Starring Role for the Space Telescope

Astronomers have always wanted a telescope located outside the earth's atmosphere. Now they are about to get one. The Space Telescope is expected to be put up by the space shuttle in the next few years.

According to Jack Brandt of the NASA Goddard Space Flight Center, the Space Telescope was sold to the United States Congress as an instrument for seeing the edges of the universe. Later, people saw that it would be able to do excellent planetary imaging. What almost got lost in the shuttle was the instrument's capability of observing the stars. Speaking in Seattle at last week's meeting of the Astronomical Society of the Pacific, Brandt tried to redress the balance of publicity a little and to tell stellar astronomers (a very numerous group even when compared to planetary or galactic astronomers) what the Space Telescope could do for them.

It means first of all "orders of magnitude more stars of any kind in any class." Stellar astronomy goes by statistics. More examples generally lead to better understanding and more precise theories. They may also open up new aspects of the problem entirely. Brandt gave some examples: Binary systems involving K supergiants and B main sequence stars show great losses of matter over time, contributing to strong stellar winds. A high rate of stellar wind flow means fast evolution for both the star and the interstellar medium in the neighborhood. The Space Telescope should be able to study the atmospheres of these stars as they go in and out of eclipse. Five such systems can be studied by the International Ultraviolet Explorer satellite. One hundred will be available with the ST. Comparisons are with the International Ultraviolet Explorer because the ST is basically an instrument for ultraviolet observing.

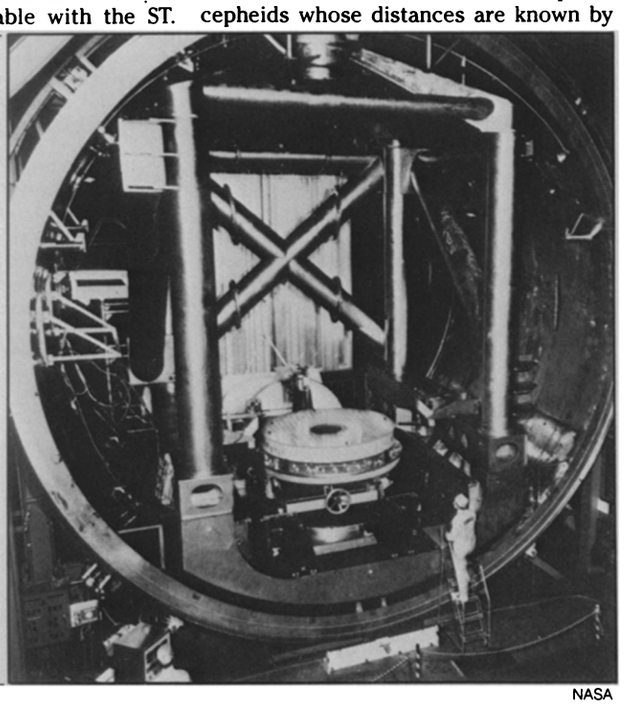
In principle, the Space Telescope could do all of the peculiar class A stars that are known and discover more, most if not all of the bright OB stars, white dwarfs, symbiotic stars, etc., etc. For most star classes the ST will be able to study stars 6 to 8 magnitudes fainter than now available. "You can calculate the spectra you would see," Brandt says, and then degrade them to IUE levels. "The information vanishes before your eyes with IUE resolution." The ST could do good spectra down to 26th magnitude. This will mean a real beginning for stellar astronomy of other galaxies. Many more stars will be available for study in the Magellanic Clouds than now are, and some can be studied in the galaxies M31 and M33.

The oldest way of measuring the distances of stars is by trigonometric parallax. Observations made when the earth is at different positions in its orbit are compared. If there is a difference in the apparent positions of the star, the angle between them can be used to triangulate the distance of the star. Only a few stars are near enough to display parallax, but for them it gives a distance that is not assailable on the grounds that the star's astrophysics may affect the measurement (as is the case with the redshifts of quasars). Parallactic distances are also the foundation of all astronomical distance measurements. The system of measurement of galactic distance using the periods of cepheid variable stars is anchored on a sample of cepheids whose distances are known by parallax. The system of measuring the greatest galactic distances by redshift is founded more or less on galaxies measured through cepheids. Brandt estimates that parallaxes will be observable to 10 times the distance now possible. That means (by simply taking the cube) 1,000 times as many stars. Maybe some of the peculiar stellar objects now of interest to astrophysicists will come into the range.

The Space Telescope will have a faint object camera capable of getting an image of a 28th magnitude star — albeit with an expensive 10-hour exposure. The same instrument could do profiles of the intensity of the light over the image of a single star or a close binary. It might also do photometry in globular clusters of stars, where the light of many stars tends to smear together for ground-based telescopes.

Over-all there are "order-of-magnitude leaps in many of its capabilities," says Brandt, and the prospect of "a large number of unexpected discoveries." □

The Space Telescope's 2.5 meter primary mirror was fabricated by Perkin-Elmer. It is shown here undergoing tests.



NASA

Reagan unveils new energy policy plan

The Reagan administration presented its "reformulated energy-policy guidelines" to Congress on July 17. So as not to be pinned down by something "static and unresponsive," its strategy consists of a philosophy rather than an actual blueprint or action plan. And that strategy represents a clear shift from the last federal energy plan, one developed by Jimmy Carter (SN: 7/21/79, p. 38).

Whereas Carter's plan proposed major new federal initiatives — such as development of a synthetic-fuels corporation and solar-development bank — Reagan instead proposes pulling the government out of the energy development scene to the full extent possible. Rather than setting specific objectives and guidelines — such as the Carter goal to develop a domestic capacity to produce 2.5 million barrels of "alternative fuels" per day within the next decade — Reagan would for the most part let market forces determine both national fuel-use patterns and which technologies deserve development support.

Even the goal to reduce oil imports — once Carter's highest energy priority — has undergone significant moderation. "Achieving a low level of U.S. oil imports *at any cost* is not a major criterion for the nation's energy security and economic health," the new Reagan plan says, because "even at its current high price, imported oil in some cases is substantially less expensive than available alternatives." Therefore, federal policies will