.

A letter from Cary T. Hutchinson, submitting his resignation as Secretary of the Council, was read. He stated, however, that he expected to continue as Secretary of the Engineering Foundation for the present and would be glad at the same time to serve the Council, if of convenience.

After discussion and upon motion, the offer of Mr. Hutchinson to continue his work as Secretary of the Council was accepted with thanks.

The following resolution passed by the Engineering Foundation at its meeting on September 20, 1917, was submitted, in reply to the offer of the National Research Council, tendered by resolution at a meeting of its Executive Committee on August 22, 1917.

Resolved, That the Engineering Foundation receives with pleasure the resolution of the National Research Council expressing appreciation of the financial and personal assistance rendered to the organization and work of the Council during the past year. Reciprocating the Council's desire for the maintenance of close relations between workers in science and in

engineering, the Foundation hereby declares that it will be its policy to continue the cooperation between the two bodies in all practicable ways that may be now, or may become, mutually available, such ways consisting of the interchange of helpful suggestions, advice, information, office representation and similar facilities, and in addition a recognition of community of purpose that shall promote in the field of engineering research increasingly intimate relations between engineering and science.

The reciprocal designation of the secretary of each of the bodies as an assistant secretary of the other for the purpose of enabling both bodies to have offices in both New York and Washington is favorably regarded, and the Foundation welcomes and gladly accepts the offered assistance of the Research Council in the national co-relations of the Engineering Research work of the Foundation to which the Foundation's resources will be devoted.

Extended discussion took place with regard to advisable means for bringing about a more co-ordinate effort among engineering interests with reference to the Government. Upon invitation, Mr. C. A. Adams, Chairman of the General Engineering Committee of the Advisory Commission of the Council of National Defense, outlined plans already made for a general conference on this subject to be held in Washington on October 26, to which all of the national societies and special organizations interested in engineering work have been invited to send representatives. He stated that the National Research Council, its Engineering Committee and its Aeronautics Committee have each been invited to appoint two representatives to attend this conference. There followed further discussion in which Mr. Adams participated, concerning the engineering work of the Research Council, after which the Chairman of the Executive Committee was requested upon motion to appoint the six representatives of the Council to attend the conference on October 26, with the understanding that these conferees will meet in advance to discuss and determine upon appropriate recommendations which may advisedly be made by them at the conference in question. The following members of the Council were appointed as conferees; Messrs. Carty, Dunn, Durand, Noyes, Millikan and Pupin.

The meeting adjourned at 1.10 p.m.

The thirty-third meeting of the Executive Committee convened in the offices of the Council in the Munsey Building, Washington, D. C., on Saturday, November 10, 1917, and was called to order at 10.10 a.m. by the Chairman of the Committee, Mr. Carty.

Present: Messrs. Bogert, Carty, Chittenden, Conklin, Dunn, Hale, Manning, Millikan, Noyes, Pearl and Pupin. Mr. Mendenhall was also present upon invitation.

The minutes of the regular monthly meeting of the Committee of October 10 were approved as prepared and distributed to members of the Committee.

Record is made of the following actions which have taken place since the last meeting of the Committee:

1. That upon suggestion of the Chairman of the Council, Major General William M. Black has been appointed a member of the Council by the President of the National Academy of Sciences and has been designated by the President of the United States for such service. General Black has accepted such appointment and has furthermore been added to the membership of the Military Committee.

2. That leases of Rooms 304, 312, 313 and 314 in the Munsey Building have been taken for a period of ten months, beginning November 1, 1917, at the monthly rental of ninety-five dollars.

3. The following have been appointed and have accepted appointment as members of the Botanical Raw Products Committee; Prof. H. M. Hall, Professor of Botany, University of California; Mr. Arthur D. Little, President of Arthur D. Little, Incorporated, Boston; and Dr. W. W. Stockberger, physiologist in charge of drug plant and poisonous plant investigations, U. S. Department of Agriculture.

4. Upon request of the Chairman of the Chemistry Committee, record is made of the following additions to membership in the Sub-committee on Biochemistry:

William J. Gies, Professor of Biochemistry, Columbia University; Lawrence J. Henderson, Assistant Professor of Biochemistry, Harvard University.

Mr. Hale, upon invitation of the Chairman, stated that the primary purpose in calling the present meeting was to afford opportunity for necessary discussion relative to the development and organization of the Council.

Upon request, Mr. Hale outlined proposed plans with regard to the development of the Council, and spoke at length concerning the possibility of obtaining financial assistance in its work. Extended discussion took place, emphasizing the important possibilities of the Council's various fields of work, as indicated in a written statement presented by Mr. Hale. Upon motion of Mr. Noyes, it was voted that these preliminary plans, as submitted and outlined by the Chairman of the Council, be substantially approved.

Upon motion it was also voted that the duties of the Sub-committee of the Executive Committee, authorized at the last meeting of the Committee to consider and report with reference to questions of organization and Governmental relations, be increased by requesting this Sub-committee likewise to undertake careful consideration of plans which have been approved for the future development of the Council. This Sub-committee was thereupon appointed to consist of Mr. Hale, Chairman, and Messrs. Carty, Dunn, Millikan, Noyes, Pearl, Vaughan and Walcott.

The meeting adjourned at 12.45 p.m.

CARY T. HUTCHINSON, *Secretary*.

LIST OF PUBLICATIONS OF THE NATIONAL ACADEMY OF SCIENCES

From the year 1864 to date the National Academy of Sciences has published at various times Scientific Memoirs, Biographical Memoirs, Annual Reports, Proceedings, and Reports of Committees. The detailed list of titles, with the number of pages and the year of publication, is given below.