

the fisheries, and are loath to promote any development which is likely to curtail their opportunities for personal influence. It is most encouraging to see evidence that the federal departments are each year becoming less dominated by personal and party politics, and that the officials are permitted to follow the facts wherever they may lead, and to apply the possible corrections. So long as this obtains it is the duty of every organization and right-minded individual to support the federal and state authorities in their attempts to administer these assets for the public good.

Many thinking persons view with alarm the increasing tendency to substitute bureaucracy for democracy and state or federal control or regulation made necessary by changing conditions. The danger lies not so much in the form as in the facts. If the bureaus cease to be the real representatives of the demos, and instead of representing the whole people on the firm basis of judicially ascertained facts, their opinions and acts are coerced and warped from the truth by either subjective or objective considerations, so that they no longer represent the federal democratic ideals, but merely localities and special interests, bending to political and transient expediencies, the danger is not only threatening but is already *here*. The remedy is plain. It is in the hands of the people and must be speedily applied.

G. W. FIELD

GRANTS FOR SCIENTIFIC RESEARCH

(Continued from p. 57)

CHIEFLY COLLEGIATE INSTITUTIONS

THE following schedule embodies information obtained regarding research funds held chiefly by universities and collegiate institutions. With some marked exceptions these funds are available for use only under the immediate direction of the institution possessing the fund and by those connected with it either as members of the staff of instruction or as holding a fellowship. Funds devoted to agriculture and the mechanic arts, as for example those created by the federal government, it has seemed best to reserve for separate treatment later and more fully than is

possible at present. The same is true with regard to funds devoted to astronomical research. Also information has yet to be received regarding marine biological laboratories. Consideration of the appropriations made by Congress for the support of the "Scientific Bureaus" of the United States would seem to come more particularly within the scope of consideration of another sub-committee.

The data already published regarding research funds for scientific purposes which are of general availability throughout the country, and of medical research funds have been gathered from replies to a circular letter issued by the Subcommittee on Research Funds in the spring of 1915, which asked the question:

Will you be so kind as to inform me whether the institution with which you are connected possesses any research fund and if so what is its amount and for what purposes and under what conditions is it available.

The letter referred to was sent to such institutions as seemed likely to possess funds of this character, the publications "Minerva" and "Who's Who in Science (International)" serving as guides. It was widely distributed among collegiate institutions. Upon the replies received from these last the statements here presented are based.

University of Michigan, Ann Arbor, Mich. Harry Burns Hutchins, President. Three research assistantships have been established to aid researches of designated professors.

University of California, Berkeley, Calif. Benjamin Ide Wheeler, President. Research in general maintained by appropriations from the university funds. There is a considerable endowment for graduate fellowships. Appropriations for scientific publications are made from general funds, in 1916-17, \$30,000.

California Museum of Vertebrate Zoology. Supported by annual gift from Miss Annie M. Alexander, of \$7,500.

Scripps Institution for Biological Research, located at La Jolla. Wm. E. Ritter, Scientific Director. Supported by annual gift of \$10,500 from Miss Ellen B. Scripps for which an endowment is pledged, and annual appropriation of \$12,500 from state.

Massachusetts Institute of Technology, Boston, Mass. Richard C. Maclaurin, President.

Ellen H. Richards Fund. \$16,250. For research in chemistry.

Charlotte B. Richardson Fund. \$33,379. For research in industrial chemistry.

Whitney Fund. \$26,890. For research in seismology.

Samuel Cabot Fund. \$55,190. For equipment in industrial chemistry.

For research in sanitary science, the institute has received annually for many years a gift of \$5,000-\$6,000.

For researches in electrical engineering a gift from the American Telephone & Telegraph Co. per annum for a period of five years from 1913, \$15,000.

The institute makes regularly an appropriation from its general funds for research in physical chemistry.

Harvard University, Cambridge, Mass. A. Lawrence Lowell, President.

Jefferson Physical Laboratory. Income from Coolidge Fund (1914-15), \$2,700. Joseph Lovering Fund for physical research, \$7,720. Ernest B. Dane Fund, available in part for research in physics, \$50,000.

Department of Chemistry. Income from C. M. Warren Fund (1913-14). \$334.

Gray Herbarium. Remainder of income from endowment of \$300,000 not needed to care for collections is chiefly devoted to furthering research.

Peabody Museum. Peabody Foundation Fund. \$45,000. Income used for collection and research in archeology and ethnology with special reference to the aboriginal American races.

Huntington-Frothingham-Wolcott Fund. \$20,000. Income devoted to archeological and ethnological research and exploration and publication.

Henry C. Warren Fund. \$10,000. For carrying on exploration. Principal and interest to be used at the discretion of the corporation.

Mary Hemenway Fund for Archeology. \$45,000. Income available for original research in archeology.

