

C O P Y

Sheffield Scientific School
of Yale University

New Haven, Connecticut,
October 26, 1916.

My dear Dr. Hale:-

My delay in writing you has not been due to lack of interest in the problems under consideration, but largely because of the celebration of the two hundredth anniversary of the moving of Yale College from New Britain to New Haven, which has just occurred. This has taken considerable of my time, and other matters likewise have come forward which have kept me busy.

It seems to me that one of the first points to be emphasized, in a general way, is that the whole question of national defense, or the problems connected with it, must be looked at from a very broad standpoint. It is understood, I think, -- certainly by scientific men, -- that any form of scientific research may lead to results of broad value, and even of practical value. In other words, the so-called national defense problems are not to be considered as having to do simply with a limited number of questions directly bearing on the more obvious lines of national defense, but should be considered in the broadest possible manner. By this I mean that in our letter to the universities, from which it is hoped to obtain a sort of inventory of resources along lines of research, we should be interested in acquiring information as to all possible resources in research which the university may have at its disposal. Biological research, physiological re-

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Shellfish Scientific School
of Yale University

New Haven, Connecticut,
October 26, 1916.

My dear Dr. Halsey:-

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search, may have just as much practical bearing on the broad subject of national defense as research in applied chemistry, metallography, or any form of engineering.

I should like to see just as much emphasis in this inventory put upon pure scientific research, as upon research in applied science or industrial science. Our National Research Council should have full knowledge, ultimately, of all the resources available in the country bearing on all forms of science in their possible relation to the public welfare.

Again, I should like to see incorporated in the letter questions tending to draw out the resources of our different universities in research fellowships in pure and applied science; the degree to which industrial research fellowships have been established; how far cooperative research is practiced; how far men are being specially trained in the different universities for research work, both pure and applied; how far there are laboratories and equipment available for the carrying on of research.

After thinking over the matter at some length, I am strongly of the opinion that on the local research committees to be established it would be very desirable to have one representative of the highest official board of the University, either the President, or some one member of the Board of Trustees. Personally, I think if the President of the University could be induced to serve on such a committee, it

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G.E.H. -3-

would add materially to its strength, and eventually might be exceedingly serviceable. With this in mind, I have talked the matter over with President Hadley, and he has agreed to serve with me on the local research committee here in New Haven.

I conceive it quite possible that, sooner or later, there may be reasonably large sums of money available for carrying out certain lines of specific research, and we need to know how far the individual universities of the country would be able to offer facilities, either in laboratory space or in men, for such kinds of cooperation. I believe that many specific problems will arise which would be altogether too large for any one university to handle, but for which grants of money could be obtained through parties interested, and then committees could be formed to devise methods for attacking the problem; oversee the carrying out of these methods in different localities.

Sincerely yours,

(Signed) Russell H. Chittenden.

Dr. George E. Hale,
c/o Mr. Cary T. Hutchinson,
Engineering Society Building,
25 West 79th Street,
New York City.

Dictated.

G.E.H. - 2

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tacking the problem; oversee the carrying out of these methods
in different localities.

Sincerely yours,

(Signed) Russell K. E. Chittenden.

Dr. George E. Hale,
c/o Mr. Cary T. Hutchinson,
Engineering Society Building,
25 West 25th Street,
New York City.

Dictated.

Chicago, November 9, 1916

Dear Mr. Hale:

Yours of the 1st inst. with accompanying documents was duly received. I had a chat with Mr. Coulter and shall be glad to act along the lines which you indicate. I presume that it might be well to confer with you when you reach here for your engagement of the 17th inst. before proceeding. With sincere regards, I am,

Very truly yours,

H.P.J. - L.

Professor George E. Hale
% Professor H. M. Goodwin
Massachusetts Institute of Technology
Boston, Massachusetts

Chicago, November 9, 1916

Dear Mr. Hale:

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documents was duly received. I had a chat with Mr. Conliffe and shall be glad to act along the lines which you indicate. I presume that it might be well to confer with you when you reach here for your engagement of the 17th inst. before proceeding. With sincere regards, I am,

Very truly yours,

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Professor George E. Hale
& Professor H. M. Goodwin
Massachusetts Institute of Technology
Boston, Massachusetts

NATIONAL RESEARCH COUNCIL

CENSUS OF RESEARCH

7

EDUCATIONAL INSTITUTIONS

INSTITUTIONAL REPORT

At the request of the President of the United States, the National Academy of Sciences has appointed the National Research Council to assist and encourage scientific research. With this end in view, the Council is collecting information concerning the research men and facilities available in the United States. Such information will be used to promote research in pure science, to stimulate investigational activity and co-operation along technical lines, and to aid in the solution of the scientific and technical problems of the Government, with particular reference to national defense.

The Chairman of the Research Committee or Secretary of the Institution is requested to fill out this Institutional Report in triplicate: retaining one copy; forwarding the second as soon as possible to the National Research Council, Munsey Building, Washington, D. C.; and sending the third to the same address with the completed set of Departmental Reports.

