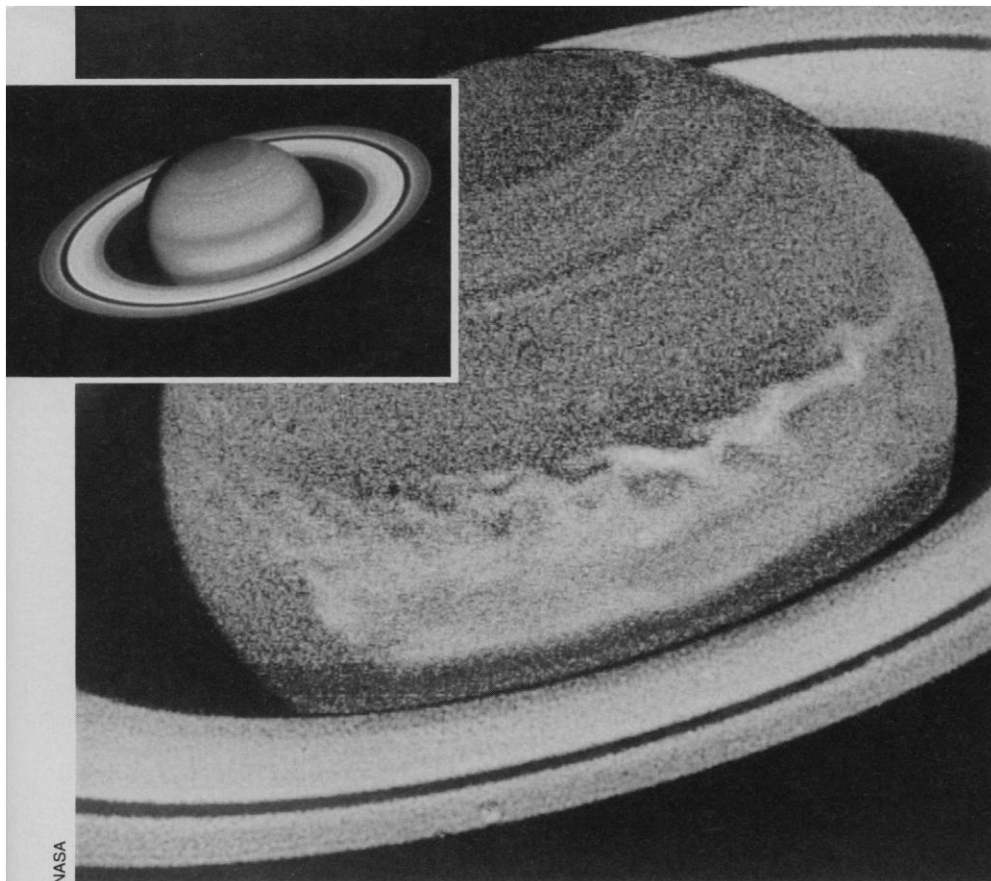




Images of an Unquiet Planet

With some hasty reprogramming, the Hubble Space Telescope turned its gaze on the angry face of Saturn—and what it saw only deepened the mystery

THE FIRST TIME THE HUBBLE SPACE TELESCOPE turned its fuzzily focused eye toward Saturn, on 26 August, its computer-corrected images of the Ringed Planet were pretty but unsurprising: Saturn's calm, banded face seemed almost identical to the unruffled visage it presented to the Voyager spacecraft in 1980 and 1981. But now Hubble has taken a second look, capturing Saturn in a very different mood.

The change came in late September, when amateur astronomers around the world reported that the planet had suddenly developed a "White Spot"—a gigantic storm system at least three times the size of Earth. The professionals jumped in immediately, tracking the spot with ground-based telescopes as it spread across Saturn's equatorial regions. They were so intrigued by what they saw that they cajoled Space Telescope officials into interrupting Hubble's carefully planned schedule for a second look. On 9 and 11 November, the telescope revealed images such as the one shown here: a psychedelic cloudscape that had become strikingly like the relentlessly churning atmo-

sphere that the Voyagers saw on Jupiter.

"People said, 'Westphal, you've put rings around the wrong planet!'" laughs California Institute of Technology engineer James Westphal, principal investigator for Hubble's workhorse imaging instrument, the Wide Field/Planetary Camera.

Indeed, say Hubble scientists who joined Westphal at the NASA press conference on 20 November where the image was released, the White Spot seems to be Saturn's answer to Jupiter's Great Red Spot—a brick-colored hurricane that has been raging on the Giant Planet at least since the invention of the telescope in the 17th century. The difference is that on Saturn, such large-scale outbursts are rare and short-lived. The previous one appeared in 1933 and survived only a few years, while the last one before that was in 1870.

"Saturn burped," says Caltech planetary scientist Andrew Ingersoll, summing up his profession's near-total ignorance about this phenomena. The question is, Why?

The spot cannot be a volcanic eruption, explains Ingersoll, because Saturn has no

Saturnian psychedelics. *The ringed planet was calm in August (inset) but 2 months later it had become as stormy as Jupiter.*

magma in its interior. Nor does it have a solid surface from which magma could erupt. Like Jupiter, it is essentially a giant ball of compressed hydrogen and helium gases, with just enough methane, ammonia, and other trace compounds to give it some color. (The white color of the spot, for example, is apparently due to a high cirrus of frozen ammonia crystals.)

The explanation for the White Spot may nevertheless lie deep within Saturn. Even without magma, Ingersoll says, the planet has lots of heat welling up from the deep interior, where massive amounts of energy still linger from the days of the planet's formation 4.6 billion years ago. And that heat could well cause Saturn's thin gaseous substance to simmer like water on a stovetop, with a multitude of convection cells producing a multitude of comparatively small storms. And in fact, says Ingersoll, the two Voyagers did see such small storms. There is still a problem, however. The White Spot seems to represent an intermittent, massive upwelling more like the bubbles in a thick pot of oatmeal than plain water. "I don't understand it," he says.

Westphal and his colleagues hope to know more soon. When they saw the images that Space Telescope had sent them on 9 and 11 November, they immediately went to NASA and asked for more telescope time. With an atmosphere as tumultuous as this one, they said, they would literally need a time-lapse movie to figure it out. And time was of the essence. By Thanksgiving, Saturn would be lost for months in the glare of the sun; when it reemerged, the spot might be gone.

"The response was wonderful" says Westphal. "Everybody wanted this to happen." Scientists and NASA officials toiled day and night, eventually opening up space in Hubble's crowded schedule for the telescope to take 30 new sets of Saturn pictures—one during every 85-minute orbit for three full days, 16 through 18 November. When the images are completed, Ingersoll and the other scientists will be able to examine a data set rivaling that from the two Voyagers. Is the White Spot rotating, like terrestrial hurricanes and the Great Red Spot on Jupiter? Is material still welling up in the center? Is the storm dissipating? Is it growing stronger?

The images are still being processed to remove Hubble's optical aberration. But in January when they are finished, Westphal says, people should start getting some answers. ■ M. MITCHELL WALDROP