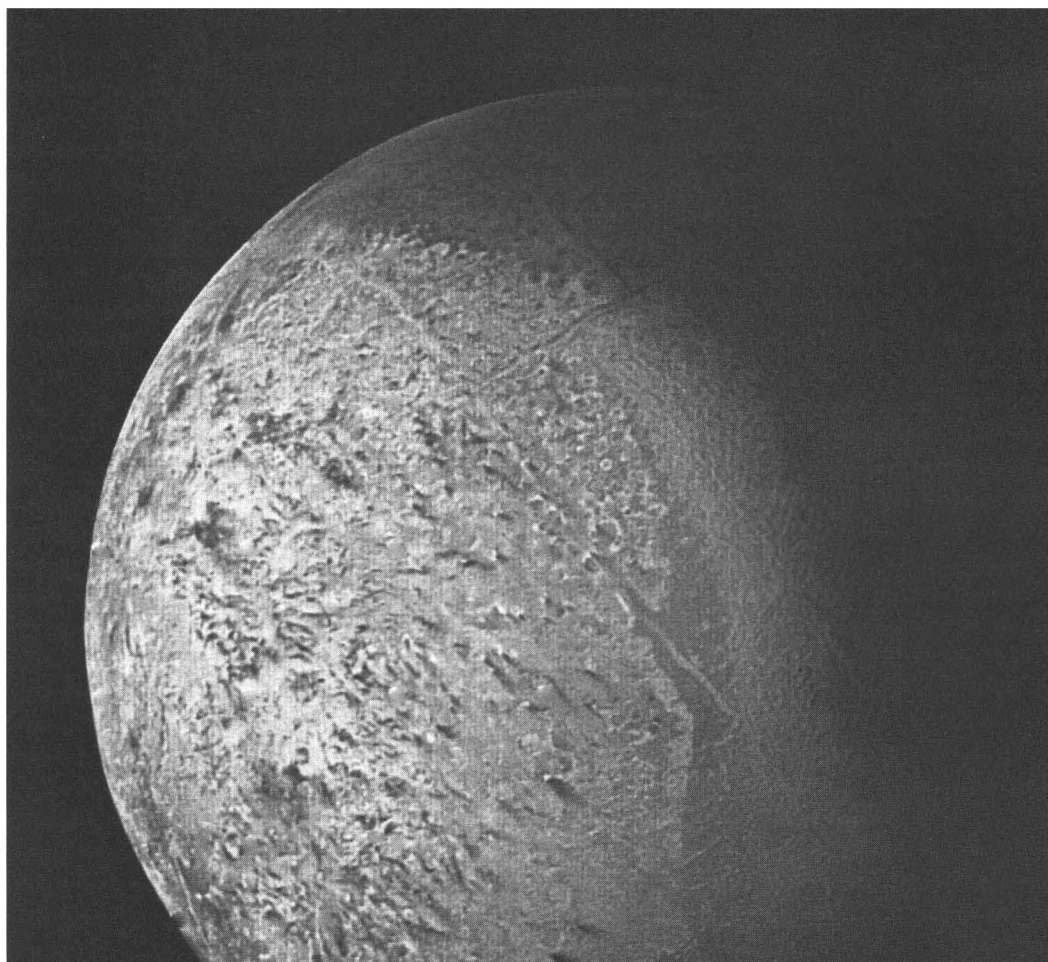


# Voyager

B U L L E T I N

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Both the darker regions to the north and the very bright subequatorial band on Triton show a complex pattern of irregular topography that somewhat resembles "fretted terrain" on parts of Venus and Mars. (P-34687)