The accompanying blanks for Departmental Reports are to be sent to the departments (See question 5) which are concerned with the following subjects: Mathematics, Astronomy, Physics, Chemistry, Engineering, Geology, Paleontology, Geography, Botany, Zoology, Agriculture, Forestry, Physiology, Medicine, Anatomy, Hygiene, Psychology, Anthropology.

(This blank is intended for use on a typewriter. If additional space is needed, use separate sheets, numbering replies to correspond with questions).

1. Name of Institution The University of Chicago

2. Location Chicago, Illinois

3. Research Committee		Indicate by a cross (X) the group which the member is designated to represent.		
		FACULTY	TRUSTEES	ALUMNI
John M. Coulter	Chairman	X		
T. C. Chamberlin		X		
A. A. Michelson		X		
R. A. Millikan		X		
Julius Stieglitz		X		
E. H. Moore		X		
R. R. Bensley		X		
Martin A. Ryerson			X	
Julius Rosenwald			X	
Harold H. Swift			X	
F. B. Jewett				X
Raymond F. Bacon				X

4. Research Funds.

State in detail below for each separate fund: (1) its customary designation, (2) its annual income, (3) any limitations as to its use, and (4) the purposes for which it is available. If desired a printed statement from the catalogue or other source may be attached to this sheet.

(a) Funds available only for fellowships and graduate scholarships.

1. (1) Joseph B. Loewenthal Fellowship. (2) \$400... (3) For especial promise in research. (4) Department of Chemistry.
2. (1) Gustavus F. Swift Fellowship. (2) \$520. (3) For especial ability in research. (4) Department of Chemistry.
3. (1) Edith Barnard Memorial Fellowship. (2) \$120. (3) Awarded to a deserving graduate student. (4) Department of Chemistry.
4. (1) Other fellowships in scientific departments are awarded to graduate students, 51 in addition to the above. These fellowships are provided from the income of the General Funds of the University. (2) Stipends range from \$120 to \$520. per annum. (3) For work toward the degree of Doctor of Philosophy. (4)

Scientific Departments.

(b) Other funds available for research.

1. (1) Ogden School of Science Endowment. (2) Income in 1915-16, \$14,531.40. (3 & 4) For instruction and research in the scientific departments of the University.
2. (1) Helen Culver Endowment. (2) Income in 1915-16, \$31,783.98. (3) For the development and spread of knowledge in the field of biological sciences. (4) Instruction and researches in biology.

5. List the Departments of science and engineering of the Institution, or sub-divisions of departments, to which the accompanying Departmental Report forms have been referred. (In large departments, each main sub-division may be treated as a separate department.)

Mathematics

Astronomy and Astrophysics

Physics

Chemistry

Geology and Paleontology

Geography

Zoology

Anatomy

Physiology

Physiological Chemistry

Botany

Pathology

Hygiene and Bacteriology

6. In view of existing war conditions, in what ways and to what extent will the men and facilities of the institution be available for problems relating to national defense?

The Board of Trustees of the University of Chicago
have offered the Federal Government the use of the science
laboratories for any purposes which the Government may
regard as desirable, and members of the staff of the
scientific departments have volunteered their services in
this connection.

Signature

Harry Pratt Judson
President

Date May 19, 1917

The University of Chicago

The Botanical Gazette

May 10, 1917.

President H. P. Judson,
Office of the President.

Dear President Judson:

I have distributed to our scientific departments
the blanks sent by the National Research Council.

There is also a blank calling for an "institutional
report." I have filled this out so far as I can, but
nos. 4 and 6 belong to the administration to fill out.
I am therefore returning this blank to you, accompanied
by the letter addressed to you, and also the sample
report, which is intended to guide us in filling out
the blank.

You will notice that this report is in triplicate,
and that one copy is to be returned at once in the en-
closed addressed envelope.

Yours sincerely,

John M. Coulter

Case University of Chicago

100 University Avenue

Chicago, Ill.

President M. T. Anderson
University of the Pacific

Stockton, California

I have directed to our administrative

department to send you the following report

There is also a slight addition for an "Administrative

Report" I have filled this out as far as I can, but

one I am not certain of the administration to fill out

I am therefore returning this blank to you, accompanied

by the letter addressed to you, and also the sample

report, which is intended to guide as to filling out

the blank.

You will notice that this report is in triplicate,

and that one copy is to be retained at each of the en-

closed addresses envelope

Yours sincerely,

John M. Carter

NATIONAL RESEARCH COUNCIL

WASHINGTON OFFICE
MUNSEY BUILDING

NEW YORK OFFICE
THE ENGINEERING FOUNDATION
33 WEST THIRTY-NINTH STREET

WASHINGTON, D. C.

President Harry Pratt Judson,
University of Chicago,
Chicago, Ill.

