

## ASTRONOMY

# Charting by 'Blinks'

Three "color-blink" instruments that make the moon seem to appear and disappear have been developed to study lunar color phenomena and surface brightening.

► LUNAR COLORS and brightness are being discovered by instruments that make the moon appear to "blink."

Three versions of a "color-blink" instrument, now being developed with support from the National Aeronautics and Space Administration, will keep track of color phenomena and surface brightenings of the moon, Dr. James B. Edson, associate administrator of NASA's Office of Advanced Research and Technology, told the New York Academy of Sciences.

The "color-blink" devices reveal color changes by adapting the principle of the blink microscope. The blink microscope, which identifies variations in the intensity or movement of light, played a role in the discovery of the planet Pluto. The new instrument promises to ease the burden of lengthy observations for astronomers concentrating on such lunar areas as the craters Alphonsus and Aristarchus, where haze and color phenomena have been reported in recent years.

In the simplest model of three versions of the "color-blink" instrument the lunar telescopic image will be sent to a photo tube through color filters, then to a gray field against which alternating images of two or more colors will be viewed.

Any color phenomena occurring on the

moon would appear to pop in and out of the image, just as in the blink microscope the image appears and disappears, seeming to "blink."

The second version will use a closed-circuit television system to give greater contrast to colors. The most complex model will use a color television system to amplify the color differences and compare two or more color images of the moon automatically, identifying those on which even minute color phenomena have occurred.

Ruby red, reddish-orange and pink patches on the moon's rim and near the crater Aristarchus were seen by the Lowell Observatory scientists on two occasions in October and November 1963. Both times a streak about 1.5 miles wide by 11 miles long was seen along the southwestern rim of the crater. Dr. James C. Greenacre of Lowell estimates that a 16-inch reflector or a 20-inch refractor might be needed to pick out such colored spots.

British astronomer Patrick Moore estimated that color phenomena or brightenings like those seen around Aristarchus might be observable with a good 12-inch instrument. He recommended an organized observing program to keep the reportedly active lunar surface areas under intense surveillance.

• Science News Letter, 85:338 May 30, 1964

## ASTRONOMY

# Debate Origin of Craters

► METEORS or volcanoes—the question is which caused some of the earth's ancient craters?

Do not worry if you do not know, for many highly qualified scientists hotly debated the question at the lunar research conference in New York sponsored by the New York Academy of Sciences.

Some scientists believe that certain craters were formed by volcanic pressures from beneath the earth; other scientists feel that they were formed by immense impacts of meteors from the sky.

Many craters attributed to meteor impact may not be meteor-formed at all, states Dr. G. J. H. McCall of the University of West Australia. These so-called meteor craters include the Barringer crater near Flagstaff, Ariz., the Wolf Creek crater in western Australia, and the Chubb, New Quebec crater near Hudson Strait in northern Quebec.

Dr. McCall's views were supported by Dr. L. Currie of the Geological Survey of Canada, Ottawa, who found little or no direct evidence that any Canadian craters had been formed by meteoric impacts.

"The continental distribution of the craters shows that their cause must be deep seated," said Dr. Currie, who believes the craters may have been formed by an upwelling of volatile rich material from inside the earth.

The great pressures required to produce the high-pressure form of silica found in the vicinity of the Holleford crater in Ontario may have been built up by uplifting forces from below rather than by fast-moving meteoric impact, he commented.

Supporting the meteoric theory, Dr. M. R. Dence of Dominion Observatory, Ottawa, stated that borings of shattered rocks and microscopic sections of fractured quartz taken from beneath the craters seemed remarkably similar to specimens from the nuclear-explosion craters produced at the Nevada test site.

Offering moderate opinions, Dr. Carlton S. Beals, astronomer of the Dominion Observatory, believes that no decision can be stated as to whether craters have been formed by volcanic action or meteoric impact.

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## SPACE

# Saturn I to Be Launched With Apollo Spacecraft

## See Front Cover

► THE FIRST in the series of Saturn I rockets carrying unmanned "boilerplate" models of the moon-mission spacecraft was scheduled for launch from Cape Kennedy in late May.

Designated SA-6, for its place in the Saturn series, the vehicle will use an active guidance system for the first time on a Saturn to steer the second stage into an orbit 110 to 140 miles above the earth.

Since the previous launching, SA-5, all Saturn I's have powered second stages, enabling them to carry a payload of about 20,000 pounds into an earth orbit. The second stage is powered by six liquid hydrogen/liquid oxygen engines, with a total of 90,000 pounds of thrust.

Seen on this week's front cover is an artist's concept of the Saturn I SA-6 vehicle shortly after the first and second stages have been separated at an altitude of 43 miles about 145 seconds after liftoff.

In addition to providing additional performance data on Saturn I fuel and propulsion systems, SA-6 is designed to prove the technique for separating the first and second stages in flight. In this technique, explosive bolts release the first stage when its engines have stopped firing. Then the second stage engines ignite, while retro-rockets on the first stage cause it to fall behind.

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## SPACE

# Moon Landing Research Vehicle Ready for Use

► THE FIRST of two research vehicles, designed to help train astronauts on earth in the proper procedures of landing on the moon, has been completed.

Powered by a turbofan engine and hydrogen peroxide rockets, the vehicle will aid in the design of the Lunar Excursion Module, which will actually land on the moon.

The turbofan will provide enough lift to reduce the test vehicle's weight to what it would be on the moon. Developed by Bell Aerosystems Company in Buffalo, N. Y., the vehicle can fly at altitudes as high as 4,000 feet.

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## SPACE

# Gemini Rendezvous Radars Completed

► A PRODUCTION radar system designed to aid in linking the two-man Gemini spacecraft and the unmanned Agena-D target vehicle while in orbit, has been built by the Westinghouse Defense and Space Center, Baltimore.

Providing the astronauts with continuous information needed to maneuver their spacecraft into position for contact, the radar will cover a range of 250 miles.

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