

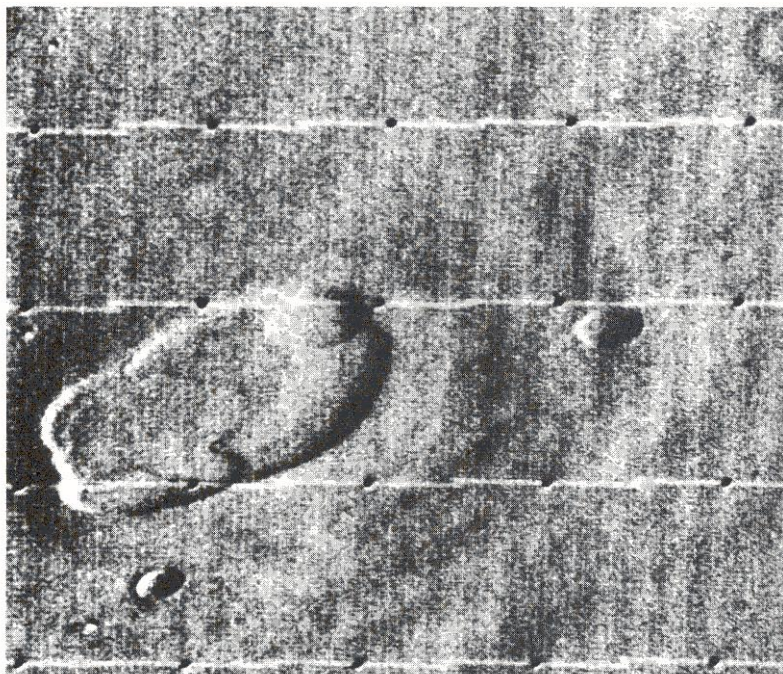
Mariner Looks at Mars

Mariner 9, launched at Cape Kennedy on May 30, 1971, went into orbit around Mars on November 13. It is the first spacecraft to orbit another planet.

For at least 90 days Mariner 9 will circle Mars about twice a day, swinging in as close as 862 miles and out almost 11,000 miles. The mission, which is being managed for National Aeronautics and Space Administration by Caltech's Jet Propulsion Laboratory, will map about 70 percent of the surface of Mars. The composition, density, pressure, and temperature of the atmosphere will be studied—as will the structure, temperature, and composition of the surface. And data will be obtained on the changes in the planet's surface markings.