Dear Sir:

The National Research Council, formed by the National Academy of Sciences at the request of the President of the United States, is collecting information concerning the research men and facilities available in this country. Such information will be used to promote research in pure science, to stimulate investigational activity and cooperation along technical lines, and to aid in the solution of the scientific and technical problems of the Government, with particular reference to national defense.

While under normal conditions the Research Council will direct its efforts towards the development of research in all its aspects, present conditions demand that special attention be given to the problems of national defense. This need is emphasized by the following resolution, adopted on February 28, 1917, by the Council of National Defense (which consists of the Secretaries of War, Navy, Interior, Agriculture, Commerce, and Labor):

RESOLVED that the Council of National Defense, recognizing that the National Research Council at the request of the President of the United States has organized the scientific forces of the country in the interest of national defense and national

welfare, requests that the National Research Council cooperate with it in matters pertaining to scientific research for National defense and to this end the Council of National Defense suggests that the National Research Council appoint a committee of not more than three, at least one of whom shall be located in Washington, for the purpose of maintaining active relations with the Director of the Council of National Defense.

In accordance with this request, the Research Council has appointed Dr. Charles D. Walcott, Chairman of the Military Committee, Dr. S. W. Stratton, Secretary of the Military Committee, and Dr. Robert A. Millikan, Vice Chairman in Charge of the Correlation of Scientific Research for National Defense, as members of such a committee to conduct its work in Washington in cooperation with the Director of the Council of National Defense.

An important preliminary step in the work of the Research Council is the preparation of a national Census of Research, showing the research men and facilities in cooperating government bureaus, educational institutions, research foundations and industrial research laboratories.

To secure information for this Census in such form that it can be readily tabulated, the enclosed blanks have been prepared. In view of the present emergency, you will greatly aid the Council by having these blanks filled out and returned promptly.

In seeking this information, and in all of its plans for cooperation, the Research Council wishes to emphasize its belief that individual freedom and initiative are of

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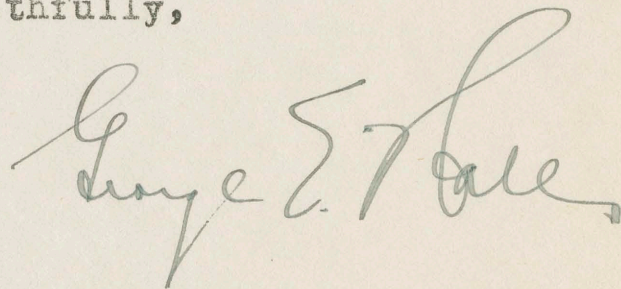
In seeking this information, and in all of its plans for cooperation, the Research Council wishes to emphasize its belief that individual freedom and initiative are of

fundamental importance in successful research. Cooperation is only a means for stimulating and rendering more effective the research activities of the individual investigator. Moreover, it is not the desire of the Council to inconvenience or embarrass any investigator, or to receive information of a confidential nature. These principles should be borne in mind in interpreting the enclosed blank form.

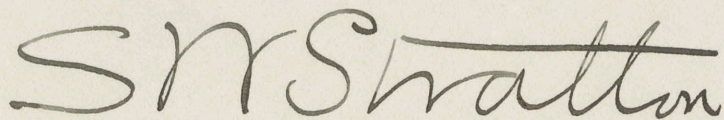
Your attention is especially directed to the request for research problems and suggestions bearing on the national defense. The formulation of such problems has been undertaken by various committees of the Council, particularly by the Military Committee and by a special committee of scientific men sent abroad to report on military needs. Additional suggestions, nevertheless, are desired from investigators in all departments.

Trusting that we may have the benefit of your cooperation in this work, we remain,

Yours faithfully,



Chairman.



Chairman, Committee on Census of Research.

CENSUS OF RESEARCH

INSTITUTIONAL REPORT

[illegible]

4. Research Funds.

State in detail below for each separate fund: (1) its customary designation, (2) its annual income, (3) any limitations as to its use, and (4) the purposes for which it is available. If desired a printed statement from the catalogue or other source may be attached to this sheet.

(a) Funds available only for fellowships and graduate scholarships.

1. (1) Arthur Brown Astronomical Fellowship. (2) \$300. (3) Holder must have an M. A. degree. (4) Astronomical research.
2. (1) Davenport Scholarship. (2) \$200. (3) Holder must have an A.B. degree. (4) Aid for a needy student.
3. (1) James Clark Fellowship. (2) \$500. (3) None. (4) Research in science.
4. (1) The Electrical Manufacturers' Fellowship. (2) \$1000. (3) None. Research upon electrical materials.

(b) Other funds available for research.

1. (1) John Wilson Research Fund. (2) \$10,000.
(3) Not more than one-half of income can be spent on apparatus.
(4) Research in the physical sciences.
2. (1) The Martha Townsend Fund for Psychological Research. (2) \$3000.
(3) None. (4) Research in Psychology.

5. List the Departments of science and engineering of the Institution, or sub-divisions of departments, to which the accompanying Departmental Report forms have been referred. (In large departments, each main sub-division may be treated as a separate department.)

