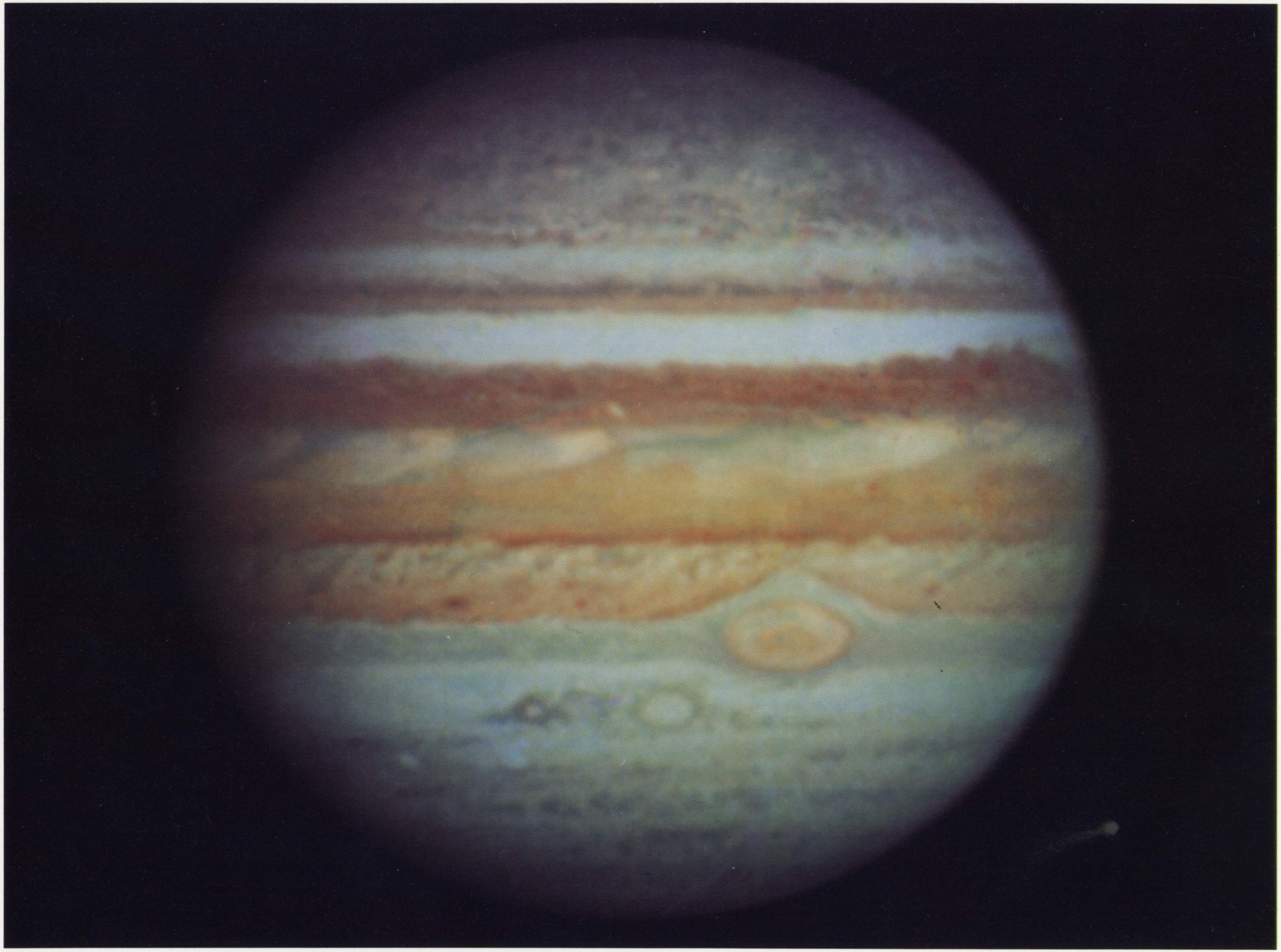
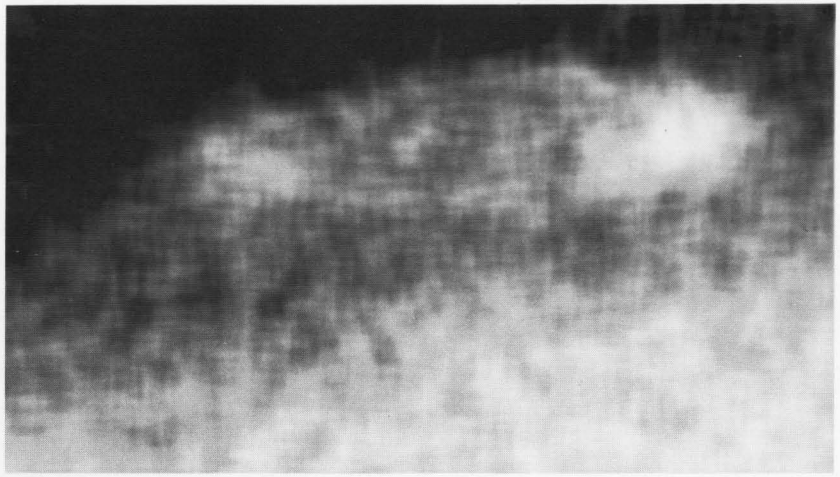
National Aeronautics and
Space Administration
**Goddard Space Flight Center**