## *"Imagine Jupiter orbited by Mars . . ."*

—*Dr. Laurence Soderblom, Deputy Team Leader,  
Voyager Imaging Science Team*

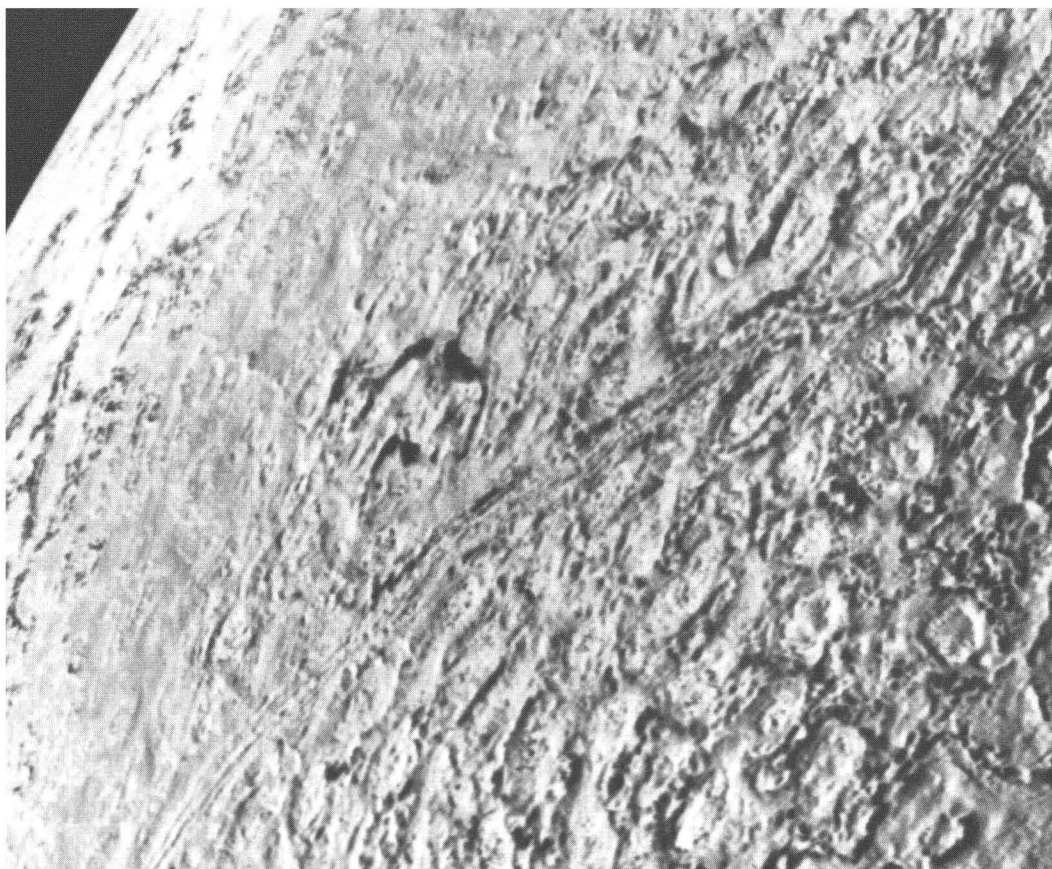
As the last solid body to be observed by Voyager 2 after a 12-year odyssey through the outer solar system, Neptune's largest moon, Triton, provided a stunning finale.

Triton's surface is marked by extraordinarily varied terrain, some of which has not been seen before on any other body, and some that is like our Moon, Mars, Io, or Europa, among several examples.

