Pride in our Past
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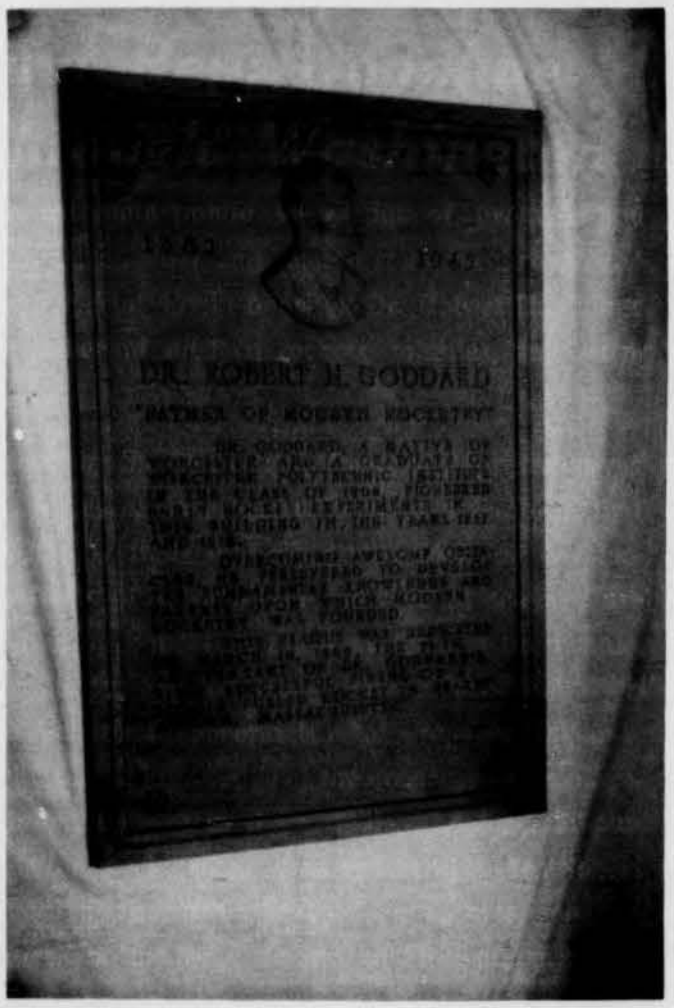
1865-1965
WORCESTER POLYTECHNIC INSTITUTE

The Tech News

Special Edition | Worcester, Massachusetts, Tuesday, March 16, 1965 | No. 20

NATIONAL GODDARD DAY PROCLAIMED BY CONGRESS



The plaque to commemorate the work done at Worcester Polytechnic Institute Magnetics Laboratory by Doctor Goddard. Erected on the north wall of the same laboratory and dedicated on National Goddard Day, March 16, 1965. The memorial is a gift of the faculty, students, and Trustees of W.P.I.

Sen. Saltonstall and Rep. Donohue Guide Measure Through Washington

Through an act of Congress, March 16, 1965 has been proclaimed National Goddard Day. The avowed purpose of the bill is to promote public recognition of the advances in space sciences and rocketry and to recognize the father of modern rocket science, Dr. Robert Hutchings Goddard.

The idea had been fostered and nurtured along by business leaders in Worcester, alumni and administrative personnel at Tech, and dedicated space experts throughout the country. The program was accelerated in order to coincide with Worcester Polytechnic Institute's Centennial Celebration. Senator Leverett Saltonstall introduced the bill in the Senate. The measure proposed March 16, the anniversary of Goddard's first liquid fuel rocket, to be an annual recognition of the rocket pioneer. The bill passed with minor revisions.

Representative Harold Donohue of Central Massachusetts simultaneously introduced the measure in the House of Representatives. The house passed a modified version limiting National Goddard Day to year 1965. The bill was therefore sent to a joint Senate-House Committee to decide on a final version. The committee agreed to single date celebration and the bill was sent to President Johnson to be signed into law. The National Aeronautics and Space Administration is in charge of handling the activities of the day. The three largest observances are to be held at Cape Kennedy, the West Coast, and at Worcester Tech.