The following research fellowships are awarded annually in the Peabody Museum.

Thaw Fellowship. \$1,140 per annum. For "work and research relating to the Indian race of America or other ethnological and archeological investigations."

Hemenway Fellowship. \$575 per annum. For the study of American archeology and ethnology.

Winthrop Scholarship. \$275 per annum. For the study of archeology and ethnology.

Fellowship in Central American Archeology. \$600 per annum. For the study of this subject.

Harvard Fellowship in the International School of American archeology and ethnology, Mexico City. \$600 per annum.

Department of Geology. Shaler Memorial Fund. \$30,367. For original research in geology in the broadest sense, including paleontology, mineralogy, economic geology, etc. The persons nominated for such research are not necessarily officers or students of Harvard University.

Secondary Enrichment Fund. \$50,000. Subscribed mainly by American Copper Companies for investigation regarding secondary enrichment of copper ores in the United States, Alaska and Mexico.

Frederick Sheldon Fund for Traveling Fellowships. \$396,157. Applicable to the aid of students of Harvard University in further study or investigation "either in this country—outside Harvard University—or abroad."

University of Iowa, Iowa City, Iowa. Carl E. Seashore, Dean. The University possesses a fund of \$16,000, about half of the income from which may be used in emergency for research.

University of Wisconsin, Madison, Wis. C. R. Van Hise, President. Usual appropriation in college of engineering for specific research work \$5,000 per annum.

Wesleyan University, Middletown, Conn. Wm. Arnold Shanklin, President.

Crawford Memorial Fund. \$5,000. Available for purchase of apparatus and promotion of research in physics.

Amos Jay Given Biological Fund. \$25,000. Available for maintenance of the department of biology and for the promotion of research in that subject.

University of Minnesota, Minneapolis, Minn. George E. Vincent, President. Funds for research and publication, \$10,000 annually, divided as exigencies may dictate.

McGill University, Montreal, Canada. William Peterson, Principal.

Research Fellowships in Mining. \$10,000.

Research Fund in Metallurgy. \$7,500.

Research work chiefly carried on by annual appropriation.

Rutgers College, New Brunswick, N. J. W. H. S. Demarest, President. Agricultural Research

Fellowships of limited duration have been established as follows:

- Sulphur Research Fellowship in plant pathology. \$1,000 per annum for three years; expires 1916. Established by the Union Sulphur Co., of N. Y.
- Pulverized Limestone Research Fellowship. \$600 per annum for three years; expires 1917. Established by Thomas A. Edison.
- Potash Research Fellowship. \$1,000 per annum for three years; expires 1917. Established by German Kali Works.
- Sodium Nitrate Research Fellowship. \$700 approximately per annum for three years; expires 1917. Established by the Nitrate Propaganda.
- The Amo-Phos Research Fellowship. \$600 per annum for three years; expires 1918. Established by the American Cyanamide Co., Buffalo.
- The Soy Bean Research Fellowship. \$600 per annum for three years; expires 1918. Established by the Murphy Varnish Co., Newark.
- New Jersey Zinc Company Fellowship. \$1,000 per annum for three years; expires 1919.
- Yale University*, New Haven, Conn. Arthur T. Hadley, President.
- Dana Fund. \$24,000 (ultimately). Available for original investigation in geology.
- Hadley University Fund. \$1,030. Available for research in general.
- Elias Loomis University Fund. \$314,000. Available for payment of salaries of astronomical observers and the cost of reducing and publishing observations.
- Seessel University Fellowship Fund. \$43,500. Available for original research in biological studies.
- Hepsa Ely Silliman Fund. \$85,000. Applicable to a certain extent for scientific research.
- Sloane University Fund. \$50,000. Applicable to the payment of research assistants in the Sloane Laboratory of Physics.
- Sloane Laboratory Fund. \$75,000. Income used for the promotion of research and study in physics.
- Thomas C. Sloane Fund. \$75,000. Available for the study of physics in the Sloane Physical Laboratory.
- Russell H. Chittenden Fund. \$4,000. Available for research in physiological chemistry.
- American Museum of Natural History*, New York. Henry F. Osborn, President.
- Jesup Fund. \$1,000,000. To promote research, exploration and publication.
- Morris K. Jesup Fund. \$5,000,000. Bequest for purposes similar to preceding fund. Not yet available.
- Columbia University*, New York, N. Y. Nicholas Murray Butler, President.
- Adams Fund. \$50,000. Available for the support of a research fellow in physical science and for the publication of the results of his investigations.
- Dyckman Fund. \$10,000. Available for research in biology.
- Peters Fund for Engineering Research. \$50,000. Available for research in the department of civil engineering.
- Throop College of Technology*, Pasadena, Calif. James A. B. Scherer, President. \$10,000 per annum guaranteed for maintenance of a department of chemical research. \$10,000 given for equipment of same.
- Princeton University*, Princeton, N. J. John G. Hibben, President. Departmental Fund yielding about \$9,000 per annum. Available in part for research.
- Brown University*, Providence, R. I. William H. P. Faunce, President. Research Fellowships have been founded as follows:
- Grand Army of the Republic Fellowships, \$10,000. Applicable to advanced liberal study.
- Arnold Biological Fellowships. \$10,000. Applicable to biological research.
- Morgan Edwards Fellowship. \$10,000. Applicable to original research in any department of knowledge.
- University of Utah*, Salt Lake City, Utah. J. T. Kingsbury, President. Fund for research in School of Mines. \$7,500. Also some departmental funds for research.
- University of Toronto*, Toronto, Ontario. Robert Falconer, President. Exhibition of 1857 Scholarship for Scientific Research, awarded biennially £150.
- Rensselaer Polytechnic Institute*, Troy, N. Y. Palmer C. Ricketts, Director. Louis E. Laffin Research Fund. \$10,000. Appropriations for research also made from general funds.
- University of Illinois*, Urbana, Ill. Edmund J. James, President. Trustees assign amount of general appropriation from legislature which shall be devoted to research. Graduate School appropriation about \$60,000 per annum.
- Clark University*, Worcester, Mass. G. Stanley Hall, President. Smith-Battles Fund for Psychological Research. \$5,000.