Pure Mathematics

Applied Mathematics

Physics

General Chemistry

Analytical Chemistry

Organic Chemistry

Physical Chemistry

Civil and Hydraulic Engineering

Mechanical and Electrical Engineering

Geology

Botany

Zoology

Forestry

Veterinary Science

Psychology

6. In view of existing war conditions, in what ways and to what extent will the men and facilities of the institution be available for problems relating to national defense?

While the instructional work of the institution will be continued so far as possible, all of the resources of the University may be used for researches upon national defense problems, except the Pax Physical Laboratory. The endowment of this laboratory specifically states that no problems relating primarily to war shall be investigated by any member of its staff. In the other laboratories a considerable part of the research work of graduate students can be given to national defense problems. A method of applying the classical fellowships to these problems is being considered by the faculty and trustees.

Signature John Burns

Date April 2, 1917.

Chairman of Research Committee

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The University of Chicago

The Botanical Gazette

March 6, 1917.

President H. P. Judson,
Office of the President.

My dear President Judson:

I am enclosing a letter from Professor Hale which I thought you might be interested in glancing through. He seems to be stirred up thoroughly, and is trying to arouse the various committees to action.

I also wish to ask whether it would not be possible ~~not~~ for us to have the initial meeting of organization of our University Committee on Research. I have looked up all the information as to what such committees can do, in the light of what others have done. I believe that such a meeting would not be regarded as merely a formality, from which we have been asked to save Mr. Rosenwald and Harold Swift.

If you can suggest a favorable time for such a meeting, which of course should include yourself, I shall be glad to arrange a schedule of proceedings. In my judgment it would be more appropriate for you to call the meeting, since there is no organization of the committee as yet.

Yours sincerely,

John M. Coulter

The University of Chicago

1000 University Avenue

Chicago 9, Ill.

President H. B. Johnson
Office of the President

My dear President Johnson:

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Yours sincerely,

John D. Latta

Please return to
JMC

NATIONAL RESEARCH COUNCIL

WASHINGTON OFFICE
NATIONAL ACADEMY OF SCIENCES
SMITHSONIAN INSTITUTION

OFFICE OF THE CHAIRMAN
MOUNT WILSON SOLAR OBSERVATORY
PASADENA, CALIFORNIA

NEW YORK OFFICE
THE ENGINEERING FOUNDATION
33 WEST THIRTY-NINTH STREET

Pasadena, March 1, 1917.

Dr. John M. Coulter
The University of Chicago
Chicago, Illinois.

My dear Dr. Coulter:

In the present crisis, and in view of the primary purpose of the National Research Council, you will need no suggestion from me to indicate that the work of your Committee should be concentrated for the time being on the research problems of national defense. In some fields of science the possibility of important contributions may seem rather remote. But by referring to the files of Nature, the Comptes Rendus, the Scientific American, and numerous other scientific and technical journals, you will be interested to see how many aspects of science are actually involved. Thus I am acquainted with astronomers who have contributed toward the solution of war problems by designing a range-finder for use against Zeppelins (Newall); devising an instrument for detecting the exact position of shrapnel in the body (de la Baume Pluvinel); making mathematical calculations needed in the development of airplanes (Chrétien); devising and applying a collimating instrument for adjusting binoculars (Dyson); and otherwise utilizing their knowledge wherever they can be of most service. Sometimes there is ample opportunity for service in one's own field; this is notably true in chemistry, physics, and medi-

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NEW YORK OFFICE
THE ENGINEERING FOUNDATION
33 WEST THIRTY-NINTH STREET

OFFICE OF THE CHAIRMAN
MOUNT WILSON SOLAR OBSERVATORY
PASADENA, CALIFORNIA

WASHINGTON OFFICE
NATIONAL ACADEMY OF SCIENCES
SMITHSONIAN INSTITUTION

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N. R. C.

To

Dr. John M. Coulter

-2-

March 1, 1917.

cine. In other cases, such as those just mentioned, an investigator used the experience or the technique gained in his own department to solve problems lying wholly outside of his customary experience. Professor Starling, the physiologist, is in charge of the asphyxiating gas work in England; Count de Noüy, the French physicist, has developed for Dr. Carrel a formula by which the time of cicatrization of wounds can be computed with great precision. Sir Joseph Thomson has worked on a variety of problems, including a device for detecting submarines. Lord Rayleigh, who is equally busy, has given special attention to researches on the development of airplanes. Dr. Harker is studying processes for the fixation of nitrogen. M. Fabry and M. Cotton have devised a new type of range-finder (for locating field artillery) and have done other work of importance. The Duc de Broglie is busy with naval problems. Many other illustrations might be cited, but these will suffice to indicate that almost any capable investigator should be able to contribute in a useful way.

The first work should be the formation of a large number of problems, which can easily be done with the aid of the journals already mentioned. These will then be transmitted to our Military Committee, which will indicate those that are most important to investigate. Research will then be undertaken in the laboratories of universities and other institutions, where investigators will certainly be afforded time for work of this nature, without reduction of salary, under the existing war conditions.