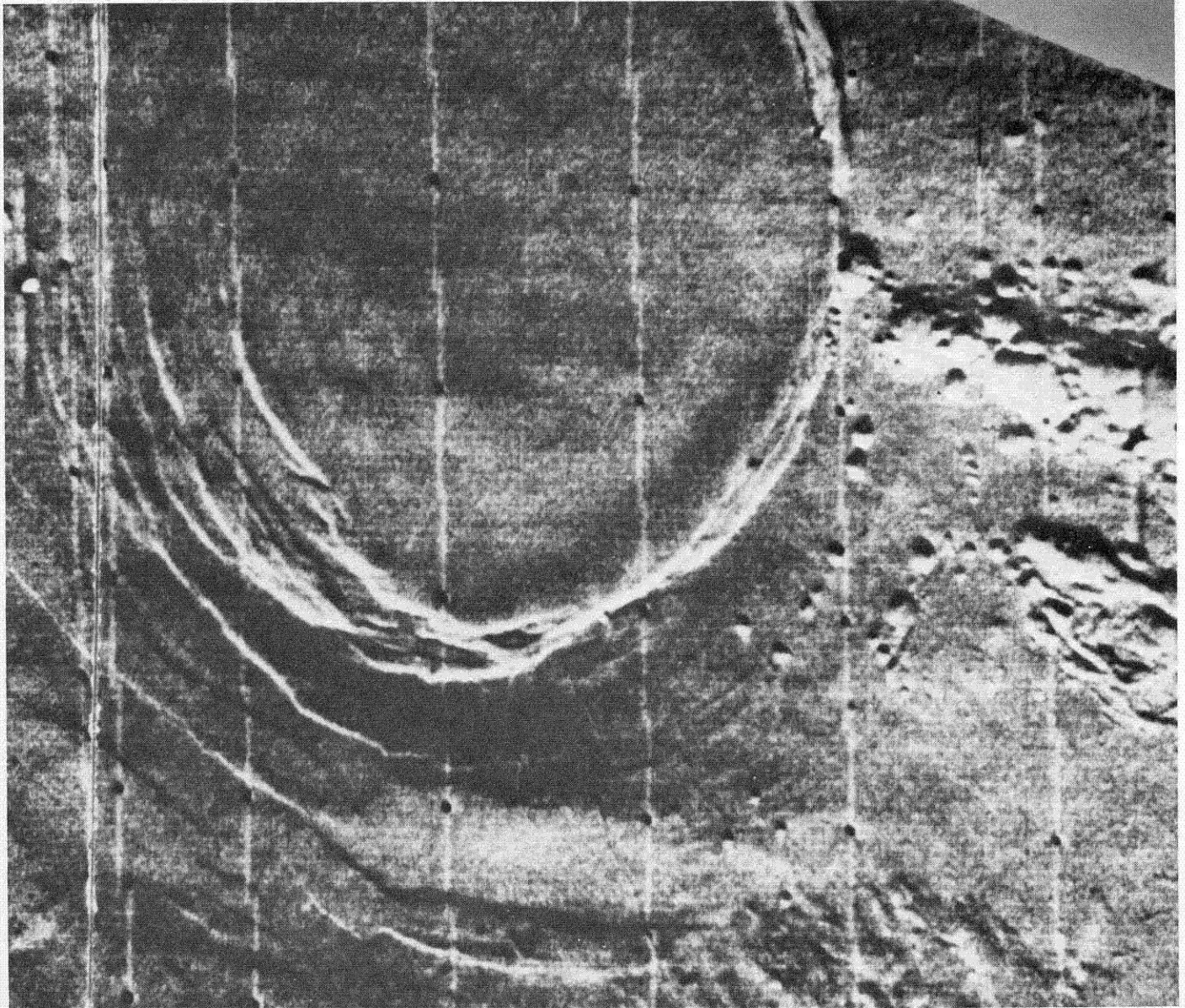
The Mariner 9 mission will provide much more data than all previous planetary missions combined. In 90 days the spacecraft cameras will take more than 5,000 photographs of the Martian surface. Though a violent dust storm was still obscuring much of the planet through the month of December, some of the early pictures received from Mariner 9 were surprisingly clear—and clearly historic.

An oblique view of the crater complex near Ascræus Lacus in the Tharsis region of Mars. This is the northernmost of the prominent dark spots observed by Mariner during its approach to the planet. The spot consists of several intersecting shallow crater-like depressions. The main crater is approximately 21 kilometers (13 miles) across, the whole complex about 40 kilometers (25 miles) across. The crater probably is in a relatively high area of the Martian surface, which accounts for its being visible above the dust storm. The faint circular features outside the crater are probably atmospheric.