A bill to promote public knowledge of progress and achievement in astronautics and related sciences through the designation of a special day in honor of Dr. Robert Hutchings Goddard, the father of modern rockets, missiles, and astronautics.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that the Congress hereby finds that rapid advances and developments in the fields of astronautics and related sciences are having an increasing impact on the daily lives of the people, the national security, and long-range human progress. It is therefore desirable and appropriate that steps be taken to promote greater public knowledge of the progress and achievement being brought about in these fields, and for that purpose to provide for special recognition and honor to Dr. Robert Hutchings Goddard, the father of modern rockets, missiles, and astronautics, and to designate and set aside a special day to honor his memory and his accomplishments.

Sec. 2. (a) The administrator of the National Aeronautics and Space Administration shall provide for appropriate ceremonies, meetings, and other activities on March 16, 1965; said day to be known and celebrated as Goddard Day in honor of the epochal achievements in these fields by the late Dr. Robert Hutchings Goddard.

(b) The President is authorized and requested to issue a proclamation calling upon officials of the Government and the public to participate in the ceremonies, meetings, and other activities held in observance of Goddard Day.

Robert H. Goddard Versatile Collegian

The man whom Tech honors for Doctor Goddard Day on Tuesday March 16 was a distinguished and versatile student at Tech in the Class of 1908. Robert Goddard came to Worcester Tech from Worcester. He chose Worcester Tech as a compromise between the practical and the scientific world, where he might dream as well as create. He early impressed Professor A. Wilmer Duff, head of Tech's Physics Department. Professor Duff made Goddard his lab assistant and recommended him as a tutor, so that Goddard might be able to continue financing his education.

During his years at Tech, Dr. Goddard was a dreamer. The practical aspects of Worcester Tech's curriculum gradually faded in Goddard's mind as his supple mind grappled with the subtle mysteries of the physics he loved and excelled in. Goddard nevertheless enthusiastically pursued Calculus, chemistry, and mechanics, the tools he needed to help his ideas crystalize. Even at this early time in his career he was fascinated by the idea of Sir William Ramsay that atoms were subdivided into even smaller particles, and intrigued that the artificial breakdown of atoms might, according to Sir Joseph Thomson, be the source of limitless energy. So earnest was his quest for knowledge that he moved Leonard P. Kinnicutt, his chemistry professor, in some exasperation after a barrage of questions, to demand, "What are you trying to get at, Goddard?"

Still the germ of a thought, the hint of a dream clung to Goddard throughout his year at Tech. Would space travel, as H. G. Wells in the **War of the Worlds** described, be possible? He toyed with means of propulsion in place of gas balloons and propeller craft—he dismissed Jules Verne's gigantic cannon in **From the Earth to the Moon** as impractical; he thought of ion accelerators; he settled upon the rocket. But even if such a rocket could be devised, could man be kept alive for extended space voyages. Perhaps, Goddard reasoned, man could be frozen into a state of suspened animation in a controlled atmosphere. Impossible, Doctor Kinicutt said; man would die from a dialysis reaction. And how could a rocket be slowed for a landing upon a moon or planet? Perhaps, Goddard hoped, by orbiting the planet and then landing in a sweeping tangent to the planet. Meanwhile, in his Junior Year, Goddard proposed a means for balancing airplanes in flight. "So far as I have been able to learn," Professor Duff said later, "this was the first suggestion for a gyro-stabilizer for aeroplanes."

Before he graduated from Tech in 1908, however, Robert Goddard could look back upon a variety of social as well as scientific experience he gained at his own initiative. He was a member of Sigma Alpha Epsilon Fraternity. He tested some of his early ideas with small solid fueled rockets using Tech equipment. Although a dreamer, he was a genial collegiate and was President, Secretary, and Vice-President of his class in his undergraduate years. He was a member of Sigma Xi, a scientific fraternity, the American Physical Society, the American Geographic Society, and the National Geographic Society. He was also editor of the **Aftermath**, the Tech Yearbook, and in it appeared his composition, Old Tech, whose ending stanza says of Tech, "She's stern and hard, but she's tried and true; Stand by her, boys, Your old Worcester Tech." Goddard and Tech did indeed stand by each other in later years of mutual anonymity. Robert Goddard would not receive the honor in life which he merited so richly in perspective after his death, but he cherished the memories and utilized the educational experience of Worcester Tech in their fullest, richest measure, and all may well be proud to share the heritage and promise of Tech on March 16, when W.P.I. honors this devoted pioneer—and alumnus of our college.