The Military Committee is already formulating problems, some of which have been referred to other committees to study. But its members are extremely busy with military duties, and all possible assistance should be given by every committee. The very essence of preparedness is not

March 1, 1917.

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To

Dr. John M. Coulter

-3-

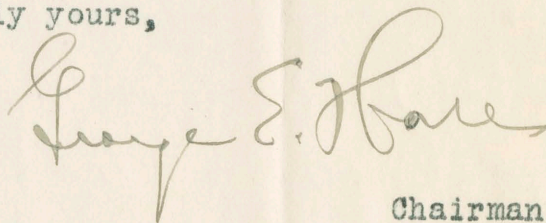
March 1, 1917.

to wait for a need to develop, when it is too late to meet it, but to foresee the need, and institute the researches required for its solution.

In the face of war, every loyal man of science should be willing to drop his present work, wholly or in part, and devote his time and attention to researches on military problems. No one should hesitate because he faces new conditions. His experience as an investigator in any field will serve him well. It should not be forgotten that many of the greatest discoveries have been made by men of science who have come with fresh vision into a new department, where freedom from the hampering effect of habit and tradition has more than compensated for deficiency in special experience.

A meeting of the Chairmen of Committees of the National Research Council will be held at the Cosmos Club, Washington, on Sunday, April 15th, at 3 P.M., to receive reports from its members on the steps that have been taken to formulate and investigate national defense research problems ^{and on other subjects.} Please be prepared to report at this time, and also at the meeting of the Council, which will be held on the following Wednesday (or Thursday morning, if the Local Committee cannot allow sufficient time on Wednesday afternoon).

Very sincerely yours,



Chairman.

N. R. C.

Dr. John H. Combs

-3-

March 1, 1914.

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Very sincerely yours,

James B. Connelley
Chairman.

Announcement of the National Research Council.

The following statement has been prepared as the most effective method of replying to numerous inquiries regarding a matter of fundamental policy.

The National Research Council is an organization whose chief function is to promote scientific research, and without discrimination as between pure and applied science. It operates under the charter of the National Academy of Sciences, which has traditionally represented only the natural and physical sciences, obviously omitting a number of highly important intellectual interests, especially those of the linguistic, social, and historical sciences. The organization of the Council reflects this tradition of the Academy in that its Divisions of Science and Technology are confined to the physical and natural sciences. This fact has been occasionally interpreted as indicating on the part of the Council a somewhat invidious and depreciatory attitude toward research in other fields.

It should be clearly understood that this view has no warrant in fact. The Council, so long as it conforms to the traditions of the Academy, can hardly with propriety extend its functions to fields not connected rather obviously with the natural sciences. Moreover, it would be inexpedient to attempt at the outset of its work to cover more ground than is now being cultivated. The dangers of too rapid expansion are obvious. It is far wiser to begin modestly and build slowly but firmly. Meantime, the Council is cordially sympathetic to the development of research in every field of learning, and will lend its moral support to every worthy effort in that direction.

Conceivably, it may itself, in time be able to take over certain of these interests. But in any event, its present limitation of field must be understood as reflecting its historical foundation and the practical exigencies which confront it, and in no sense as indicating failure to appreciate research outside its own boundaries. It is believed that any improvement which the Council may effect in particular fields of investigation will ultimately redound to the benefit of all research interests.

James R. Angell
Chairman.

December 12, 1919.

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James R. Angell
Chairman.

December 12, 1919.

Chicago, May 16, 1919

Dear Mr. Leuschner:

Your favor of the 6th inst.

enclosing the papers relating to Dr. Leonard B. Loeb, appointed by the National Research Council as a Research Fellow in Physics, was duly received. I beg to say that the University will receive Dr. Loeb in the Department of Physics, Graduate School, and will give him such status and privileges and afford him such facilities as will enable him to carry out his research to the best advantage. At the next meeting of the Board of Trustees of the University I shall recommend Dr. Loeb's appointment as a Research Fellow. Of course he will have all the privileges that he needs in the University.

Very truly yours,

H.P.J. - L.

Mr. A. P. Leuschner
Research Fellowship Board
National Research Council
1023 16th St., Washington, D. C.

Chicago, May 16, 1919

Dear Mr. Leshner:

Your favor of the 6th inst.

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Very truly yours,

H. P. J. - L.

Mr. A. P. Leshner
Research Fellowship Board
National Research Council
1025 16th St., Washington, D. C.

NATIONAL RESEARCH COUNCIL

NATIONAL RESEARCH FELLOWSHIPS IN PHYSICS AND CHEMISTRY

SUPPORTED BY THE ROCKEFELLER FOUNDATION

Applications should be filled out in duplicate and mailed to the Secretary of the Research Fellowship Board, National Research Council, 1023 Sixteenth Street, Washington, D. C.

