BULLETIN

THE AMERICAN INTERPLANETARY SOCIETY

302 West 22nd Street, New York, N. Y.

David Lasser, President C. W. Van Devander, Editor.

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NEWS OF THE SOCIETY

An autographed copy of "L'Astronautique," by M. Robert Esnault-Pelterie, has been received by the American Interplanetary Society from the author. The book is an exhaustive scientific treatise on interplanetary travel, and contains valuable calculations and formulas. M. Esnault-Pelterie at the same time gave the American Interplanetary Society the American rights to the book and the Society plans to issue an English translation some time in the future. The French scientist accompanied his gift with an application for membership in the Society and he was elected to active membership at the meeting held in the American Museum of Natural History on June 20. Our distinguished French member expects to visit the United States this fall, and it is hoped that the Society can induce him to speak in New York on the subject of interplanetary travel under the auspices of the Society. If he complies it is probable that he will amplify his recent statement that the chief problem now standing in the way of a flight to the moon is that of obtaining the necessary financial backing.

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A memorial biography of Max Valier, the German scientist whose death by the explosion of a rocket motor made him the first martyr to the science of rocket propulsion, has been prepared by G. Edward Pendray, vice-president of the Society, and presented to the library.

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The librarian reported at the meeting of June 20 that a cataloging system has been devised and the books, articles and pamphlets already on hand have been arranged as the beginning of the library. Magazine and newspaper articles and pamphlets bearing on the Society's subject matter are desired.

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Monthly meetings will be held in New York in July and August, the bi-weekly meeting schedule being resumed in September, after the vacation period is over. The probable nature of the moon and planets as bearing on their ability to support life, and the possibility of colonizing the moon are to be discussed in a series of papers to be read at forthcoming meetings. Meanwhile the survey of the entire field of information bearing upon the possibility of flights to the moon or planets and the difficulties that must be surmounted, is going ahead under the direction of C.P. Mason. Special subjects have been assigned to various members for research. All members who have specialized knowledge of any of the related subjects or who are willing to undertake any particular line of research are again requested to consult with Mr. Mason for the purpose of receiving assignments.

GETTING AWAY FROM THE EARTH.

(Summary of a paper presented by Laurence E. Manning at the meeting of the A. I. S. on May 23, 1930.)

A speed of 7½ miles a second will remove any object from the dominant of gravity of the Earth. This is impractical in one rocket since it would take 23 pounds of fuel (at least) to propel 1 pound of rocket -- and we have no material strong and light enough to build such a rocket. If however, we build a rocket to reach a speed of only 2½ miles a second, only 3 pounds of fuel is required to each pound of rocket. Then if this first rocket be enclosed in a still larger rocket, and be considered the pay load in that rocket, a still further increase of speed up to a total of 5 miles a second can be realized. This is known as the "Step-rocket principle"

ROCKET NO.1		ROCKET NO.2		FINAL ROCKET 3	
Load (No. 2)	640 tons	Load (No.3)	80 tons	Load (pay)	10 tons
Rocket body	640	Rocket body	80	Rocket	10 tons
Fuel	3840	Fuel	480	Fuel	60 tons
Total	5120 TONS	Total	640 tons	Total	80 tons
When fuel is exhausted the speed is 2½ miles sec. Rocket body is thrown away. and Rocket No.2 started		When No.2 is used up speed has been increased 2½ miles making 5 miles/sec.		The fuel is sufficient to add 2½ miles to the speed per second, Making it total 7½ miles/sec.	

By the method in the above table, a ten ton rocket with ten tons of load in it and no fuel left is on its way into space. No provision has here been made for navigation or safe return. The following table is compiled from Herman Noordung's "Problems of Space Flying".

Ultimate Speed/sec.	Expulsion speed of gas per sec.	Nearest experimental Results	Weight of fuel compared to load
7½ miles	1 mile/second	Oberth 1 mile/second (alcohol & oxygen)	519 to 1
7½ miles	2 miles/second	Goddard 1½ miles/sec. (smokeless powder)	63 to 1
7½ miles	2½ miles/sec.	Oberth 2½ miles/sec. (Hydrogen & Oxygen)	23 to 1
2½ miles	2 miles/sec.	several	3 to 1

It has been conservatively proved that a man can stand an acceleration of 100 feet each sec. At this rate he would reach 7½ miles per second after travelling 1000 miles and after the expiration of 8 minutes.

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CAN MAN EXIST IN OUTER SPACE?

(Synopsis of a paper presented by C. P. Mason at the meeting of the A. I. S. June 6, 1930.)

The question before us is this: Can man reach the space outside the atmosphere of the earth, with a velocity capable of bearing him into another dominant gravitational field; and can be provide the means of sustaining life under the unprecedented, and to a large extent unknown, conditions prevailing there?

As to the first question, some of the calculations of M. Robert Esnault-Pelterie, with which the Society has been lately favored, indicate that much difficulty will be found in attaining suitable velocity with the fuels now known: the properties of monatomic hydrogen deserve investigation. In addition, the heat which must be generated by atmospheric pressure against the head of an accelerated space car, is formidable. The speaker raised the question whether this heat might be employed to aid in the expansion of the propellant gases.