Dr. Robert H. Goddard — The Man

A Personal Glimpse

Dr. Robert Hutchings Goddard, American physicist and engineer, is one of the most important men behind today's developments in long-range rockets, missiles, earth satellites and space flight. He founded a whole new field of science and engineering, now grown into a multi-billion dollar industry.

At his rocket proving range near Roswell, New Mexico, Dr. Goddard developed large and successful rockets during the 1930's which anticipated many features of the later German V2 rockets, including gyroscopic control, steering by means of vanes in the jet stream of the rocket motor, gymbalsteering, power-driven fuel pumps, and other devices.

An ironical fact is that if his own countrymen had listened to Dr. Goddard, the United States today would be 18 to 20 years ahead of its present position in the international space race. There might, in fact, have been no race. Several times in his career, and especially in 1940, he tried to interest our Armed Forces in the potential of rockets, but met only with courteous inaction. This cost us an unchallenged lead in rockets, satellites, and space flight today.

Dr. Goddard began his pioneer experiments in rocketry long before other scientists or engineers in the U. S. or Europe had perceived the full value and promise of the rocket. He continued until his death in 1945 at which time he was engaged in developing jet assisted take-off and variable thrust liquid-fuel rocket motors for the U.S. Navy.

Dr. Goddard was born in Worcester, Mass., on October 5, 1882. He was graduated from Worcester Polytechnic Institute in 1908. Upon graduation he obtained a position as an instructor of physics at W.P.I., and at the same time began graduate work at Clark University. He received his M.A. from Clark in 1910 and his Ph.D. in 1911. He was a research fellow in physics at Princeton University in 1912-1913, and the following year joined the faculty of Clark, where he became a full professor in 1919.

He began his interest in rockets at the age of seventeen, in 1899. As early as 1908 he carried out static tests with small solid-fuel rockets at Worcester Tech. In 1912 he worked out the detailed mathematical theory of rocket propulsion, and showed that the rocket, because it needs no air to operate, could be sent to the moon or into space, provided an efficient motor could be developed.

Upon returning to Clark in 1914, he began to experiment with larger rockets. By 1916, he had reached the limit of what he could do on his own resources. The Smithsonian Institute came to his aid, and with this help he was able not only to continue his work on solid-propellant rockets, but to begin the development of liquid-propellant rockets as well.

After the entry of the United States into the first World War in 1917, Dr. Goddard volunteered his services to the nation, and was sent by the U.S. Signal Corps to the task of exploring the military possibility of rockets. He succeeded in developing several types of solid-fuel rockets intended to be fired at tanks or other military objectives, from a launching tube held in the hands or steadied by two short legs — devices similar in many respects to bazookas of World War II. These developments he successfully demonstrated at Aberdeen Proving Grounds a few days before the close of the first World War. They were the basis of the great United States developments in solid-propellant rockets in the Second World War.

In 1919 he summarized his mathematical explorations, the results of his solid propellant research, and some of his space flight ideas, in a classical paper entitled "A Method of Reaching Extreme Altitudes," published by the Smithsonian Institution. That paper today is one of the basic documents in technical rocket and jet propulsion literature, and the source of numerous developments that have come about since its appearance.

DOCTOR ROBERT HUTCHINGS GODDARD

In the following two decades he produced a number of large liquid-propellant rockets at his shop and rocket range at Roswell, New Mexico, including rockets that anticipated many of the features of the later German V2's. This work was made possible through financial assistance of Daniel Guggenheim and the Daniel and Florence Guggenheim Foundation. In the mid-30's he reported on the progress of his liquid - propellant work in "Liquid Propellant Rocket Development," published by the Smithsonian in 1936. The work in New Mexico was described in further detail in 1948 in a book edited posthumously from Dr. Goddard's notes, and published by Prentice-Hall, Inc., under the title "Rocket Development."

He again offered his services in the Second World War, and was assigned by the U.S. Navy to the development of practical jet assisted takeoff, and liquid propellant rocket motors capable of variable thrust. In both areas he was successful, and demonstrated the resulting devices in tests at Annapolis. The work continued until his death in 1945.