April 16, 1919

1. Name in full Leonard Benedict Loeb

2. Present address Physical Laboratory, Manchester University, Manchester, England

3. Home address 103 East 78 St. New York N. Y. U.S.A.
(American citizen)

4. Date and place of birth, and citizenship Zürich, Switzerland, Sept. 16, 1891

5. Dependents, if any None

6. Collegiate institutions attended, with dates; and degrees received, or to be received before September next, with dates (with specification of major and minor subjects in the case of the Doctor's degree).

University of California (1908-1910) 2 years, Columbia University (1910-1911) 1 year, Chicago University (1911-1912) 1 year getting B.Sc.

University of Chicago 1912-1916, getting Ph.D. June 1916, Physics major, Chemistry minor subjects.

7. Fellowships and teaching or other professional positions held, with dates.

Assistant in Physics, Chicago 1914-1916.

Laboratory Assistant, ^{later} Assistant Physicist Bureau of Standards, 1916-1918. Technical Section, Engine Division U.S. Air Service, A.E.F. Paris 1918-1919. Research Student & Assistant in Physics, Manchester University, Feb. 1919 - July 1919.

8. Names and addresses of two or more persons well acquainted with the applicant, who, at his request, are sending letters directly to the Secretary of the Research Fellowship Board, as to the applicant's attainment and promise in research, as indicated by his ideals, ability, originality, judgment, enthusiasm, industry, and personality.

Prof. R. A. Millikan, Ryerson Laboratory, Univ. of Chicago.

Prof. Sir Ernest Rutherford, Manchester Univ. Manchester Eng.

Dr. H. C. Dickinson, Associate Physicist, National Bureau of Standards

Major J. C. Riley, Tech. Sect. U.S. Air Service, Paris, France.

W. F. Durand, Dean of Engineering, Stanford University

9. Advanced study in mathematics (including the calculus), and in physics and chemistry (beyond the usual freshman and sophomore courses), showing total number of hours, instructors, and institutions. Also facility in reading foreign languages.

Mathematics, Differential Equations ^{Slaughter} 1 Qr. Univ. of Chicago. 1911.

Differential & Integral Calculus, Prof. Hawkes, Columbia, 1 year, 1911

Advanced Physics, Michelson, 2 years Chicago, 1915, 1916, Mechanics & Wave Motion, Electricity & Magnetism, Physical Optics, Electromagnetics

Advanced Physics, Millikan 3 years Chicago. Kinetic Theory.

Thermodynamics, Electron theory 3 courses, Radioactivity.

Gale, Chicago 1913, Physical Optics. 4 years Research on

Mobility of Gaseous Ions, Under Millikan, Chicago 1913-1916 incl.

6 Months Research work on Structure of Nucleus of Atom

under Sir E. Rutherford, Manchester University, Manchester

1 Year Radioactive Measurements, McCay, Chicago, 1913.

1 Year Physical Chem. Lab. McCay, Chicago. 1912-1913.

1 Year Organic Chemical Preparations, Chicago, 1912. Ref.

1 Year Chemical Engineering Quantitative Analysis, Metzger

Columbia, 1911. 1/2 Year Physical Chem. J. P. Morgan, Columbia 1911.

1/2 Year elect. Conduc. in Gases, Lewis, Columbia, 1910.

Can read and Speak French Easily.

Can read and Speak German fluently.

By one year of a course is meant either 2 Quarters work at Chicago, or 5 lectures a week for 6 months, or 10 hours or more laboratory a week for the 6 months.

Or by 3 lectures a week for the 9 months at Columbia in lectures, or 6 or more hours lab. work a week for 9 months or more

National Research Council
Research Fellowship Board

10. Researches previously pursued, stating where, when, and with whom they were carried out, and where they have been published or otherwise recorded. (These statements are to be supplemented by the submission of reprints of publications, and by typewritten descriptions, a few pages in length of unpublished work.)

3 1/2 Years Research on Mobility of Gas Ions, Millikan Chicago.
1913-1916. Published, Physical Rev. ^{Dec} 1916. Proc Nat. Acad Sciences ^{June} 1916.

ids, Wash. Theoretical Discussion of Results, Louis Franklin Institute Dec. 1917.

Determination of Compressibility Liquid Ammonia
under H. C. Dickinson
Bureau of Standards 1917, Results to date unpublished.

Study of Problem Airplane Sparkplugs, U.S. Bureau of
Standards, Aeronautic Power Plants, ⁱⁿ Confidential Reports.

12, 13, 14, 15, and other results not published as well as
experimental work in France under H. C. Dickinson.

the theory. Research work in connection with Antiaircraft Sound
locating with group of Jean Perin, at Sorbonne, France, 1918.

Research on problem of reflection of particles from light atoms
in connection with nuclear structure, in progress under Sir E.
Purcell at University of Manchester, Manchester, England, now.

11. Subject of the proposed research, and names of one or more institutions at which, in the applicant's judgment, it can be prosecuted to the best advantage. (Applicants are expected to submit a typewritten description of the proposed research, showing its scientific importance, its relation to existing knowledge, the plan of attack, facilities needed, etc; it being understood that this initial program may be modified by the applicant after consultation with the Board and with the professors with whom he will be associated).

