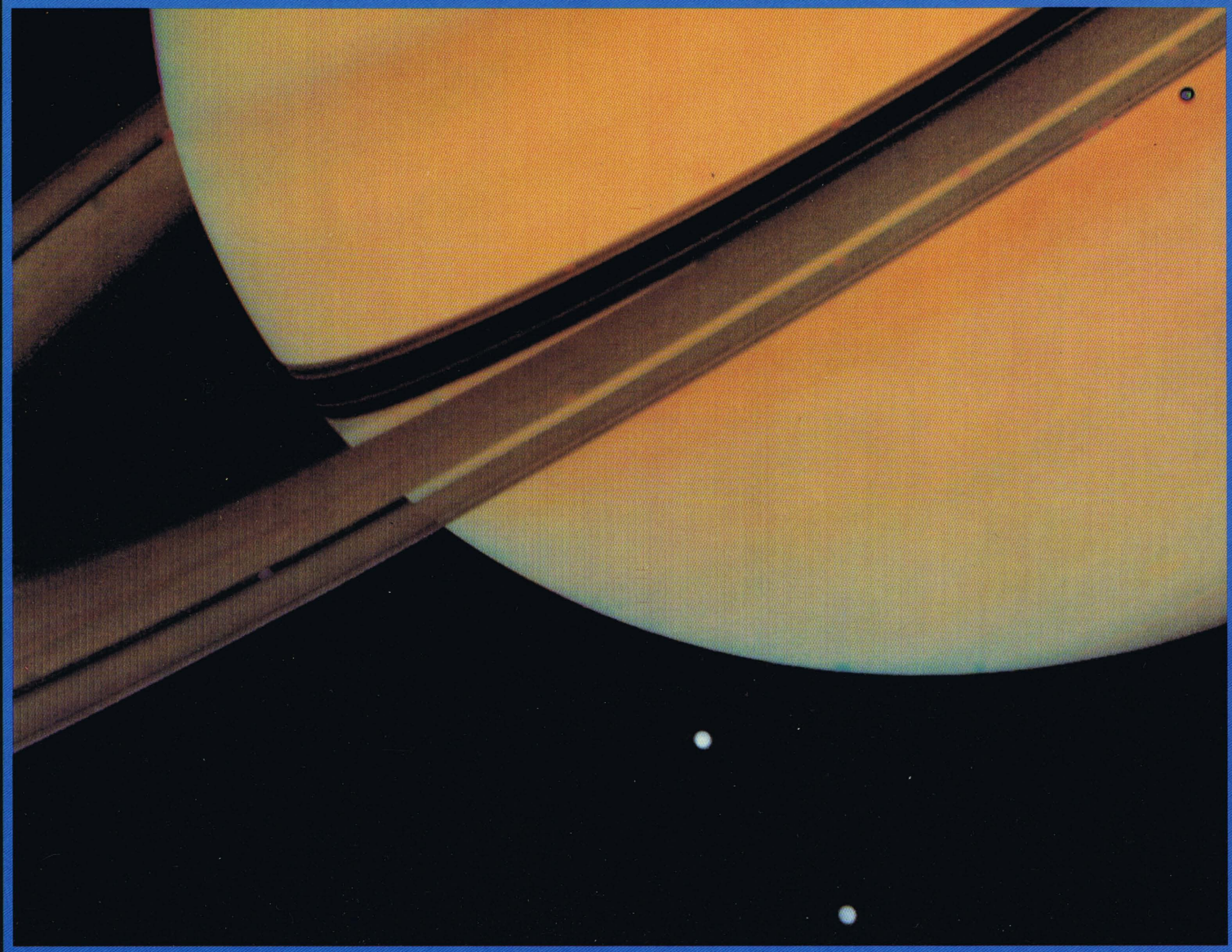


Voyager at Saturn

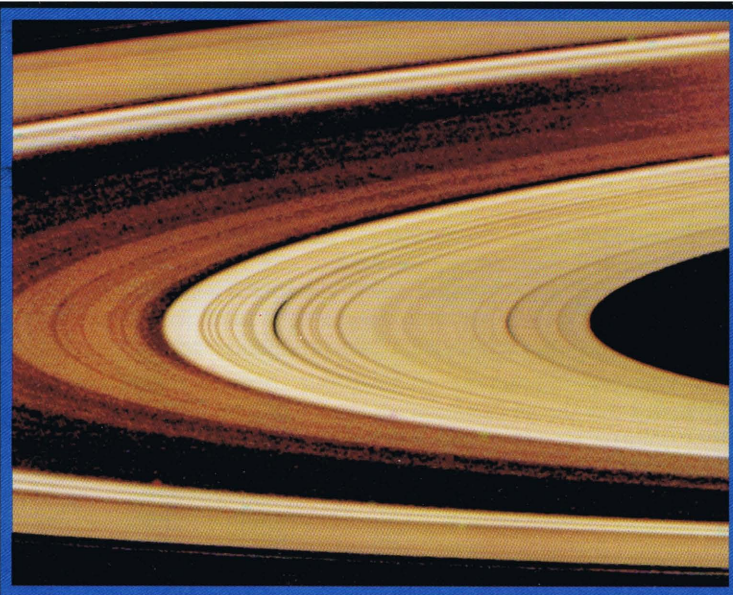
The Planet & Rings



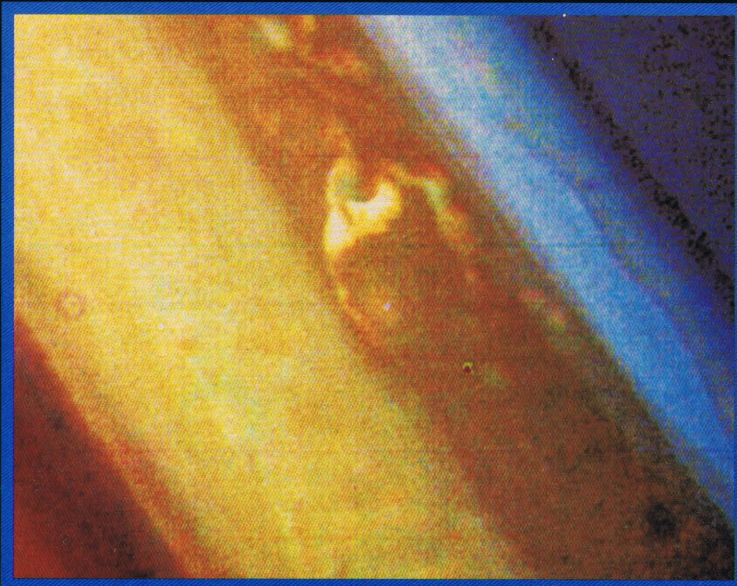
Saturn Close-Up



Saturn and Its Rings



Under the Rings



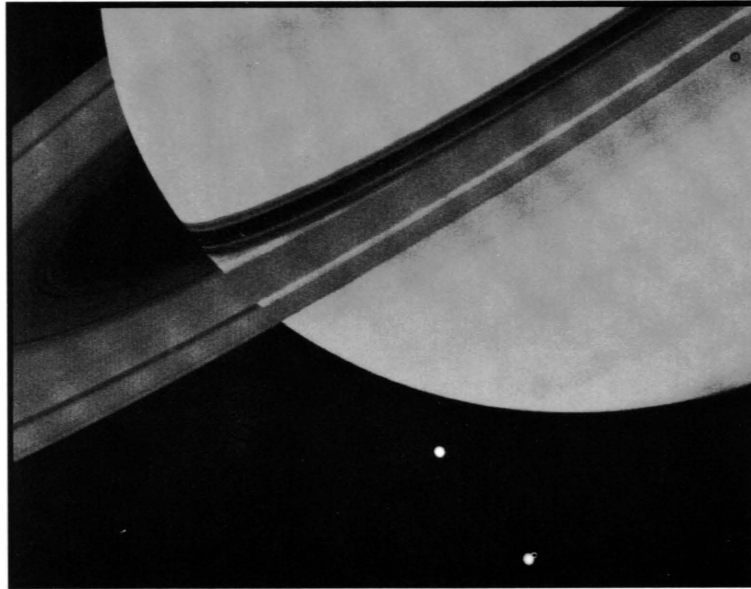
Closing In



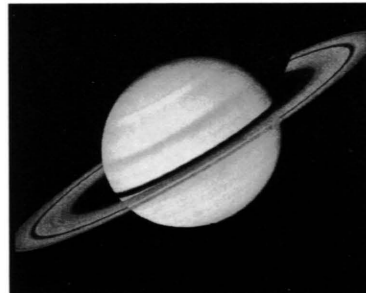
Looking Back

Voyager at Saturn

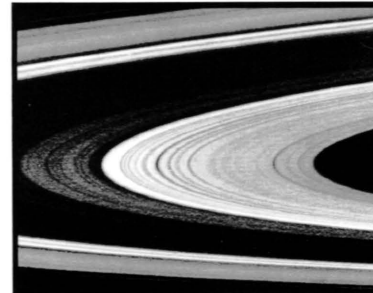
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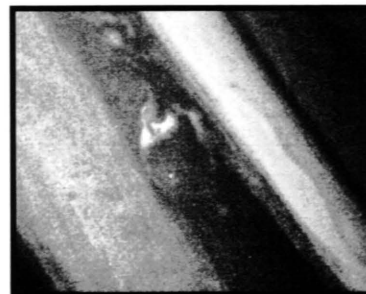
Saturn Close-Up