Dr. Goddard was the first modern scientist who perceived the possibilities of rockets and space flight, and undertook the enormous work of bringing them to practical realization. He lived to see his dream of rocket power come to fulfillment — but in the form of a terrible weapon — the German V2 — in the hands of the enemy. His idea of the ultimate in rocket development: flight into space, has also begun to become a reality. His contributions must be recognized as among the most important technical achievements of modern times, marking as they do a turning point in the history of mankind.

The life work of Dr. Robert Goddard has been described as the result of a brilliant mathematical imagination coupled with quiet persistence and optimism. If it is at all possible for a man's work to reflect his personality, then the calm confidence with which Dr. Goddard met his tasks certainly exemplifies his ability.

He was descendant of early settlers in New England, and because of the family, there is no doubt that he possessed great natural gifts. His father was one to encourage his mechanical trends, one reason for his never ending search for truth. As a boy, mathematics was a difficult subject, but he soon realized that he must have a thorough knowledge of that and of physics to achieve his early dreams. He led many classes in these and other subjects with the result that a good part of his college and graduate work was financed through scholarships and fellowships. Not only did he lead his classes scholastically in high school and college, but he found time to serve his class in many extra curricular activities. The "Journal of the Worcester Polytechnic Institute" described him as follows:

"Bob Goddard was no timid recluse . . . but a sociable and witty person, with a host of friends. . . . At the Institute, he was not only number one man in his class scholastically but he was successively elected as its vice-president, secretary, and president. And that class was high powered, both mentally and physically. He was editor-in-chief of the 1908 "Aftermath". He was a member of Sigma Alpha Epsilon fraternity, and one of the first Worcester men elected to Sigma Xi."

Early in life he showed that he had the mind of a researcher. Many don't realize that his inventiveness was not confined to rockets, for he worked on the balancing of airplanes, wireless detectors, mechanical effects with high frequency currents, and the future possibilities of rapid transit. After 1912, when the tremendous possibilities of rockets became clear to him, everything else was second to his work. Throughout his career he kept orderly notebooks, in ink, of all his ideas and experiments.

Although his childhood was an uncommonly happy one, his very sensitive nature was early made evident through the discouragements and disappointments of adolescence, followed by a serious bout with pulmonary tuberculoses. From this period, he emerged not only with an intensified introversion, but with a spiritual reserve to meet misfortunes and reverses that commanded the respect of all who knew him. No one ever saw him in a temper, or knew him to say or do an unkind thing.

It was like him never to refer to his health, nor take advantage of it in any way. He seldom failed to do eight hours of hard work each day. It was the social and recreational side of his life that he held back on.

Like most sensitive people, he was deeply aware of the beauties of nature. Photography was throughout his life his most practiced hobby, probably because of it, it was also a useful tool in his work. When time permitted he painted in oils, usually landscapes. A course of painting lessons in the spring of 1934, together with a very fine painting kit from a grateful student increased his skill and enjoyment of the hobby.

He enjoyed, also, music and reading. For years he was a regular subscriber to a Worcester concert series; and while living in Roswell, New Mexico, he developed a taste for Spanish music. An example of his achievement in this field is "Old Tech", a song that Dr. Goddard composed while an undergraduate at W. P. I. Most of his reading was of a technical nature, but he somehow managed to find time for other books. Among his favorite writers were Kipling, Sir Walter Scott and Kenneth Roberts. Upon finding a writer that appealed to him he managed to read most of the writer's works.

All these activities were only an accompaniment to the main theme of his life, the aspiration to make possible the ascent to great attitudes. He never lost the eagerness to learn. Day by day he worked as few other men can, always striving toward his single goal. Truly a man of great intelligence, courage, and ability.

SCHEDULE

March 16, 1965

10:15 Dedication of plaque on Skull Tomb

Address: Mr. Milton Lehman

Unveiling: Mr. Donald Simonds '08
Mr. George Mitschang '65

11:00 Alden Memorial Auditorium
"Old Tech"

Speaker: Gen. Homer Boushey USAF

12:30 Luncheon Program— Morgan Hall

Address: Gen. Bernard A. Schriever
Commander, Air Force Systems