It will be obvious from the preceding data that the number of university research funds and especially of permanent endowments is small, and that several of our universities which are distinguished for the amount and the excellence of the scientific papers emanating from them do not possess such funds, so that by far the greater amount of scientific research which is carried on in this country is sustained by special appropriations. And, furthermore, much of the research work pursued in institutions possessing research funds is also sustained by such budget and special appropriations.

In many of the replies received by the committee attention is called to the fact that while there is no endowment for research yet appropriations sometimes large in amount are regularly made for the purpose. The following abstracts of certain of these replies, although lying somewhat outside of the immediate scope of the inquiry made, will be of interest.

Ohio State University: several graduate fellowships established requiring research work. Johns Hopkins University: besides appropriations for research made in budget for each department, income of various funds is drawn upon for purposes of research. Bowdoin College: maintains a table at the Marine Biological Laboratory at Woods Hole. University of Chicago: special appropriations for research made from time to time from the general funds of the university. Field Museum of Natural History: appropriations for surveys, investigation, etc., made from general fund. University of North Dakota: \$700 annually from departmental appropriations used for research. Denison University: annual appropriation, \$500, made for publication of research work done in the university. Dartmouth College: besides general departmental appropriation in budget, special appropriations for research are made from time to time. Drexel Institute: pays in part fees for professors engaged in investigation. Cornell University: besides appropriations in budget, the university sometimes releases a professor from teaching in order to carry on research. University of Kansas: \$8,000 available for fellowships. Mellon Institute of Industrial Research: expenses of researches met by private subscription. Leland Stanford Junior University: appropriations for research made from budget. Pennsylvania State College School of Engineering: expended for re-

search, 1915-16, \$1,549. Rose Polytechnic Institute: research work provided for by special appropriation. University of Arizona: will probably receive \$5,000 from the state for research in mining. Tufts College: department of biology maintains a room at Harpswell Laboratory. Wellesley College: occasionally an appropriation is made for research carried on by a professor on leave of absence. University of Manitoba: sum of \$1,000 has been collected for research in physiology. Worcester Polytechnic Institute: part of annual appropriation spent for research.

The data which the committee has gathered regarding research funds, while fulfilling the ends which it was intended to reach, can not furnish any definite idea of the real amount expended annually in this country in aid of the progress of scientific research. Such information is very desirable, but to obtain it will require a much more extended inquiry than the present one.

While much care has been exercised in the compilation of the foregoing matter, there will doubtless be found errors both of omission and of statement. The undersigned will be glad to receive corrections of such and to insert them later.

CHARLES R. CROSS,
Chairman

KARL SCHWARZSCHILD

THE American friends of Professor Schwarzschild hoped that the report of his death was a mistake, but since its confirmation by private letters from Germany, they have felt a great sense of sorrow and loss, not only to science, but to themselves personally. Schwarzschild made a visit to this country in 1910, attending the meeting of the Astronomical and Astrophysical Society of America at the Harvard College Observatory and the meeting of the Solar Union at Pasadena. This visit gave an opportunity for closer acquaintance which ripened into personal friendship, and increased our admiration for the man as well as for the astronomer.

Schwarzschild was born at Frankfort-on-the-Main, 1873, October 9. His first astronomical work was done as assistant at the von Kuffner Observatory in Vienna from 1896 to 1899. This work appeared in volume five of the pub-