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# BELIEVES ROCKET CAN REACH MOON

Smithsonian Institution Tells of  
Prof. Goddard's Invention to  
Explore Upper Air.

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## MULTIPLE-CHARGE SYSTEM

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Instruments Could Go Up 200  
Miles, and Bigger Rocket  
Might Land on Satellite.

*Special to The New York Times.*

WASHINGTON, Jan. 11.—Announcement was authorized by the Smithsonian Institution tonight that Professor Robert H. Goddard of Clark College had invented and tested a new type of multiple-charge, high efficiency rocket of entirely new design for exploring the unknown regions of the upper air. The claim is made for the rocket that it will not only be possible to send this apparatus to the higher layers of the air, including those beyond the earth's atmosphere, but possibly even as far as the moon itself.

The highest level so far reached with recording instruments is nineteen miles, accomplished with a free balloon. Professor Goddard believes that his new rocket can be sent through the band of atmosphere around the earth, which he says extends some 200 miles out, and that his new rocket will be of great value to the science of meteorology. To send a rocket beyond the earth influence would require an "initial mass" of 1,274 pounds.

The announcement authorized tonight declares that Professor Goddard is at the present time perfecting the reloading mechanism of his rocket, under a grant from the Smithsonian Institution, and that it is hoped shortly to be able to demonstrate the practicability and value of this new type of rocket.

Professor Goddard has furnished a complete description of his invention to the Smithsonian Institution, which is publishing his paper. Tonight the institution authorized this press statement based on Professor Goddard's description of the invention:

"The apparatus designed and tested by Professor Goddard is a multiple charge high efficiency rocket of an entirely new design. The determining factor of the efficiency of a rocket is the velocity of ejection of the gases due to the explosion of the propelling material. In the case of ordinary or ship rockets, as tested by Professor Goddard, the velocity of exit of the gases is very low, about a thousand feet per second, giving the rocket an efficiency of only 2 per cent. By increasing this velocity, through increasing the proportion of the propelling material to weight of projectile, and through a greatly improved nozzle-shaped passage for the escape of the gases, to about 8,000 feet per second, Professor Goddard has raised the efficiency of the rocket to nearly 64 per cent.

"The great scientific value of Professor Goddard's experiments lies in the possibility of sending recording apparatus to moderate and extreme altitudes within the earth's atmosphere. The nature of the higher levels of the air has for a long time been a subject of much speculation, as to their chemical composition, temperature, electrical nature, density, ozone content, &c. The highest level that has ever been reached up to the present time with recording instruments is about nineteen miles, accomplished with a free balloon.

"As the earth's atmosphere extends some 200 miles out, there is a great unknown region, knowledge of which would greatly benefit the science of meteorology. Weather forecasting, to us the most familiar phase of meteorological research, would undoubtedly be improved if daily observations could be taken in the upper levels of the atmosphere. The present method of observing conditions at moderate altitudes by means of free sounding balloons is time consuming and uncertain. The balloon with its recording apparatus requires several hours to ascend to its highest attitudes, drifts horizontally for a considerable period of time, and may come down at a great distance from its starting point.

"Its recovery by the sender depends on the chance of its descent being noticed and on the willingness of the finder to return it. Thus it may be days or weeks before the record taken is made available. On the other hand, the new rocket apparatus would go straight up and come straight down, the whole operation probably consuming less than half an hour. Thus daily observations at any desired altitudes for use in weather prediction could be easily taken.

"An interesting speculation, described in the publication, arising from Profes-

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# AIM TO REACH MOON WITH NEW ROCKET

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sor Goddard's work, is on the possibility of sending to the surface of the dark part of the new moon a sufficient amount of the most brilliant flash powder which, being ignited on impact, would be plainly visible in a powerful telescope. This would be the only way possible of proving that the rocket had really left the attraction of the earth, as the apparatus would never come back, once it had escaped that attraction. While this experiment would be of little obvious scientific value, its successful trial would be of great general interest, as the first actual contact between a planet and a satellite.

"Professor Goddard carried out a large number of experiments, both in vacuo and in air, to discover the best form of explosion chamber and nozzle for the escape of gases, to secure the highest possible velocity of ejection. With the most highly efficient chamber and nozzle as determined from these experiments he was enabled to calculate the initial mass required to raise recording instruments of about one pound in weight, even to the highest levels of the atmosphere. That this initial mass is a very reasonable quantity, using the efficient form of rocket described, may be seen from the following figures:

"To reach 184,500 feet in the air, 3.6 pounds; 377,500 feet, 5.1 pounds; 610,000 feet, 6.4 pounds; 1,228,000 feet, 9.8 pounds; 2,310,000 feet, 12.3 pounds; and to reach beyond the earth's influence, only 1274 pounds initial mass.

"The time of ascent of the rocket would be very short, only  $6\frac{1}{2}$  minutes being required to carry the apparatus up 230 miles, somewhere near the outer limit of the earth's atmosphere. The too rapid descent of the recording instru-

ments could easily be checked by the use of a small parachute.

"Professor Goddard is at present under a grant from the Smithsonian Institution, perfecting the reloading mechanism whereby successive charges are inserted in the explosion chamber during its upward flight, and it is hoped shortly to be able to demonstrate the practicability and value of this new type of rocket."