

ASTRONOMY

Detect 'Cool' Spot On Sun

A 20,000-degree pocket of "cool" gas discovered in the sun's corona has unsettled the idea of a steady dependable temperature output from the sun.

► SOME CHERISHED scientific ideas about the steady, dependable temperature output of the sun have been unsettled by evidence of a 20,000-degree pocket of "cool" gas in the sun's corona.

The corona is the sun's luminous outer jacket which usually radiates at three million degrees Fahrenheit.

The evidence, a spectrogram, or special photograph, recording atomic activity in the great solar furnace, was presented in Florence, Italy, by an American-Italian team at the Fifth International Space Science Symposium, sponsored by the Committee on Space Research (COSPAR).

The cool spot, revealed on the spectrogram as an intense line of radiation in the ultraviolet, was discovered by Dr. Guglielmo Righini, director of the Astrophysical Observatory, Arcetri, Italy, and Dr. Armin J. Deutsch of Mount Wilson and Palomar Observatories, Pasadena, Calif.

They found the spot when they examined data taken by a high-flying airplane during last July's total eclipse of the sun.

The astronomers were at a loss to explain the reason for the presence of the cool spot to their colleagues at the COSPAR conference, but they indicated that current ideas about the nature of the corona will have to be modified.

The best time to study the corona is during a total solar eclipse, when it flashes

briefly in view. The telltale spectrogram was made at 40,000 feet, well above most of the obscuring haze of the earth's atmosphere. It showed a bright emission of ultraviolet light caused by electrically charged calcium atoms about 400,000 miles up from the surface of the sun.

The atoms become charged because the intense heat drives electrons away from the positively charged atomic nuclei.

However, Dr. Righini and Dr. Deutsch said, only one electron out of 20 circling each calcium atom appears to have been driven off by the relatively cool temperature of the mysterious coronal pocket. It is this low rate of activity, they believe, which causes the bright ultraviolet emission on the spectrogram.

It was the first time the emission has shown up on a spectrogram. Earlier earth-bound observations had led astronomers to assume that the corona's heat must strip off nearly all the electrons.

Dr. Deutsch said discovery of the emission line "could significantly modify our ideas about the corona."

The next time that more data on the cool spot in the corona will be gathered, Dr. Righini said, will be May 30, 1965. At that time a total solar eclipse will be visible over the Pacific Ocean northeast of Tahiti.

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Signs of Life on Mars

► THE WAY SUNLIGHT reflects from certain dark areas on Mars may mean life does exist on that cold, oxygenless planet, a French astronomer believes.

As the seasons come and go on Mars, a peculiar change of polarization of reflected sunlight can be observed, reported Dr. Audouin Dollfus of the Paris Observatory. These different light vibrations might be caused by the growth of living organisms there, he told the Fifth International Space Symposium in Florence, Italy.

By using polarization measurements, Dr. Dollfus has identified some of the material on the Martian deserts as limonite, which is an iron oxide with water chemically bound to it. Martian deserts usually show up as bright areas to earth scientists.

In the darker areas of Mars, he explained, the polarization is very peculiar and has not been matched with that of any earth material.

The seasonal changes of light in these dark areas might be explained by the growth of microorganisms living on top of the limonite, he added.

Scientists believe that the surface of Mars is composed of three areas: the icy polar caps, the bright areas which are deserts, and the dark areas which are the suspected sites of living organisms.

As the polar cap shrinks during the Martian summer, water vapor is released into the atmosphere and carried toward the planet's equator.

At this time, a "wave of darkening" moves across the dark areas, explained Dr. Carl Sagan of Harvard University and the Smithsonian Astrophysical Observatory, Cambridge, Mass.

This wave of darkening might be the growth of Martian microorganisms as they receive the vital water vapor, Dr. Sagan summarized as the views expressed by 35 scientists including astronomers, biologists, physicists, chemists and others at a meeting held in Cambridge, Mass., early this year.

In the laboratories, he said, scientists have been able to foster some earth microorganisms under harsh conditions similar to those believed existing on Mars.

When water is added to the laboratory environment, the tiny organisms begin to grow and reproduce, just as they might be doing on Mars.

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SPACE

Water Supply in Space From Power Supply

► ASTRONAUTS in the Apollo spacecraft will be getting their water supply from their power supply.

A fuel cell, being developed in Pratt and Whitney Aircraft's Apollo facility, East Hartford, Conn., has already produced more than required amounts of electrical power for a continuous period greater than the 14 days needed by the astronauts.

As a by-product, the cell, using hydrogen and oxygen fuel, produces drinkable water for human needs and for cooling the spacecraft.

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SATELLITE TRACKER — *The mobile photographic tracking station (MOPTS) at the Pacific Missile Range, Pt. Mugu, Calif., is equipped with hydraulic motors built by the Cimtrol division of the Cincinnati Milling Machine Company. The motors provide a wide controlled speed range so that a rushing rocket or creeping satellite can be tracked with equal ease.*