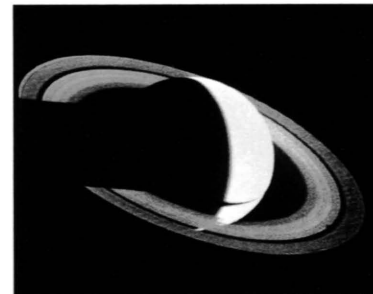
Saturn and Its Rings



Under the Rings



Closing In



Looking Back

Voyager Mission Highlights

Two unmanned spacecraft, Voyagers 1 and 2, completed highly successful fly-through encounters of the Jovian System on March 5 and July 9, 1979, respectively. Voyager 1 went on to rendezvous with Saturn on November 12, 1980, as Voyager 2 will in August 1981. Voyager 2 will continue on to encounter Uranus in 1986 and possibly Neptune in 1989. Both spacecraft will eventually escape our solar system into interstellar space.

The historic Voyager encounters with Jupiter provided startling new information about the Jovian System. Jupiter's atmosphere is complex, with layers of colorful clouds above a deep atmosphere of hydrogen and helium. The atmosphere, more turbulent than had been expected, appears to be controlled by forces far below the visible cloudtops. The Great Red Spot, large enough to hold several Earths, is a tremendous atmospheric storm that rotates counterclockwise, with one revolution every six days.

The most spectacular discovery was that of active volcanoes on Io, Jupiter's innermost Galilean satellite. The largest active volcano observed by Voyager 1, however, had become inactive by the time Voyager 2 arrived 4 months later. Additional Voyager discoveries include a thin ring of material around Jupiter, three new satellites, and auroras and cloud-top lightning bolts, similar to superbolts on Earth.

The Saturn System proved to be equally exciting, with hundreds of tiny ringlets comprising the three brightest rings that are visible from Earth. Several new rings and at least three new satellites have also been confirmed. Lightning-like discharges appear to come from the rings rather than Saturn's atmosphere. Titan, Saturn's largest satellite, was one of Voyager 1's prime targets, and was found to have a thick, nitrogen-rich atmosphere that totally hides the surface from our view. Voyager 1 has completed its planetary observations and is now continuing its journey outward toward the edge of the universe.

These pictures were obtained by Voyager 1 as it swept through the Saturn System in November 1980.

Saturn Close-Up — Saturn, its rings, and two of its moons, Tethys (above) and Dione (below) were photographed by Voyager 1 as it approached the Saturn System in November 1980. Shadows of Tethys (far right) and the three main rings are cast onto the planet's cloudtops. The body of the planet can be seen through the Cassini Division, a 3500-kilometer (2170-mile) stretch between the A- and B-rings.

P-23058 11/3/80 13 million km (8 million mi)

Saturn and Its Rings — A mosaic of images shows Saturn and its satellites Tethys (outer left), Enceladus (inner left), and Mimas (upper right) about two weeks before Voyager 1's closest approach. Features larger than 350 kilometers (220 miles) can be seen on the planet despite the deep haze layer above the cloud deck. Detail in the rings also became apparent as Voyager 1 neared. For example, this picture shows a gap in the dark C-Ring, and material can be seen within the relatively wide Cassini Division (long believed to be empty) which separates the B-Ring (middle) from the A-Ring (outer). The Encke Division appears near the outer edge of the A-Ring. The shadow of the rings falls across the equatorial regions of the planet, while the shadow of the planet appears to cut off the rings at right.

P-23077 10/30/80 18 million km (11 million mi)

Under the Rings — The rings of Saturn extend over 65,000 kilometers (40,000 miles) but may be only a few kilometers thick. The ring particles range in size from dust to boulders, and may be icy snowballs or frosted rocks. Colors have been exaggerated in this photograph, which was taken from the unilluminated (southern) side of the rings. The very dense B-Ring takes on a dark reddish-brown hue, while the less dense C-Ring and Cassini Division appear pearly white. The medium-density A-Ring shows up nearly amber, while the fine particles in the F-Ring sparkle as a multicolored strand outside the A-Ring.

P-23207 11/12/80 717 thousand km (444 thousand mi)

Closing In — Various features in Saturn's cloudtops are seen in this color-enhanced image of the planet's northern hemisphere: small-scale convective cloud features (similar to, but much larger than, thunderstorms in Earth's atmosphere) are visible in the brown belt; an isolated convective cloud with a dark ring is visible in the light brown zone; and a longitudinal wave is visible in the light blue region.

P-23062 11/5/80 9 million km (5.5 million mi)

Looking Back — Voyager 1 continued its observations for nearly five weeks after closest approach to the planet. The spacecraft photographed Saturn's sunlit crescent, the ring shadows falling on the planet, and the dark hemisphere illuminated by "ringshine." It searched for lightning and auroras on the planet's dark side, looked for "sun dogs" resulting from ammonia crystals in the atmosphere, and continued temperature and composition measurements.

P-23254 11/16/80 5.3 million km (3.3 million mi)