Very little is known definitely as to the conditions beyond the atmosphere. The calculations of M. Esnault-Pelterie indicate that the problem of maintaining vital heat in a space car is not serious, at the earth's distance from the sun. What the effect of the intense penetrating radiation will be is a matter for future investigation; as well as that of the matter, in a state of molecular or atomic division, pervading space; and that of the continual electronic bombardment which may be expected.

The problem also of the adaptability of the human organism -- particularly of the circulatory system and organs of balancing -- must also receive the attention of biologists. It is certain that, if long-range rocket travel between terrestrial points is undertaken, much valuable data will be obtained.

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NAVIGATION IN INTERPLANETARY SPACE.

(Synopsis of paper read by C. W. Van Devander at the meeting of June 20.)

Ninety percent or more of interplanetary navigation will be done before the space ship leaves the earth's surface. Among the factors which will complicate the calculations are the earth's double motion -- relative to the sun -- of rotation at a surface speed of about 1000 miles an hour at the equator, and revolution in its orbit at a varying rate of about 18-1/2 miles a second; the air resistance to be encountered in the first few hundred miles of a trip from the earth's surface; the fact that the moon and planets are all in motion comparable to that of the earth, and the deflection that will be caused in the ship's course by the attraction of each member of the solar system. The fact that it is seriously proposed to shoot a rocket to the moon without any guiding agency aboard shows man's belief that these factors can all be discounted in advance calculations.

Space navigation will be three dimensional, with the plane of the earth's orbit serving as the most important plane of reference. The position of the space ship relative to this plane can always be calculated from the sun's position relative to the ecliptic and the ship's distance from the sun. The distance from any convenient body whose size is known can be obtained from the arc subtended from the ship, and this distance, together with the observed angle between any two bodies whose position is known, will give the ship's position in the plane of the ecliptic. The essential thing is to develop some method of recording the passage of time. The space navigator undoubtedly, will keep a running chart of successive positions on which the ship's position, direction and speed of motion will be shown at all times.

CURRENT NEWS AND VIEWS

John Q. Stewart, associate professor of Astronomical Physics, at Princeton University, has amplified his description of a possible flight to the moon in an article published in the New York Times for Sunday June 22. Many exact and detailed calculations are given.

Of the 70,000 tons initial mass of the space cruiser, there would be 28,000 tons of material, such as lead, which would be fired from cannons to provide the necessary recoil. The start would be made from a desert where the shots from the cannon could cause no destruction, and would be timed for half an hour before noon and three days before the new moon. The ship is supposedly lifted upward with an acceleration one-sixteenth that of gravity, to provide which nearly two and a half tons of shot would be fired every second vertically downward with a speed of nearly 200 miles a second. Two hours and 29 minutes after the

take-off the ship would have risen 13,200 miles and have acquired an upward speed of 190 miles a minute. The firing would then be stopped and the ship would coast the rest of the way, reaching the moon's orbit 70 hours after the start. Professor Stewart imagines the ship circling the moon as its satellite before landing. Due to the moon's lesser gravity the landing would be much less difficult than that on the earth on the return trip. The writer believes the Moon to be airless and waterless and points out that temperatures vary from about that of boiling water to about that of liquid air. The voyagers would walk on the moon clad in diving suits and would be able to carry several hundred pounds of apparatus for providing fresh air and regulating temperature. Communication with the earth would be by means of a beam of light if the Kennelly-Heaviside layer in the Earth's atmosphere made radio signalling impossible.

NEWS FROM ABROAD

An international prize of ten thousand francs is offered through the Society Astronomique de France for "the best original scientific work, either theoretical or experimental, which tends to improve the solution of the problem of interplanetary navigation or any one of the branches of science which are included in 'Astronautics.'" The prize, an annual one for the years 1928, 1929 and 1930, is donated by Messrs. Robert Esnault-Pelterie, who is a member of the American Interplanetary Society, and Andre Hirsch. Anyone wishing to compete for the current year's award may submit a report to the Societe Astronomique de France before January 1, 1931. The conditions specify that the reports must be clear and concise, containing no considerations that are not of a scientific character and they may be in any of the following languages: French, English, German, Spanish, Italian or Esperanto. The committee is at liberty to award the entire sum as one prize or to divide it into two or more prizes.

A communication from the German Interplanetary Society, the "Verein fur Raumschiffahrt E. V. Geschaftsstelle Berlin," states that the Verein, in cooperation with Professor Hermann Oberth, now has three rockets in construction. Two are small ones for use in rocket experimentation, while the third is a larger one with which it is hoped to explore the stratosphere to a height of 100 kilometers. Members of the Verein include Professor Oberth, Rudolph Nebel, E. Wurm, Willy Ley, Otto Willi Gail, Fritz von Opel, Guido von Pirquet in Austria, Professors Nikolai A. Rynin and K. E. Ziolkowsky and Dr. Jakow I. Perlman in Russia, and Robert Esnault-Pelterie in France. The Society has one thousand members.

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.