1919.

Subject of the proposed research will be a study
of the relations between the existence of so called "Free
electrons" ^{at low pressures} in most gases, the abnormal mobilities
of negative ions at these pressures, and the
mechanism
criteria of ion formation from electrons and
neutral molecules. It can be prosecuted to the best
advantage at the University of Chicago. It
might also be prosecuted at Yale.

NATIONAL RESEARCH COUNCIL

NATIONAL RESEARCH FELLOWSHIPS
IN
PHYSICS AND CHEMISTRY

(Not to be filled in by the applicant)

Name Loeb, Leonard B.

Institutions attended and degrees awarded

Univ. of Calif., 1908-10;
Columbia Univ., 1910-11;
Univ. of Chicago, 1911-16;
B.S., 1912; Ph.D., 1916,
Univ. of Chicago.

Title of proposed research

The Mobility of Gaseous Ions

Institutions named by the applicant

University of Chicago.

Actions taken by the Board

Research Fellowship granted for
ensuing year at \$1500.

NEW YORK OFFICE
THE ENGINEERING FOUNDATION
33 WEST THIRTY-NINTH STREET

NATIONAL RESEARCH COUNCIL

ACTING AS THE
DEPARTMENT OF SCIENCE AND RESEARCH
OF THE

COUNCIL OF NATIONAL DEFENSE

WASHINGTON OFFICE
1023 SIXTEENTH STREET

RESEARCH FELLOWSHIP BOARD

Washington, D. C.
May 6, 1919.

Dr. H. P. Judson,
President, University of Chicago,
Chicago, Illinois.

My dear President Judson:

I take pleasure in informing you that the Research Fellowship Board of the National Research Council has recently appointed Dr. Leonard B. Loeb a National Research Fellow under the plan of which an Announcement was recently sent you, and of which a copy is enclosed herewith; and that Dr. Loeb has expressed a desire to conduct in the Department of Physics of the University of Chicago researches on The Mobility of Gaseous Ions. For your information I am enclosing a copy of his Fellowship application.

The Board would be glad to know whether you desire to receive Dr. Loeb in the graduate division of your Department of Physics, and whether you are willing to give him such status and privileges and afford him such facilities as will enable him to carry out his research to the best advantage. While the Fellowship Board feels responsible for securing the most favorable conditions for the researches of its Fellows, it recognizes that the whole plan is dependent for its success on the cordial cooperation of the educational institutions of the country. The Board therefore invites your active assistance in providing adequately for the investigations of Dr. Loeb and of such other Fellows as may desire to work with your Departments of Physics and Chemistry.

A statement of the general conditions favorable to research has been included in the Announcement; but the Board, while recognizing that different policies prevail in different institutions, ventures to make a few specific suggestions with respect to the Research Fellows and their investigations.

WASHINGTON OFFICE
1001 NINTH STREET

NATIONAL RESEARCH COUNCIL

DEPARTMENT OF SCIENCE AND RESEARCH

COUNCIL OF NATIONAL DEFENSE

RESEARCH FELLOWSHIP BOARD

Washington, D. C.
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N. R. C.

To President H. P. Judson

- 2 -

May 6, 1919.

Thus it seems to the Board highly desirable that the Fellow be closely associated with the staff of the university, and that to this end he should be given a definite status by appointing him as a Research Fellow or with other suitable rank in the university. It would seem further appropriate that there be accorded to him all the privileges as to the use at all times of the laboratories, libraries, supply rooms, etc., as are ordinarily given to the instructing staff; and that no fees should be charged for such facilities or for attendance at advanced courses of lectures or seminars. Finally, it is hoped that the university will be ready to provide within reasonable limits any materials or special equipment which the Fellow may need for his investigations.

The Board will esteem it a favor if you will indicate to it to what extent you feel it practicable to meet the needs of the Fellows along the lines indicated, and will welcome any suggestions as to modifications that seem more consonant with the policy of your institution or better adapted to secure intimate association of the Fellows with the research work of the university.

Very truly yours,

Arthur A. Noyes

Acting Chairman

A. O. Leuschner

Acting Secretary

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R. C.

President H. F. Johnson

May 6, 1919

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Arthur A. Noyes

Acting Chairman

Acting Secretary

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NATIONAL RESEARCH COUNCIL

NATIONAL RESEARCH FELLOWSHIPS IN PHYSICS AND CHEMISTRY

SUPPORTED BY THE ROCKEFELLER FOUNDATION

General Statement.—The National Research Council has been entrusted by the Rockefeller Foundation with the expenditure of an appropriation of \$500,000 within a period of five years for promoting fundamental research in physics and chemistry primarily in educational institutions of the United States.

The primary feature of the plan is the initiation and maintenance of a system of National Research Fellowships, which are to be awarded by the National Research Council 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 effective prosecution of research in physics or chemistry. The plan will include such supplementary features as may promote its broad purpose and increase its efficiency.

