

This months meeting will be held, as usual, at 7:30 p.m. at the Olin Hall of Science on the Nebraska Wesleyan campus. The program will be a review of the National Astronomical League convention in Omaha. There will also be a drawing for a door prize and you must be present to win, so don't miss it.

\*\*\*\*THE PRESIDENTS REPORT \*\*\*\*

At this months meeting nominations for club offices will be held and if time permits the elections will also take place.

Lari Moser  
President

## VENUS UNMASKED BY ASTRONOMERS

### Radar Probes Give Man His First Look at Surface— Craters Dot Landscape

By JOHN NOBLE WILFORD

Special to The New York Times

HOUSTON, Aug. 4 — High-resolution radar probes have broken through the thick clouds of Venus and for the first time distinguished features on the planet's surface, which presents a landscape of huge, shallow craters.

Of the dozen craters discovered in man's first look at the Venusian surface, the biggest is 100 miles wide and less than a quarter of a mile deep. Others range in size from 20 to 65 miles wide.

The discoveries have led to the production of the first map of a part of Venus showing discrete features, instead of the blurry shadings of earlier radar maps of the planet. The new map is also the first to include elevation contours of the basically flat surface.

#### Likened to Moon

The unmasking of Venus, which is concealed by a perpetual bank of clouds some 13 miles thick, was accomplished by a team of radar astronomers at the Jet Propulsion Laboratory at Pasadena, Calif. The results were announced simultaneously there and at the Johnson Space Center here.

Covered in the latest radar scan of Venus is an area along the equator of more than 500,000 square miles, which is about the size of Alaska. The probe achieved a resolution of

\*\*\*\* GATEWAY SHOW \*\*\*\*

Our next, and I believe the last for this year, will be held on thursday Oct. 4 (Oct. 5 in case of rain or clouds). If you can possibly make it with or without telescope try to be there so we can make our last show of this year the best ever. The reason for this request being that our average attendance is about six(6) members and four telescopes

\*\*\*\*OF ASTRO INTREST\*\*\*\*

To the left and below is an article from the New York Times that was given to me by Lee Thomas. If anyone ever has something of intrest for the newsletter please give it to me at the meeting.

J.B.

## Venus Unmasked by Astronomy Team

Continued From Page 1, Col. 4

Laboratory team, said, "This area of Venus appears to be as crater-infested as the moon."

This came as no great surprise to planetary scientists.

Dr. Carl E. Sagan, director of the Laboratory of Planetary Studies at Cornell University, said in a telephone interview that the "same sort of debris that makes holes on the moon should be bombarding Venus."

Dr. Sagan said that the apparent density and size of the craters on Venus suggested that they had been formed by meteorite impacts rather than volcanic eruptions. Volcanic

closest approach to earth, 26 million miles away. To get the improved resolution, they used two antennas at the Goldstone Tracking Station in the Mojave Desert of California. It took them a year to process the data and make the map.

The radar signals were beamed toward Venus by the 210-foot dish antenna, and the return echoes were received at both the large antenna and an emitting power is 400,000 watts. The round-trip signal time is four and a half minutes.

From the slight time-delay variations in the radar bounce-backs, the astronomers were able to detect the relief of

apart, the scientists were better able to distinguish elevation differences at a resolution of about 600 feet.

"This, in effect, gives us stereo reception," Dr. Goldstein said, "and enabled to pinpoint each area touched on Venus. We were able to see depths better."

Dr. Howard C. Rumsey Jr., who developed the computer technique used in producing the map, said that the area surveyed was "basically flat," with elevation variation no greater than 3,300 feet.

Dr. Rumsey is also on the

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Covered in the latest radar scan of Venus is an area along the equator of more than 500,000 square miles, which is about the size of Alaska. The probe achieved a resolution of about six miles, five times better than the last Venus radar experiment in 1970.

In previous radar observations over the last decade, by the Jet Propulsion Laboratory and also the Massachusetts Institute of Technology, more than a sixth of the Venusian surface has been mapped in some fashion. Optical astronomers have yet to see any of the planet's surface through telescopes.

Dr. Richard A. Goldstein, who headed the Jet Propulsion

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Dr. Sagan said that the apparent density and size of the craters on Venus suggested that they had been formed by meteorite impacts rather than volcanic eruptions. Volcanic craters are usually smaller.

The radar findings also indicate that meteorites of considerable size can't penetrate the thick, high-pressure atmosphere of Venus without burning up, Dr. Fagan added.

### Erosion Is a Mystery

But since there is no water and presumably a low wind velocity at the Venusian surface, he said, it is not clear what forces were causing the craters to erode. The shallowness of the craters suggests that they are eroded.

Dr. Goldstein and his team made the radar sounding of the planet on June 20, 1972—when Venus was last at its

closest approach to earth, 26 million miles away. To get the improved resolution, they used two antennas at the Goldstone Tracking Station in the Mojave Desert of California. It took them a year to process the data and make the map.

The radar signals were beamed toward Venus by the 210-foot dish antenna, and the return echoes were received at both the large antenna and an emitting power is 400,000 watts. The round-trip signal time is four and a half minutes.

From the slight time-delay variations in the radar bounces, the astronomers were able to detect the relief of the planet and outline the shape and depth of such features as the craters. The signals are timed with hydrogen maser clocks, which are so accurate and precise that they would have an error of one second in one million years.

### 'Stereo Reception'

In addition, the return signals are analyzed for polarization. If the signals bounce back unpolarized—that is, with their electric fields scrambled—they indicate rough terrain. Unscrambled echoes indicate smooth terrain.

By receiving the return signals at two antennas 14 miles

apart, the scientists were better able to distinguish elevation differences at a resolution of about 600 feet.

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Dr. Howard C. Rumsey Jr., who developed the computer technique used in producing the map, said that the area surveyed was "basically flat," with elevation variation no greater than 3,300 feet.

Dr. Rumsey is also on the staff of the Jet Propulsion Laboratory, which is operated by the California Institute of Technology for the National Aeronautics and Space Association.

Early next year, the laboratory's scientists expect to get a much closer radar profile of parts of Venus when Mariner 10 flies by the planet on its way to the first rendezvous with Mercury. The unmanned spacecraft is scheduled to be launched from Cape Kennedy, Fla., in early November.

Mariner 10 is equipped with television cameras and radar. The new radar map is being studied by project scientists to help them to decide where to point Mariner's cameras.