method similar to that of the repeating rifle. He also developed several types of projectile rockets intended to be fired at tanks or other military objectives, from a launching tube held in the hands and steadied by two short legs, a device similar in many respects to the "bazooka" of World War II.

These weapons were demonstrated at the Aberdeen Proving Grounds on November 10, 1918, before representatives of the Signal Corps, the Air Corps, the Army Ordnance and others. The demonstrations went off quite successfully, but the Armistice next day put an end to the war and also to the experiments.

In the Second World War Goddard likewise offered his services, and was engaged in work on liquid fuel rocket research for the Navy at Annapolis throughout the conflict.

Goddard concluded his last report, in 1936, with these words: "The next step in the development of the liquid-propellant rocket is the reduction of weight to a minimum. Some progress along this line has already been made."

Part of this progress consisted of the development of ingenious, light-weight, simple fuel pumps for injecting the propellants rapidly into the liquid-fuel rocket motor. The physicist had expected to return to New Mexico as soon as possible after the war, to continue his work on high altitude rockets, and planned to set some altitude records which would have been spectacular indeed. His death, at the age of 62, brought this program to an untimely end. Nevertheless, Goddard lived to see the dream of his youth become reality. Jet propulsion, for the uses of war at least, matured in his lifetime from a fantastic notion into a billion-dollar industry. It gave promise, too, of achieving the objectives of peacetime research for which he had spent a lifetime of thought and effort.

Dr. Goddard had been a member of the American Rocket Society for many years, and a few months before his death was elected to the society's Board of Directors. He was universally beloved and respected, and especially so by his associates in research on rockets and jet propulsion. The Board of Directors of the American Rocket Society paid tribute to him in these words:

> The lifework of Dr. Goddard, both as a scientist and a man, will always remain a brilliant inspiration to all of those who are privileged to carry on his endeavors, and to every other bold explorer on the new frontiers of science. In time to come, his name will be set among the foremost of American technical pioneers.

G. EDWARD PENDRAY,
Secretary, American Rocket Society

RECENT DEATHS

DR. EUGENE COOK BINGHAM, professor of chemistry at Lafayette College, died on November 6 at the age of fifty-six years.

DR. RODNEY B. HARVEY, professor and head of the Section of Plant Physiology of the University of Minnesota, died on November 4 at the age of fifty-five years.

DR. RALPH HENRY SMITH, professor of entomology and entomologist in the Agricultural Experiment Station of the University of California at Los Angeles, died on September 22 at the age of fifty-seven years.

DR. CALVIN S. BROWN, professor of Romance languages at the University of Mississippi, well known for his work in geology and in archeology, died on September 10 at the age of seventy-nine years.

SCIENTIFIC EVENTS

THE SUMMER MEETING OF THE AMERICAN MATHEMATICAL SOCIETY

THE fifty-first summer meeting of the American Mathematical Society was held at the New Jersey College for Women of Rutgers University, New Brunswick, on September 15, 16 and 17. The Institute of Mathematical Statistics met on September 16. In accordance with the restrictions on conventions by the Office of Defense Transportation, the society has held no previous meetings in the east or midwest since the annual meeting on November 24–25, 1944, in Chicago. The attendance was about four hundred, including three hundred and twenty members of the society.

Three addresses were given: "Some New Viewpoints in Differential Geometry in the Large," by Professor S. S. Chern, of the National Tsing Hua University and the Institute for Advanced Study; "Topological Methods in Abstract Algebra," by Professor Samuel Eilenberg, of the University of Michigan; "Some Aspects of Ergodic Theory," by Professor Witold Hurewicz, of the University of North Carolina.

On Sunday afternoon a symposium was held on "Recent Developments in Numerical Methods," consisting of three addresses: "Interpolation, Smoothing and Curve Fitting," by Professor I. J. Schoenberg, of the University of Pennsylvania; "Laurent Expansions of Algebraic Functions," by Professor Hans Rademacher, of the University of Pennsylvania, and

"Numerical Solutions of Integral Equations," by Professor A. T. Lonseth, of Northwestern University.