Purposes in View.—Among the important results which are expected to follow from the execution of the plan may be mentioned:

(1) Opening of a scientific career to a larger number of able investigators and their more thorough training in research, thus meeting an urgent need of our universities and industries.

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(2) Increase of knowledge relating to the fundamental principles of physics and chemistry, upon which the progress of all the sciences and the development of industry depend.

(3) Creation of more favorable conditions for research in the educational institutions of this country.

Administration.—The plan will be administered by the Research Fellowship Board of the National Research Council. This Board consists of six members appointed for terms of five years, and of the chairmen ex-officiis of the Division of Physical Science and the Division of Chemistry and Chemical Technology of the National Research Council. The members of the Board are:

HENRY A. BUMSTEAD, Professor of Physics, Yale University.

SIMON FLEXNER, Director of Laboratories, Rockefeller Institution for Medical Research.

GEORGE E. HALE, Director of Mount Wilson Observatory.

ELMER P. KOHLER, Professor of Chemistry, Harvard University.

ROBERT A. MILLIKAN, Professor of Physics, University of Chicago.

ARTHUR A. NOYES, Director of the Research Laboratory of Physical Chemistry, Massachusetts Institute of Technology.

WILDER D. BANCROFT, Professor of Physical Chemistry, Cornell University.

Chairman of the Division of Chemistry and Chemical Technology.
_____, Chairman of the Division of Physical Science.

Cooperation of Educational Institutions.—National Research Fellows will be permitted to conduct their investigations at institutions that will cooperate in meeting their needs. These needs differ widely from those of students seeking only instruction. Able investigators, actively engaged in productive research, are needed to inspire and guide the work of the Fellows. Research laboratories, adequately manned with assistants and mechanics, and amply supplied with instruments, machine tools, and other facilities, are indispensable; and funds to provide supplies and to satisfy the constantly recurrent demands of research must be available. Above all, there must exist the stimulating atmosphere found only in institutions that have brought together a group of men devoted to the advancement of science through pursuit of research.

The Research Fellowship Board expects to make arrangements by which educational institutions will associate the Research Fellows with their graduate departments and offer the most favorable conditions for the prosecution of their researches.

The applicant will indicate one or more institutions at which, in his opinion, his research work can be conducted to the best advantage.

Fellowship Appointments.—The appointments of National Research Fellows will be made only after careful consideration of the scientific attainments of all candidates, not only of those who apply on their own initiative, but also of those who are brought to the attention of the Fellowship Board by professors in educational institutions and by other investigators throughout the country. In making the appointments much weight will also be given to the judgment shown by the applicant in selecting and planning his proposed research.

The Research Fellowships will for the most part be awarded to American citizens who have had training equivalent to that represented by the Doctor's degree. The salary will ordinarily be \$1,500 for the first year. The Research Fellowship Board will not, however, be bound by rigid rules of procedure. Thus it may offer larger salaries to those of exceptional attainment or wider experience, and may give appointment to competent investigators who have had training other than that represented by the Doctor's degree. The Research Fellows will be appointed for one year; but they will be eligible for successive reappointments, ordinarily with increase of salary.

Fellowship Regulations.—Research Fellows are expected to devote their entire time to research, except that during the college year they may at their option give not more than one-fifth of their time (outside preparation included) to teaching of educational value to themselves, or to attendance on advanced courses of study. They may associate graduate students with their researches. They shall not engage in

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work for remuneration during the term of their appointment. Fellows who have not received the Doctor's degree may, with the approval of the institution, offer their research work in partial fulfillment of the requirements for that degree.

Fellows are expected to submit to the Board shortly before the first of April of each year a detailed report on the progress of their researches. They must also present an account of their researches in form for publication before withdrawing from the Fellowship; and final salary payments will be deferred until this condition is fulfilled. It is understood that all results of investigation by the Fellows shall be made available to the public without restriction.

Fellowship appointments are subject to the condition that after they are accepted by the applicant, they will not be vacated within the year without consent of the Research Fellowship Board.

Fellowship Applications.—It is expected that fifteen to twenty Research Fellowships will be available during the coming year, and that the number will be increased in subsequent years. Applications for these Fellowships should be made on the form provided for the purpose, and should be sent to the Secretary of the Research Fellowship Board, National Research Council, 1023 Sixteenth Street, Washington, D. C., to whom all other correspondence should also be addressed. Applications will be received up to September 1, 1919 for Fellowships available during the next academic year; but a limited number of appointments will be made on the basis of the applications received before April 20, 1919.

Washington, D. C., March 29, 1919.

The University of Chicago

Ryerson Physical Laboratory

May 14 1919

My dear President Judson:—

In regard to the Research
Fellowship offered to Dr Leonard
Noel I would say that the
Department of Physics will be
pleased to accept him as a
Research Fellow and will offer
him such facilities for his work
as are in our power

Very truly yours

J. S. Michener