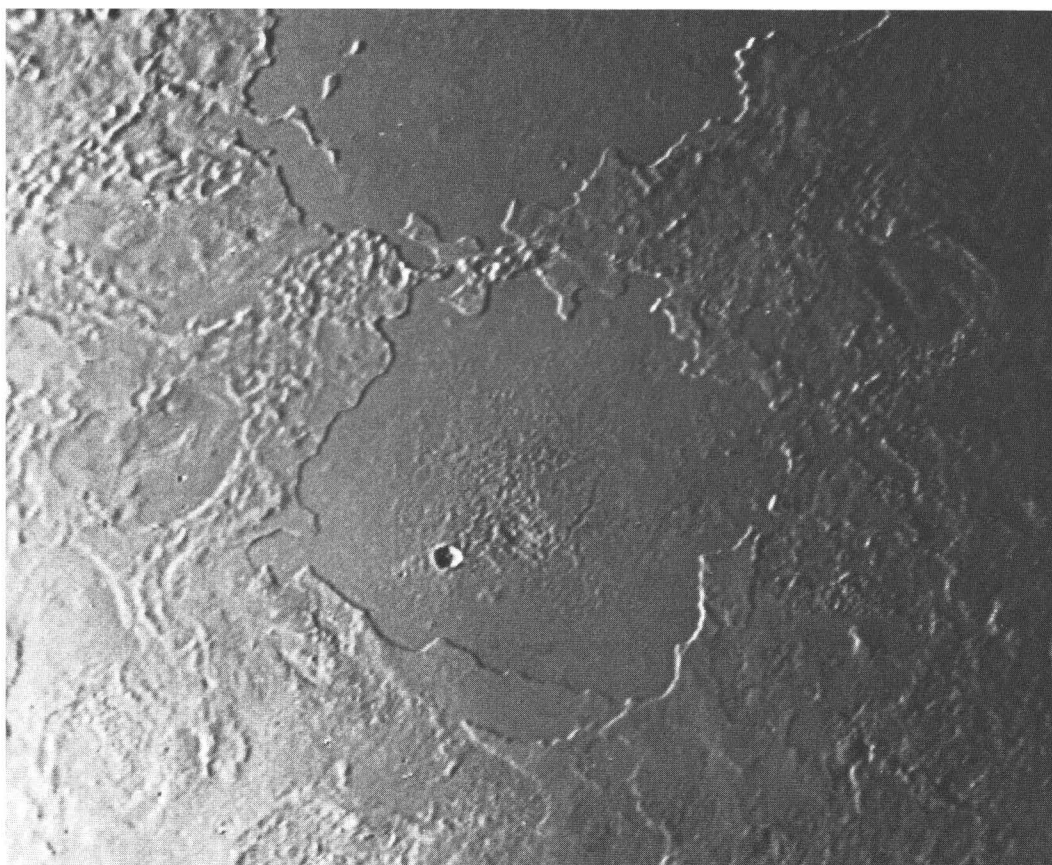
Triton has something for everybody, noted Dr. Soderblom, of the U.S. Geological Survey in Tucson, Arizona: Complex geology, polar ices, complex chemistry, and hazes. Dr. Soderblom proposes that perhaps ice volcanoes are active even now.