One hundred and thirty-one research papers were presented at this meeting, thirty-five in person and ninety-six by title.

T. R. HOLLCROFT,
Associate Secretary

RESEARCH INSTITUTIONS OF BIOLOGY

THE following statement has been submitted by the Committee on the Promotion of Research of the Michigan Academy of Science, Arts and Letters to the Subcommittee on War Mobilization of the Senate Military Affairs Committee, of which Dr. Lee R. Dice is chairman, which is currently holding hearings on proposals to increase research in the United States:

We earnestly urge the establishment of research institutes of biology in each state and territory of the United States and their generous support jointly by both the federal and state government. These biological research institutes should be dedicated to the discovery of the fundamental laws of biology and the application of biological knowledge to human affairs. Among the problems to be investigated should be included the causes of human diseases and mental disorders, the factors that determine human aptitudes and special abilities, the effects of different types of environments on the human organism, and the adjustment of human societies and cultures to the conditions and resources of their habitats. This kind of research can best be carried out in the individual states rather than concentrated in a single federal institution. Research in human biology surely deserves adequate support by the nation at least as much as and in addition to research in agriculture, in physical science and in engineering.

THE MAGNUSON BILL

THE executive committee of the Pacific Division, American Association for the Advancement of Science, at its meeting in San Francisco on October 19, voted unanimous approval of the following letter, which was written in the first instance by Professor Howard S. Reed to Senator Sheridan Downey of California:

Dear Mr. Senator:

In my capacity as an officer of the Pacific Division of the American Association for the Advancement of Science, I am writing briefly concerning the bills before the Congress regarding national support of scientific research and development.

I have recently been studying the text of Senate Bills 1297, 1285, 1248 and 828. The idea underlying the proposals of the four bills is something new and will undoubtedly provoke an unfavorable reaction on the part of some people just because it is new and venturesome. I do not feel that way about it. I find that these bills recognize the fact that *all* the people should support and promote research in science and the useful arts. Hitherto, support of these activities has come from relatively few public-spirited men and women. In a general way, I favor the proposals outlined in a bill introduced by Mr. Magnuson (Senate Bill No. 1285). The following are my reasons for endorsing this rather than the other proposals:

(1) The proposed National Research Foundation is authorized to develop and promote a broad program and to initiate and support basic scientific research.

(2) The Foundation is authorized to grant scholarships and fellowships. (This is undoubtedly one of the best ways to train promising young men and women.)

(3) The Board of Directors would be free to promote the purposes of the Foundation without the political or semi-political consideration.

(4) The Division of Publications and Scientific Collaboration which could make available to the public scientific information is extremely important, and I speak from experience when I say that privately operating scientific periodicals are fighting desperately for life.

For the first five years the Board of Research and Development could utilize existing laboratories. No greater mistake could be made than to spend large sums at present in the construction of Federal laboratories. It would be much better to make grants of funds to private industrial laboratories or educational institutions under the supervision of the Board of Directors. It will take nearly five years for the board to prepare an adequate program for research. In its essence, men and their intellects are the important things in research rather than lofty buildings. I am not in favor of having the research funds spent in the existing laboratories of the Federal Government because I do not believe that there are now men in those laboratories who are capable of directing basic scientific researches, except in a few cases.

Thanking you for your consideration, I am

Very respectfully yours,

H. S. REED, *Chairman of the Executive Committee, Pacific Division of the American Association for the Advancement of Science.*

The executive committee of the Pacific Division, in endorsing Professor Reed's letter, instructed the secretary to send copies to all members of the Senate and House Committees on Military Affairs, and to send a copy to the editors of SCIENCE.

FEDERAL SUPPORT OF SCIENTIFIC RESEARCH

THE Board of Permanent Officers of the Sheffield Scientific School of Yale University, at a meeting on October 8, 1945, unanimously approved the report of a committee appointed to formulate policy as to federal support of scientific research.

This report recommends the incorporation of four general principles in any legislation concerned with the problem. These are as follows: