

GEOPHYSICS

Wanted: Moon Photos

Some of the scientific mysteries of the moon might be unraveled if a camera-carrying rocket were successful in reaching the moon and returning to earth.

➤ SENDING A U. S. rocket to the moon would not only give this country a great propaganda boost in the space race, but it could also have definite scientific value.

Photographs of the moon taken from a rocket zooming close to the lunar surface, then returned to earth, would probably solve the mystery of what caused its craters.

This would be the main scientific value of sending a rocket to the moon and back. Various kinds of paths could be used. If the rocket were launched so that its orbit took it around the dark side of the moon, photographs could be made of the 40% of the lunar surface never visible from earth.

Astronomers would be very surprised if the unseen side looks much different from that seen and mapped from earth. However, because it is unknown territory, scientists would like to have the chance of studying the dark side's features.

Even the world's largest telescope, the famed 200-inch giant atop Mt. Palomar in California, brings the moon only about as close as the naked eye would see it from 200 miles. A camera equipped with telescopic lens carried in a rocket skimming some 50 to 100 miles above the lunar surface could thus get much clearer pictures of the craters and "seas" on the moon than now possible.

It would have the added advantage of not having to photograph these and other features through the earth's atmosphere, continuous changes in which blur images of all heavenly objects, including the man-made earth satellites.

Sunlight reflected from the moon's surface is bright enough so there would be no problem of lighting, even with the ex-

tremely short exposures needed because of the rocket's high speed.

Because of the difficulties involved in putting a rocket in an accurate orbit around the moon, and also the problem of recovery, the first lunar trip will probably be a one-way one. The rocket could be equipped with a homing device to insure its hitting the moon.

Some scientists have suggested it should be equipped with a hydrogen-bomb warhead so there would be no doubt when the rocket smashed into the moon's surface.

Probably the ideal way to send a rocket to the moon would be to launch the vehicle as the brightest possible satellite first. Once it is in orbit and its position very accurately known, then the rocket could be sent off on its space journey by signal from earth at the precise moment computed to be the best to set it on a fuel-saving, coasting course to the moon.

When a space vehicle is sent to the moon by just freeing it from earth's gravity, then allowing it to fall freely in space the rest of the way, the journey will take at least five days. It could take longer, depending on which of the various paths were chosen for reaching the moon.

Direct powered flight to the moon from earth would take only about ten hours at speeds of 25,000 miles an hour, which is the velocity necessary to escape from earth's gravitational pull. This kind of journey would require an extremely large fuel supply, while the coasting method would require only that needed to free the rocket from earth's gravitation.

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PHYSICS

Two Rare Gases on Moon

➤ WHEN THE FIRST man lands on the moon, the "air" he breathes will contain only two rare, heavy gases, krypton and xenon.

And he will be out of luck if he bought stock in a uranium mine on the moon in hopes of reaping rich profits.

These are the conclusions of Dr. Lyle B. Borst, New York University's physics department chairman, who says he would not buy stock in a lunar uranium mine for himself. After studying possible sources of the moon's tenuous atmosphere, about equivalent to the best vacuum obtained in the laboratory, he concluded there is about one percent as much uranium on the lunar surface as there is on the earth's surface.

Dr. Borst reported his theory, worked out jointly with W. F. Edwards of California

Institute of Technology, at the American Physical Society meeting in New York. Krypton and xenon, which are used to change the color of "neon" lights, are products of the spontaneous fission of uranium-238.

If the uranium on the moon's surface were as great as on the earth's surface, the lunar atmosphere would be much more dense. Recent radio astronomy observations from England show the moon's atmosphere is about one-trillionth as dense as the earth's at the surface.

This atmosphere resulted from the radioactive decay of iodine-129 early in lunar history, the two scientists concluded. According to their theory, it took 400,000,000 years for the moon to be created in its

present form, and for the past three or four billion years the moon has remained unchanged.

Early in the history of both the earth and the moon, conditions permitted escape of nearly all stable gases because there was little or no gravity. During this period, the scientists believe, the earth and the moon were a cloud of meteorites. Earth and moon could retain an atmosphere only after taking their present form.

Because of its size, the earth retains gases as light as nitrogen, oxygen and neon, whereas the moon could only retain the heaviest gases, krypton and xenon.

Only a gas sample taken from the moon will show in what proportions these two gases are present and, therefore, their original source, Dr. Borst said.

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GENERAL SCIENCE

Plans Approved for New Smithsonian Building

See Front Cover

➤ A MUSEUM big enough to house the Smithsonian Institution's great national collections illustrating the technology and history of the United States will soon be going up in Washington, D. C.

Plans for the new Museum of History and Technology building were announced by Sen. Clinton P. Anderson (D.-N. Mex.), chairman of the joint Congressional committee that has been studying the proposal. The site has already been selected: it is bounded by 12th and 14th streets, and Madison Drive and Constitution Avenue. The building will be modern, but with a "classical spirit" so that it will harmonize with the existing buildings on the nearby Mall and on Constitution Avenue.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows a close-up of the front of the building and the bays which will provide daylight through windows in their narrow faces.

The Smithsonian's unequalled technological collections, many important parts of which have never been displayed before, will be exhibited on the first floor.

Other collections, illustrating the civil and military history and growth of the United States, will be located on the upper floors.

Laboratories and study collections will also be provided for.

The "number one museum item of America," the famous Star Spangled Banner that flew over Fort McHenry in 1814 and inspired Francis Scott Key to write what became our national anthem, will be on display in the centrally located flag hall. This room, the Smithsonian points out, will be a convenient starting point for a museum visitor.

More than 5,000,000 persons are expected to come to the new building each year.

Detailed plans for the arrangement of exhibition halls are now being prepared. Since funds for the construction of the building have been appropriated, it is expected that work will begin on the new museum early this summer.

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