

BULLETIN

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Among recent important developments in the field of interplanetary research and theory are:

1. Professor Robert H. Goddard receives financial aid from Daniel Guggenheim for his experimental work on rockets, which will be carried forward under the supervision of a committee of noted experts.
2. Marconi, inventor of wireless telegraphy, says space can be explored by means of radio waves.
3. Professor Piccard, Belgian scientist, balked in first attempt to explore stratosphere in a balloon, waits for favorable weather to try again.
4. Possibility of human beings existing on other bodies of solar system than the Earth discussed by Nathan Schachner at A.I.S. meeting.

GUGGENHEIM AID FOR ROCKET STUDY.

An impulse which may result in America taking the lead from Europe in the development of rockets has been given in the announcement by Clark University that Daniel Guggenheim, whose interest in aviation is well known, has donated \$100,000 to the experimental work of Professor Robert H. Goddard, of the University. Professor Goddard, the foremost rocket expert in the United States, has devoted his time for many years to the perfection of rockets which can be used to explore the upper layers of the atmosphere, about which there is now no scientific knowledge. It is known that he also has hopes of enabling mankind to achieve the aspiration of visiting his neighbors in the solar system.

Professor Goddard has had the aid of the Smithsonian and Carnegie Institutions and of his university in his researches. In the announcement of Mr. Guggenheim's gift it was stated that the experiments will be carried forward under the supervision of a committee consisting of Col. Charles A. Lindbergh, Dr. J. C. Merriam, president of the Carnegie Institution; Dr. Charles G. Abbot, of the Smithsonian Institution; Charles F. Marvin, of the Weather Bureau; Dr. R. A. Millikan, of the California Institute of Technology; Dr. Walter S. Adams, of Mr. Wilson Observatory; John A. Fleming, of the Carnegie Institution, and Henry Breckinridge.

Improvement of rockets similar to the achievements in aviation in the past two decades are looked for by Dr. Goddard, the announcement by Clark University states, the present state of the science being compared to that of aviation when the Wright brothers made their first flight of a few feet.

It is well understood that the chief obstacle to the construction of rockets which would carry instruments and even human passengers to the upper strata of the air and beyond is the lack of a fuel of sufficient power in relation to weight. One of Professor Goddard's most important discoveries has been in the development of a continuously burning liquid fuel for the propulsion of his rockets. Details as to the nature of the fuel have not been made public.

It will be "a matter of years" the announcement states, before the first of the rockets intended for the exploration of the stratosphere is completed. It will carry thermometers, barometers, air traps for catching samples of the rarefied atmosphere at various altitudes, and other instruments. Since the greatest weight of the rocket will be in fuel which will be exhausted before it begins to descend, the falling rocket will weigh comparatively little, and with a parachute to check its fall it will be able to land without injury to the delicate instruments.

Valuable information about the sun's spectrum will be obtained by the instruments lifted above the ozone blanket. Another important result is expected to be a determination of the nature of the Kennelly-Heaviside layer, which greatly influences broadcasting, and which is assumed to be a stratum of air charged electrically. In another field interesting studies of vacuum conditions may be opened by such a rocket flight, as it is believed instruments can be sent to a height where the density of the atmosphere is less than in the most perfect vacuum obtainable in the laboratory.

Of great practical importance to aviators and meteorologists will be the data as to weather conditions obtainable by a study of the atmosphere at a considerable height. In the future, "moderate-height measurements of temperatures, pressures, wind velocities and electrical conditions" will be made daily at all principal airports, according to the forecast of Dr. Abbot, one of the committee. He says:

"With the parachute rocket we may expect that automatic instruments will be sent to any desired height and will bring back their records safely within a few minutes. Thus by means of a network of stations the Weather Bureau will be in position to map the weather of the air as successfully as now it maps the weather of the earth's surface."

NEW SATELLITE PROPOSED AS OBSERVATORY.

Creation of a new satellite for the Earth, revolving about it at a distance of some 500 miles and to be used as a permanent observatory for the study of terrestrial as well as astronomical phenomena, is the novel suggestion of Professor Hermann Oberth, German rocket expert, as expounded by David Lasser, President of the Society, in an article in the New York Herald-Tribune for Sunday, August 3. The author points out that the scientists in such a position would have unrivaled opportunities for a study of the heavens, unhampered by the atmospheric blanket which is even the best located observatory on Earth dims the already feeble light reaching us from the stars and planets. In addition scientists will be able to study the Earth from a detached viewpoint and gather invaluable data about little understood movements of the air and other things which affect weather conditions.

The suggestion is worked out in considerable detail. The satellite, of course, would be a rocket manned with the necessary crew and equipped with the most efficient instruments. Oberth's computations show that it would be quite within the limits of possibility, by the use of the step-rocket arrangement, to send such a manned and equipped rocket to a distance of 500 miles from the surface of the Earth and to give it the speed of about five miles per second which would enable it, without any further expenditure of power, to travel in a free orbit around the Earth, just as the moon does.

SOUNDING SPACE BY RADIO.

Exploration of space by radio was suggested as a possibility by the Marchese Guglielmo Marconi, inventor of wireless, telegraphy, in an address before the Italian Society for Advancement of Science on September 10. The theory that radio waves never pass through the Kennelly-Heaviside layer was challenged by Marconi, who pointed out that light and heat waves from the sun easily penetrate

to the Earth's surface. He expressed belief that radio waves may travel millions of miles beyond the Earth's atmosphere. Observations of Stormer and Pedersen, the speaker said, indicate that waves from the Earth travel as much as 45,000,000 miles out into space before being reflected by bands of ions, or electric particles derived from the sun.