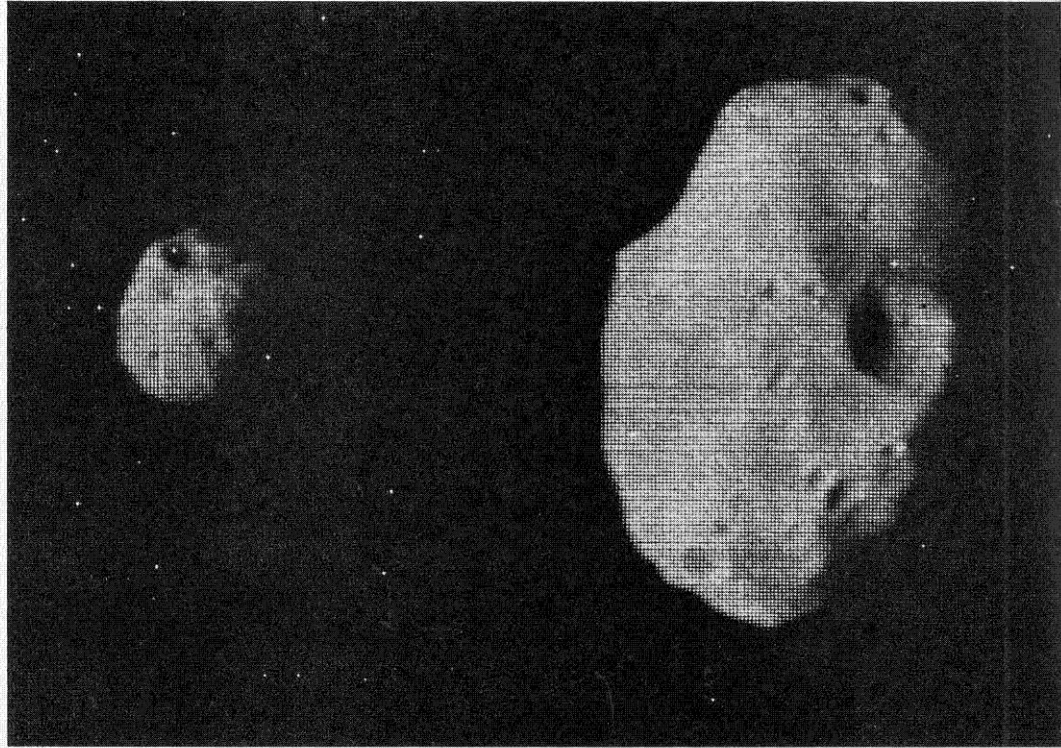
Nix Olympica (Snows of Olympus). In pictures taken early in the Mariner 9 mission, this region shows a dark mountain standing above the Martian dust storm. This higher-resolution photograph shows that the area contains a complex crater nearly 64 kilometers (40 miles) in diameter. The multiple crater form with scalloped margins is characteristic of calderas—volcanic collapse depressions on Earth. In the Mariner 6 and 7 flights in 1969, an outer ring, 1600 kilometers (1000 miles) in diameter, was seen. It is hidden by the dust in this oblique picture. Earth-based radar observations show that this is a high region on Mars and is usually covered by a white cloud when observed telescopically. The picture was taken on November 27.