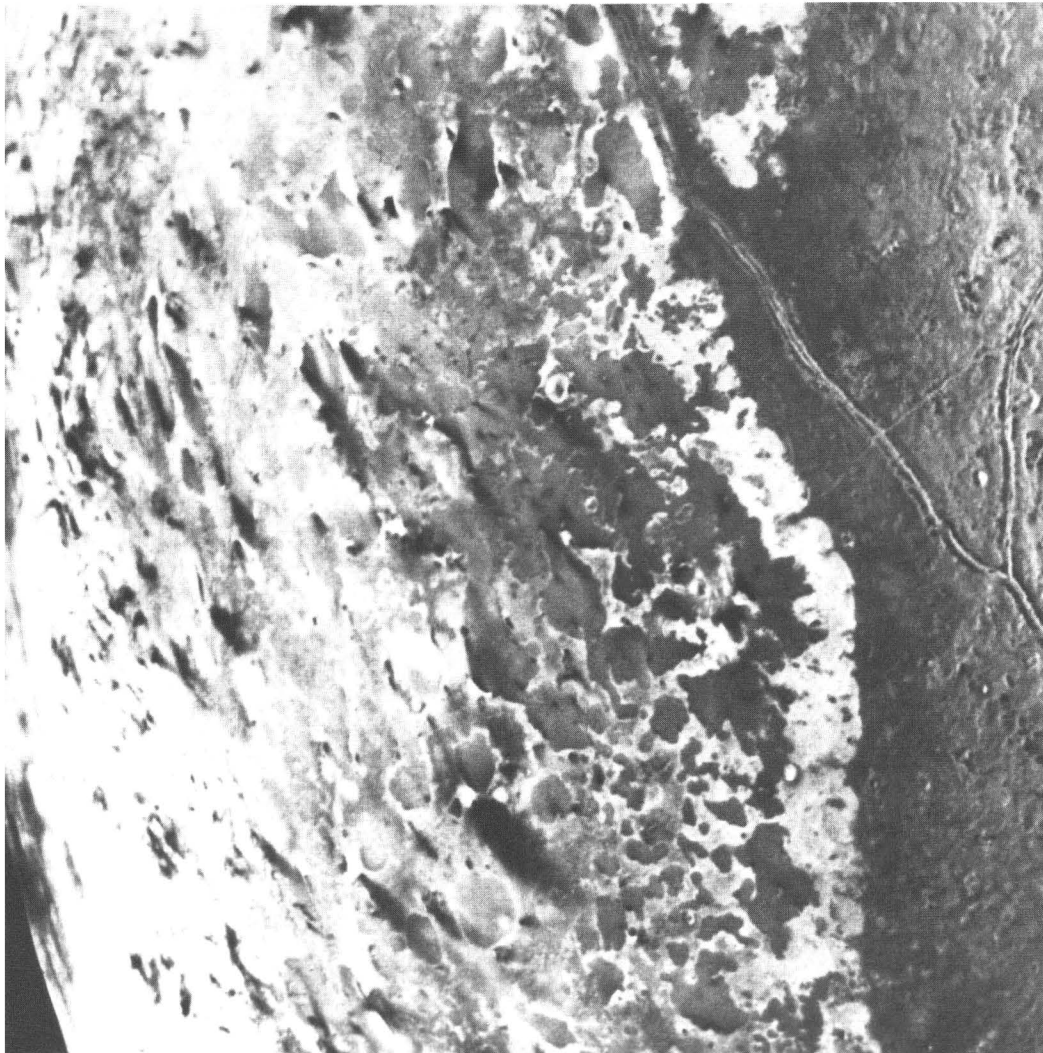
The boundary between Triton's bright southern hemi-

**One of the most detailed views of the surface of Triton taken by Voyager 2 shows a peculiar landscape of roughly circular depressions separated by rugged ridges. (P-34722)**



**These two depressions on Triton, possibly old impact basins, have been extensively modified by flooding, melting, faulting, and collapse. (P-34692)**





**About 50 dark plumes or "wind streaks" in the south polar terrain of icy Triton may be vents where gas has erupted from beneath the surface and carried dark particles into Triton's nitrogen atmosphere. (P-34714)**

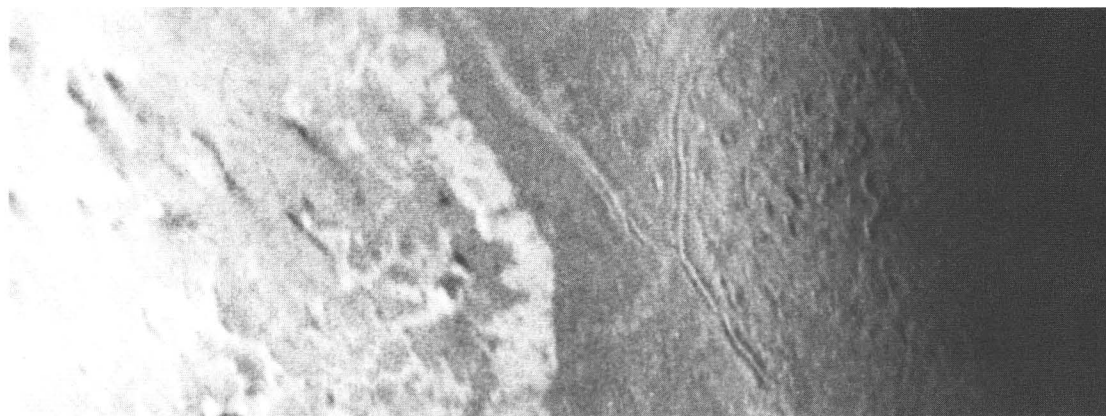
sphere and the darker northern hemisphere is clearly visible (due to Triton's tilt and inclined orbit, the southern hemisphere currently receives more direct sunlight). Patterns of light and dark regions cover most of the southern hemisphere. Also evident are long, straight lines that appear to be surface expressions of internal, tectonic processes. No large impact craters are visible in the southern hemisphere, suggesting that the crust of Triton has been re-

