

COPY

From: GENERAL FEATURES CORPORATION
250 PARK AVENUE, NEW YORK 17, NEW YORK

FOR RELEASE: SATURDAY OR SUNDAY AUGUST 12/13 1961

WONDERS OF THE UNIVERSE

KURT R. STEHLING, as a member of the Program and Evaluation Staff of the National Aeronautics and Space Administration, contributes to America's long-range space plans by analyzing problems of lunar exploration, among others. During his 15-year career in rocketry and space travel, Mr. Stehling pioneered basic concepts of rocket engine design and today holds a number of important patents with others pending. Formerly head of the Vanguard Project's propulsion and vehicle branches, Mr. Stehling once offered a plan to launch satellites and lunar rockets from balloons. In the following article -- eighth in a series by 12 internationally famous space scientists and planners -- he discusses the fascinating and timely topic of landing and living on the moon -- DR. I. M. LEVITT, Editor and regular author of "Wonders of the Universe".

* * *

MAN'S LUNAR ARRIVAL
CERTAIN THIS DECADE

by Kurt R. Stehling

It is inevitable that man will be on the moon before the end of this decade. Just how he will land on the moon is something which at this moment is not too well understood. We are certain many landings will take place in the next ten years to indicate the procedures to be followed before man achieves this goal.

When the Russian Lunik II was fired from the earth it pursued a path which permitted it to impact the moon on a line just north of the craters Aristillus and Autolycus and just north of the Apennine Mountains. When this probe struck the moon it raised a cloud of dust seen independently by observers in Sweden, Hungary and Russia. The cloud resulted from the probe striking the moon with a speed of from 7000 to 10,000 feet per second. The resulting deceleration was probably on the order of a half million "g's". This means that if you weighed 200 pounds on the earth, at the instant of impact you would have weighed 100 million earth pounds. This type of landing will do the space traveler little good.

Thus in a manned landing we will not simply shoot a something to the moon and expect it to survive. To survive a fall to the moon it is necessary that the space vehicle be decelerated to a nominal landing speed that will not prove lethal to passengers. To achieve a "soft" landing it is necessary to carry along fuel to slow or brake the forward speed to reduce landing speed.

(MORE)

COPY

From:

GENERAL FEATURES CORPORATION
250 PARK AVENUE, NEW YORK 17, NEW YORK

KURT R. STEHLING

PAGE #2 FOR RELEASE: SAT. OR SUN. AUG. 12/13, 1961

In the case of the Discoverer recovery capsule, the atmosphere of the earth provides the braking force necessary to slow the returning vehicle, and also the medium necessary for a parachute to land the vehicle.

RETRO-ROCKETS NEEDED

The lack of an atmosphere on the moon precludes the use of these devices. Thus, the only remaining mechanism to insure the safe landing of a lunar vehicle is a retro-firing rocket. For this reason we must carry along a fuel supply to insure its safe landing.

In addition to the forward velocity which the space vehicle possesses, there is also a sideways velocity, which is imparted to the vehicle by residual velocity differences between the earth's and moon's paths in space. To correct for this it is also necessary to use fuel, and this fuel must also be carried along.

Scientists generally agree that the most hazardous part of the lunar soft landing trip is the approach to the lunar surface. When the vehicle approaches the moon, its rocket engines will be trailing the vehicle. To use them effectively the vehicle must be turned around so that the rocket engines point in the direction of flight. But before and during this flipover the engine's propellants will slosh and may even be in free-fall condition, which raises many problems.

Another problem to be solved in the immediate future is the type of soft landing to be undertaken. Shall the designer of the vehicle develop an on-off type of "bang-bang" system for throttling the rocket engines, or should the energy be expended in a single burst, which would have to be timed and adjusted in magnitude and direction with the most rigorous precision? In either case, auxiliary equipment must be carried with the moon vehicle to permit the necessary intelligence to be acquired and used for the safe landing.

(MORE)

PROBLEM OF LIVING

Once on the moon will come the problem of living on its surface. Several years ago, Dr. I. M. Levitt suggested the steps needed to accomplish this difficult feat. He assumed that when we reach the moon we will go underground into caves, which he believes must exist as gas pockets or traps. Once in the cave a large rubber balloon can be inflated with a pressure of about five pounds per square inch. The rubber shell can then be sprayed with a setting plastic to make an eggshell of the balloon. In this fashion the necessary atmosphere will be trapped and contained.

What about an atmosphere? Is it available on the moon? The astronomer's answer is no. No scientist will admit to an atmosphere on the moon which could possibly support life. The problem will be to manufacture an atmosphere once man has been established on the moon.

One way in which this can be achieved is to extract the water of crystallization from the rocks. As to whether water exists there, Dr. I. M. Levitt and many other astronomers believe that the common origin of both the earth and moon indicates that the same materials must be found on both bodies. If water-bearing rocks exist on the earth, they should be found on the moon. It is only a matter of breaking, crushing and baking the rocks to extract the water of crystallization.

Once the water has been extracted, it can be broken up by electrolysis into hydrogen and oxygen. Thus, from the rocks we will acquire water, an atmosphere and hydrogen for fuel.

ALGAE AS FOOD

Food will be a problem on the moon although a technology can be developed to use algae as a principal source of food. Today there are many scientists who believe that algae can be used also as a means of purifying the air supply in the lunar housing. Fast growing animals like hogs and chickens will be carried along to provide animal proteins. Hydroponic farming may play an important role in a food supply on the moon.

(MORE)

KURT R. STEHLING PAGE #4 FOR RELEASE: SAT. OR SUN. AUG. 12/13, 1961

As for the need for plastics, clothes, dyes, medicinals, detergents, etc., Dr. Levitt, in his recent book, "Target For Tomorrow", was the first to show how these materials may be synthesized from the moon's basic elements. He shows how hydrogen, carbon, nitrogen and oxygen can be combined to give rise to the products needed in a civilization. If our ingenuity in the immediate future is as good as that exercised today, living on the moon will not present an insurmountable problem.

Just as important as the lunar environment for man's existence on the moon will be his purpose for establishing himself there. The practical reasons for going to the moon are different for different people. Let's explore some of them.

MOON FINE FOR TELESCOPES

The moon will furnish the ideal base for the astronomer. The lack of an atmosphere will permit the use of modest astronomical equipment to penetrate deeper into space than man has achieved with the 200-inch Hale telescope on Mt. Palomar. It is from these investigations that our picture of the universe will unfold.

Geologists and mineralogists will have a chance to study the primordial rocks that have not been altered or modified by atmosphere, water and radiations.

Radio telescopes on the hidden side of the moon will permit the reception of faint radio signals uncontaminated by the man-made static originating on the earth. Radio astronomy is a new and exciting science which is recognized as one of the most powerful tools ever developed.

The moon offers a fantastic laboratory for the study of materials, reactions, and processes in a lower gravitational field, in a perfect vacuum, and subject to intense solar radiation.

Perhaps the most important use of the moon will be as a way station to the planets. While it is possible that we may develop engines large enough for "one-shot" flights to the planets, in all probability the necessity for large interplanetary payloads will make the moon a jumping-off spot.

(MORE)

KURT R. STEHLING PAGE #5 FOR RELEASE: SAT. OR SUN. AUG. 12/13, 1961

We live in exciting times and thrilling prospects lie before us. Before the end of this decade man will be on the moon to make ready for the next stage in the exploration of space.

-30-

Dr. Levitt's regular column appears next week. In two weeks: Prof. Leonid I. Sedov, influential Soviet space scientist, discusses the problems and significance of the world's space achievements.