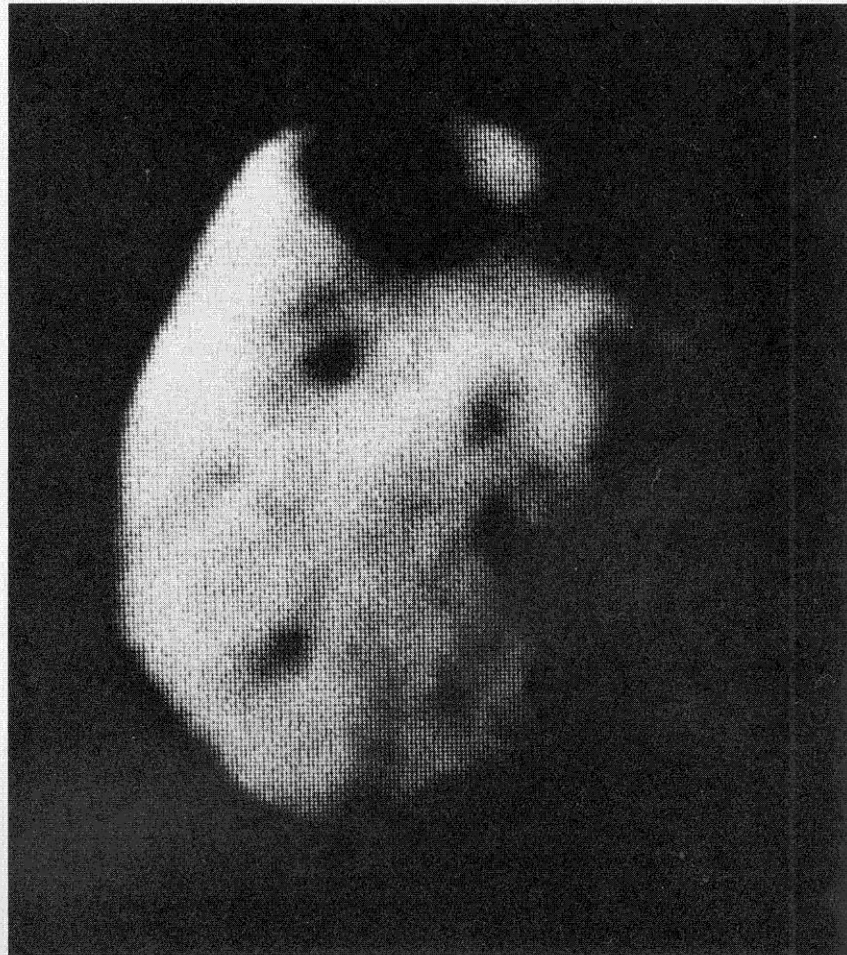


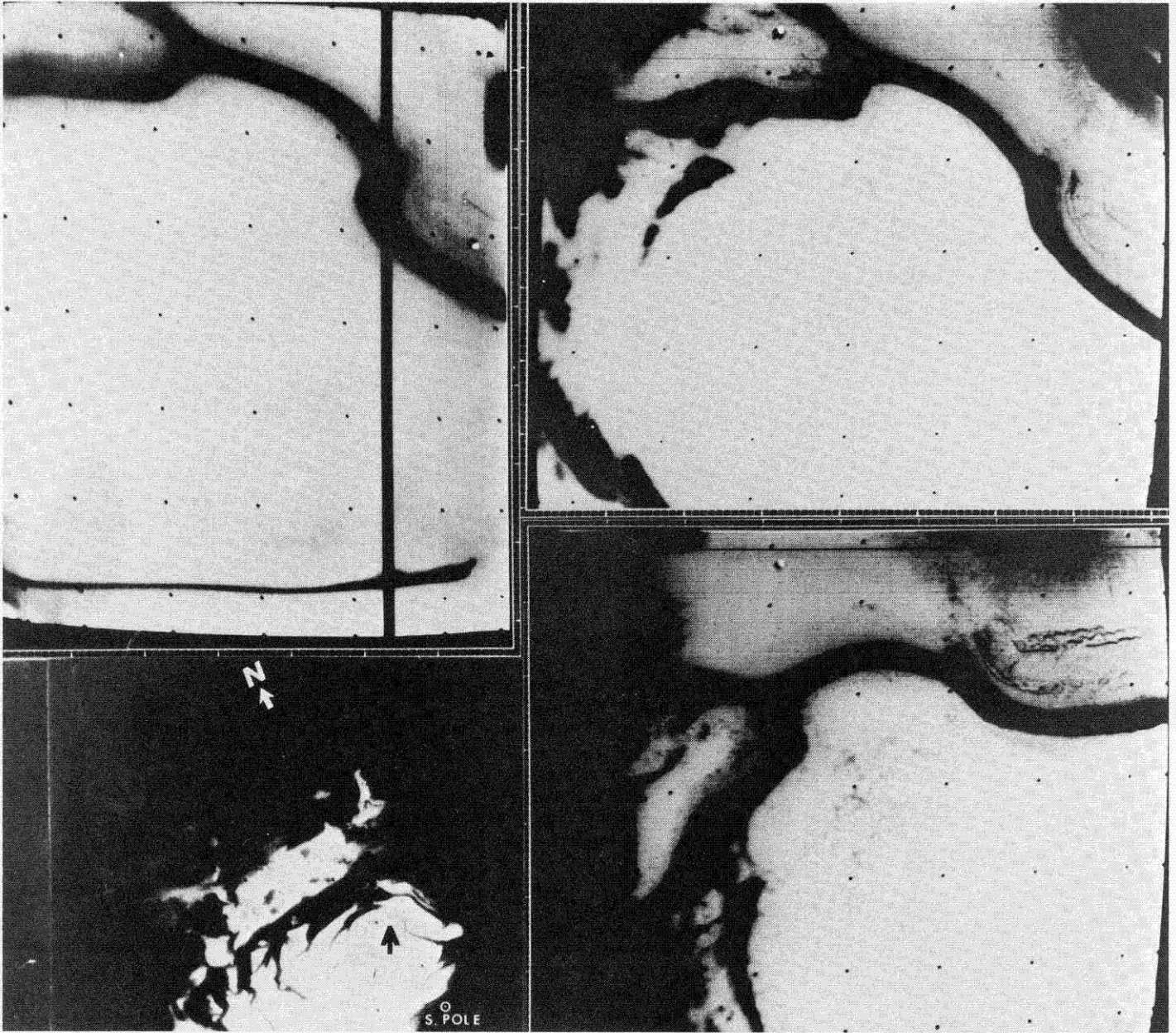
This 70-mile-diameter Martian crater near Nodus Gordii (the Gordian Knot) was photographed by Mariner 9 on November 28. The crater and its immediate surroundings are high ground, emerging island-like from a sea of wind-blown dust. In pictures taken 48 hours later, the edge of the dust cloud had shifted, obscuring the ridges and valleys on the outer northwest rim. Whether the pictures show a smooth crater floor or obscuring wind-blown dust remains to be learned. The multiple concentric fractures on the western rim and the abundant rimless craterlets suggest that this is a caldera, or volcanic collapse crater, equal in size to the largest on the Earth or on the Moon.