newed relatively recently—that is, within the past billion years or less.

One "crazy idea" currently under study is that ice volcanoes are resurfacing the moon. About 50 dark plumes or "wind streaks" can be seen in early evaluations of images of the southern polar terrain. The plumes originate at very dark spots generally a few miles in diameter. Some are more than 100 miles long. The spots, which clearly mark the source of the dark material, may be vents where gas has erupted from beneath the surface and carried dark particles into Triton's nitrogen atmosphere.

Southwesterly winds may then have transported the erupted particles, forming the gradually thinning deposits seen to the northeast of most of the vents. It is possible that the eruptions have been driven by seasonal heating of very shallow subsurface deposits of volatiles, and the winds transporting particles may be seasonal winds.

The polar terrain, upon which the dark streaks have been deposited, is a region of bright materials mottled with irregular, somewhat dark patches. The pattern of irregu-



Compositionally distinct terrain and geologic features can be seen near the boundary between Triton's lighted southern hemisphere and its shadowed northern hemisphere. (P-34720)

lar patches suggests that they may correspond to lag deposits of moderately dark material that cap the bright ice over the polar terrain.

In Triton's northern hemisphere, there are large tracts of peculiar terrain unlike anything seen elsewhere in the solar system. Most of the area is covered by roughly circular depressions separated by rugged ridges. The depressions are probably not impact craters since they are too similar in size and too regularly spaced. Their origin is currently unknown, but may involve local melting and collapse of the icy surface. A conspicuous set of grooves and ridges cuts across the landscape, indicating fracturing and deformation of Triton's surface.

Three irregular dark areas, surrounded by brighter material, may be dark substrate below a bright frost cover. Once a hole burns through the frost, for whatever reason, the region

warms and defrosts, but a cold rim spreads around the area.

Other features include what appear to be frozen lakes or old calderas, which have multiple floor levels, perhaps due to massive flooding and re-freezing in a sea of ice-like lava. In one scenario, fluid rises on the floor of the crater and then solidifies. The next era of melting allows the next floor to also rise and then refreeze. These types of floods are probably not localized to the caldera areas of the moon.

Triton's atmosphere has been found to be primarily nitrogen-based, with some methane. The atmosphere may extend as much as 800 kilometers (500 miles) above the surface of the 2720-kilometer (1690-mile) diameter moon. In addition, images show a thin haze layer extending 5 to 10 kilometers (3 to 6 miles) above the moon's limb. The haze may be condensation of subliming (evaporating) materials.

## *Topographic Textures*

A false-color map of Triton shows several compositionally distinct terrain and geologic features. At center is a gray-blue unit referred to as "cantaloupe" terrain because of its unusual topographic texture. The unit appears to predate other units to the left. Immediately adjacent to the cantaloupe terrain is a smoother unit, represented by a reddish color, that has been dissected by a prominent fault system. This unit apparently overlies a much-higher-albedo material, seen farther left. A prominent angular albedo boundary separates relatively undisturbed smooth terrain from irregular patches that have been derived from breakup of the same material. Also visible at the far left are diffuse, elongated streaks, which seem to emanate from circular, often bright-centered features. The parallel streaks may represent vented particulate materials blown in the same direction by winds in Triton's thin atmosphere.

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