"The existence of various reflecting layers, "Marconi said, "is the best hypothesis on which to base an explanation of long-distance wave transmission which overcomes the curve of the earth. Layers capable of reflecting waves exist at heights varying with the hour of the day and the season of the year. These layers also are influenced by the effects of light, by electric and magnetic activity of the sun and by other causes yet unknown."

Wireless echoes are among the most fascinating phenomena and are capable of disclosing useful information about the nature of space outside our world, he said.

TO REPEAT BALLOON ATTEMPT.

Professor Auguste Piccard, of the University of Brussels, arrived at Augsburg, Germany, early this month with a specially constructed balloon in which he and a companion, Charles Kipter, hope to penetrate the stratosphere to a height of more than 50,000 feet. An attempt to take off on September 14 was frustrated by weather conditions. Some changes in the balloon are to be made as a result, and the next attempt may be made this month or, if the weather compels, sometime this winter.

The venturesome aeronauts have an airtight aluminum sphere seven feet in diameter which will be suspended from a large gas bag containing 18,000 cubic yards of specially mixed hydrogen. Two cubic yards of oxygen liquified will be taken along to insure a supply of breathing air in the sphere. The aluminum shell is one eighth of an inch thick. One half of the exterior is highly polished and the other is coated black. A rudder device will permit turning either of these faces to the sun as heating necessities may require. Scientific instruments will be affixed to the outside of the sphere with an arrangement for reading them from the inside. They will include an electrometer for measuring the electricity in the upper air, and a potential difference meter.

Professor Piccard expects to remain at the peak of his ascent for about an hour to permit extensive observance of conditions and he estimates that the entire trip into the stratosphere will take six or seven hours. The aluminum sphere, as well as the two occupants, will be supplied with a parachute to prevent damage if it should fall.

FORESEES COLONIZATION OF VENUS.

The pressure of overpopulation on Earth will eventually lead to the colonization of another planet, probably Venus, by mankind. This is the prediction of Professor V. V. Stratonoff, an eminent Russian astronomer, who recently told an audience in Prague that accomplishment of interplanetary flights is only a matter of time. The planet Venus was selected as the most likely one to be colonized, Professor Stratonoff explained, because the average temperature there approximates that in the Earth's equatorial zone and because Venus is believed to have both water and atmosphere in about the same density as our own planet. The greatest difficulty to interplanetary flights is the difficulty of the human organism adjusting itself to the acceleration of rocket travel, he said, pointing out, however, that the capacity to make such adjustment can be developed by a course of training in appropriate apparatus, for example, machines which rotate at high speed.

A.I.S.RESUMES SEMI-MONTHLY MEETINGS.

The first meeting of the American Interplanetary Society after the Summer vacation season was held in the Academy Room of the American Museum of Natural History on Friday, August 22, and another meeting was held on September 5, in the same place.

Can Human Life Exist On Other Planets?
(Synopsis of paper presented before the Society by
Nathan Schachner on September 5, 1930.)

For a successful interplanetary flight, man must be able to exist on the planets he lands on. He requires a proper atmosphere, reasonable temperature, a gravity pull close to the earth's and many other necessities to his life. Each will be analyzed.

Atmosphere: The Moon has no atmosphere to support life. Mercury probably has none, or only minute traces. The upper layers of the Venesian clouds show no oxygen, but the lower layers may contain sufficient for us. The oxygen and water vapor content at the surface of Mars is too thin for life without artificial aid. The major planets are swathed in dense clouds. It is doubtful if they are breathable.

Temperature: On the Moon's sunny side, the temperature exceeds that of boiling water; on the dark side it approaches the cold of space. Mercury's sunny side blazes under 350 C. at which lead will melt. The other hemisphere is icy frigid. Human life could probably exist on Venus though the temperature would approach turkish bath conditions. The temperature of Mars ranges at the equator from -45 C. to 20 C., and human life is possible. The major planets have temperatures from -130 C to -200 C. and life there is inconceivable.

Gravity: On Mercury, Mars and the Moon the gravity is a fraction of the Earth's and bad effects on the lungs, heart and blood vessels are probable. On most of the major planets the gravity is considerably greater than the Earth's and body strain and difficulty in mobility would result. Only on Venus are conditions similar to the earth's.

Other dangers such as strange, harmful germ life; the effect of cosmic rays; inimical forms of life; poisonous atmospheres etc., must be chanced by the interplanetary explorer. In conclusion, Venus offers the first hope for an expedition, provided it has oxygen. Mars comes next. The others cannot be visited unless complicated apparatus, to be worn constantly, is used to hermetically seal explorers and maintain normal atmospheric conditions and pressure.

In accordance with a vote of the Society, the Bulletin, beginning with the next issue, will contain eight pages instead of four. This will permit publication of special articles relating to its field of interest.

Persons interested in the aims of the American Interplanetary Society are invited to write to the Secretary, C. P. Mason, 302 West 22nd Street, New York City, for information about the various classes of membership, including active, associate and special, which are open to men and women who possess the necessary qualifications.