Man's first close-up views of Phobos were taken on November 29 (left) and November 30. The dark spot at the top of the left image and at the center on the right is a crater about 6.8 kilometers (4.2 miles) across. Phobos itself is about 21 ± 1 mile high and about 25 ± 5 kilometers (16 ± 3 miles) long. The uncertainty in length is due to the moon's irregular shape and large fraction in darkness in these views. The picture at the left was taken during Mariner 9's 31st orbit of Mars. Range to Phobos was 14,683 kilometers (9,123 miles). Phobos has a different tilt to the spacecraft's high resolution television camera in these two views.



A computer-processed version of Man's first detailed image of Phobos, the innermost moon of Mars. The most spectacular feature here is the large crater at the top, approximately 4 miles (6.8 kilometers) across. The dimensions of this crater are about one-third the height of Phobos in this picture. The small asteroid which produced this crater must have caused major damage on Phobos. The profusion of small craters suggests that Phobos is very old and possesses considerable structural strength. The terminator of Phobos, the region of shading toward the right separating the day and night sides, is irregular. Phobos appears to be rougher than its companion satellite, Deimos. The picture was taken by Mariner 9 during its 31st orbit of Mars on November 29.





The three high resolution frames at upper left, upper right, and lower right were acquired by Mariner 9 on November 19, November 28, and December 1, respectively. The same local area is viewed in each case, but from somewhat different directions, and is indicated with a dark arrow on the accompanying low resolution view. The location of the South Pole of Mars, and the direction of the prime meridian, are shown in white. In the high resolution frames, the maximum dimension corresponds to approximately 100 kilometers (62 miles) on the Martian surface. The low resolution view is printed at 10 times greater scale. At most, only an inch or so of the carbon dioxide frost composing the cap could be expected to have sublimated in such a brief time. Uniform disappearance of thin frost over such a large area indicates that this portion of Mars is exceedingly smooth. Underlying low relief of distinctive character appears to be emerging in the bend of the sinuous dark band.