

SPACE

Flares Menace Astronauts

Research is underway to protect astronauts on the moon from severe solar flares which scientists now find may occur at any time regardless of sunspots—By Walter Wingo

► **ASTRONAUTS ON THE MOON** would be in just as much danger from deadly solar flares when the sun is in a "quiet" sunspot period as when it is in an active mood.

This revelation was made by top American scientists studying the sun. It clashes with Soviet statements that the Russian manned lunar landing program is being slowed down to avoid a time of heavy sunspots.

Sunspots are related to the many small flares of charged particles emitted by the sun, said Dr. Herbert Friedman, astrophysicist for the U.S. Naval Research Laboratory, Washington, D. C., but studies now show that the "superflares" come, sunspots or no sunspots.

Fear has been expressed by many, including Sen. Clinton P. Anderson (D-N. Mex.), chairman of the Space Committee, that such a superflare could touch off a proton bombardment of the moon. Unlike the earth, the moon has no atmosphere to protect it from such lethal rays.

As yet, there is no good way of predicting a hazardous flare.

Dr. Friedman is part of a team of scien-

tists who are trying to set up a space weather bureau which could give astronauts advance notice of solar storms.

Such a bureau would require vast amounts of information on the sun's activities—information scientists so far have been unable to collect. This is one purpose of the International Years of the Quiet Sun (IQSY) program, nicknamed "Ick-See."

The program officially began Jan. 1. On Jan. 11, the U.S. Air Force launched a Navy satellite designed to keep an X-ray watch on the sun.

Some 60 nations, including Russia, have been receiving reports on the sun from the 100-pound, ball-shaped satellite.

On Jan. 26, the satellite recorded its first medium-sized flare, based on the intensity of X-rays emitted from the sun's direction. In general, however, the satellite indicates the sun is near the period of its 11-year cycle when solar spots and storms are at a minimum.

Besides its interest in contributing to the IQSY, the Navy wants to find out how it can keep radio contact with its entire fleet during periods of radio "blackouts" related to heavy solar activity.

More such satellites are planned in hopes of setting up a reliable solar patrol before Americans are sent to the moon.

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Avoid Lethal Protons For Best Protection

► **THE MOST IMPORTANT** protection from the lethal protons of solar flares to space travelers appears to be predictability of their occurrence and avoidance of them.

Lt. Col. Edwin R. Ballinger of Brooks Air Force School of Aerospace Medicine described to the Aerospace Medicine Conference, Brooks Air Force Base, Texas, three forms of radiation dangers. These include cosmic rays, which are the least hazardous, the Van Allen belts, and solar flares which cause the proton bombardment.

We are now in what is termed "the period of the quiet sun." Flares are believed to have reached a maximum incidence in 1947 and 1958 and are expected to be great again in 1969.

While the frequency of occurrence appears to have an 11-year cycle, the size of the flare may not be so dependent, Col. Ballinger said. If a flare has occurred from a certain area of the sun's surface, the next flare is more likely to occur from the general vicinity.

"At worst," Col. Ballinger said, "we have some warning. Protons do not arrive all in one group. They stream toward the earth,

and the time for them to arrive in maximum amounts is a matter of one hour up to 20 hours."

The streaming will continue from half a day out to five days, so even with no early warning prediction based on early color changes of the sun, we do have some time to do something about it, Col. Ballinger said.

Ability to get out of the path of solar flares—possibly by a quick return to earth or by orienting the spaceship in such a way to make shielding effective—will be most important.

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More Armor Suggested For Moon Spacesuits

► **A SUIT OF MAIL** may be needed to protect a man on the moon from bullet-like effects of micrometeorites, Dr. Hugh L. Dryden, deputy administrator of the National Aeronautics and Space Administration, said.

Unless we are satisfied that an astronaut can be protected from possibilities of a hostile environment, we are not going to send a man to the moon, he said at the fifth annual Lectures in Aerospace Medicine, Brooks Air Force Base, Texas.

No plans are underway to change spacesuits before more information about the moon is obtained. But the possibility of changing the suit to chain mail to withstand a "bullet zone" is one of many subjects being considered.

Solar flares are undergoing extensive research, and it appears that by 1970 it will be possible to provide five-day forecasts of periods with solar proton showers.

So far, no apparent harm has come to astronauts from short periods of weightlessness, but because 100% oxygen under reduced pressure is expected to be used in longer flights, studies are being made to find out if this will cause physical harm.

Maj. Gen. Richard L. Bohannon, Surgeon General of the U.S. Air Force, said it is imperative to analyze critically the influence of the space-cabin environment on the physiological functions of man for periods beyond two weeks.

The nation's first manned orbiting laboratory to be started by USAF will give the opportunity of obtaining facts needed to replace educated guesses on space hazards.

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Oversize 'Bullet' Probes Atmosphere

► **AN OVERSIZED "BULLET"** that travels 6,000 miles an hour and is named for a mythical footless bird is one of the newest atmospheric probes.

Only eight inches in diameter and four feet long, the "Martlet" projectile is expected to place measurement instruments in space 60 miles high to chart the unexplored zone between the farthest point reached by balloons and the orbits now surveyed by satellites.

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U.S. Navy

MEASURES SOLAR FLARES—Robert Kreplin, head of the solar radiation section of the Naval Research Laboratory, holds two X-ray sensors similar to those aboard the NRL solar monitoring satellite. The devices register the strength of X-ray flares emitted by the sun and broadcast the information to land and sea stations.