HST JUPITER



This is the first true-color photograph of the giant planet Jupiter from the Wide Field/ Planetary Camera (WF/PC) on NASA's Hubble Space Telescope (HST). All features in this image are cloud formations in the atmosphere of Jupiter, which contain small crystals of frozen ammonia and traces of colorful chemical compounds of carbon, sulfur, and phosphorus. The temperatures of the clouds are extremely cold, about −137 degrees C.

The photograph was generated in a computer by combining three separate WF/PC exposures made in red, green, and blue light at 4:34 a.m. EDT on May 28, 1991. Jupiter's famous ''Great Red Spot,'' a centuries-old, hurricane-like formation that is large enough to more than encompass the whole Earth, is visible at the lower right. The Great Red Spot is seen here to be producing an unusual tent-shaped structure on the edge of Jupiter's South Equatorial Belt, the horizontal dark band just above (north of) the Spot. To the left and below the Spot, there is a so-called white oval, one of several that formed in or about 1940. The photograph shows much more detail than can be seen with telescopes on the ground. The HST will be photographing Jupiter periodically, so that the ''weather'' on the great gaseous planet can be studied systematically without long intervening gaps.



## *JOVIAN AURORA*

The image above shows the Jovian northern aurora—radiant emissions from the upper atmosphere—observed on February 8, 1992, by the European Space Agency's Faint Object Camera (FOC) on NASA's Hubble Space Telescope. This is the first direct image of the aurora taken in ultraviolet light and is the best auroral image ever. The aurora provides useful information about Jupiter's magnetic field and how high energy particles from the magnetosphere influence the temperature, chemical composition, and winds at the planet's northern pole.

The Hubble Space Telescope was deployed from the Space Shuttle Discovery on April 24, 1990. HST was designed to study the universe in near-infrared, visible, and ultraviolet wavelengths. HST is one of NASA's Great Observatories. The second Great Observatory, the Compton Gamma Ray Observatory, was launched in April 1991. The Goddard Space Flight Center, Greenbelt, Md, manages HST and the Compton Gamma Ray Observatory for NASA's Office of Space Science and Applications.

## For the Classroom

1. Compare and contrast Jupiter with Earth. Some characteristics to use are: size, mass, density, internal structure, atmospheric composition, and special features.

2. Find images of Jupiter from ground based telescopes and from Pioneer and Voyager. How do these compare with this recent image from NASA's Hubble Space Telescope?

3. When we see the colorful bands and spots on Jupiter, what are we actually looking at?

4. How are scientists able to determine the chemical composition of Jupiter's atmosphere?

5. On a piece of graph paper, create a simple picture using dots—one per square—using a pencil to make each dot. Ask a friend to hold your picture at varying distances moving farther and farther away. What happens to the appearance of your picture?

Try the same thing with colored pencils. How does your picture look at the farthest point in your classroom?

When computers receive data from spacecraft, the decoded numbers are arranged on a television monitor as a grid of dots or pixels much like your picture only each computer generated picture contains over two million pixels!

6. Research image processing to find out how this computer generated photograph of Jupiter was made using the Wide Field/Planetary Camera on NASA's Hubble Space Telescope. Look for these new words to add to your vocabulary: pixel, binary number, bit, megabit, and photon.

7. What causes an aurora? Where do they usually occur on Earth?