

ASTP's ultraviolet star: New window?

An elated astronomer and coughing astronaut this week represented a triumph and a near tragedy that took place during the final days of the Apollo-Soyuz Test Project, which ended July 24 with Apollo splashdown northwest of Honolulu.

At the Space Science Laboratory on the University of California's Berkeley campus, C. Stuart Bowyer and his colleagues are beginning the analysis of data from the ASTP extreme ultraviolet telescope, with the confidence that comes from being in on the ground floor of what may amount to a new field of astronomy. Meanwhile, ASTP astronauts Thomas Stafford, Donald "Deke" Slayton and Vance Brand are resting in Hawaii, where they are recovering from accidental inhalations of searing nitrogen tetroxide gas that leaked into their spacecraft during its parachute descent toward the Pacific.

Of the scientific experiments that filled (and nearly overflowed) the astronauts' time during the last five days of the flight (the Soyuz had left them on July 19), perhaps the most striking was the discovery, through Bowyer's instrument, of a definite extreme ultraviolet (EUV) source. "Atoms in the interstellar medium are very strong absorbers at this band," Bowyer says, "... and this led people to say that, forever, this radiation band would never be investigated." But, he says, much of the absorbing material is distributed irregularly, like clouds, "and if you look between the clouds you can see at least a reasonable difference." A difference that paid off.

"It blew us off the console panel," says Bowyer of the source, which registered on at least three of the instrument's four spectral bands: 60 to 250, 113 to 250 and 180 to 400 angstroms. It also showed up less brightly in the 44-to-80-angstrom X-ray band of the ASTP X-ray counter provided by Herbert Friedman of the Naval Research Laboratory.

Among possible EUV sources, says Bowyer, the most common include "stars which exhibit significant aging effects, such as various types of giant stars or white dwarf stars." Not long before the ASTP launch, the SAS-C astronomy satellite spotted a white dwarf X-ray source (subsequently observed with the 120-inch Lick Observatory telescope) that seems to have the same coordinates as the EUV source seen from Apollo: HZ-43, in an area of the sky that includes the constellation Coma Berenices. But, says Bowyer of the EUV source, "If this was the object, it was not emitting like a white dwarf." And indeed, other white dwarfs among the 30 targets of the EUV experiment failed to register similar EUV brightness.

Bowyer's task now is to refine his data, studying the complete spectral curves and looking to see whether the EUV emissions might indeed have come from a white

dwarf, a cooling neutron star or some other object. The outstanding question, however, is whether discontinuities in the interstellar medium are substantial enough really to open a new window on the sky.

The astronauts, for their part, were released Tuesday from Tripler Army Hospital in Honolulu, but planned to remain in Hawaii for 10 days more, following inhalation during reentry of the gas used to oxidize the propellant in their spacecraft's attitude control rockets. Reconstructed by NASA officials this week, the mishap seems to have begun when the astronauts failed to throw two switches that would have started an automatic sequence of events to control the final descent phase and splashdown. When they, instead, manually jettisoned a cover and deployed the vehicle's initial parachutes, they neglected to shut off the control rockets, which continued firing in an attempt to stabilize the spacecraft. The ni-

trogen tetroxide fumes, which have been cited as possibly fatal in concentrations as small as 200 parts per million, apparently entered the cabin through a valve that opens automatically to regulate cabin pressure when the atmospheric pressure outside reaches 0.9 pounds per square inch above that in the cabin. When, after considerable surprise and coughing, the crew shut off the rockets and activated the automatic landing system, fresh air was able to enter the spacecraft.

When nitrogen tetroxide comes in contact with water, such as normal body moisture, it forms nitric acid, and the astronauts suffered skin irritation around their faces and hands, as well as fluid buildup in their lungs due to inflamed lung tissue. Physicians were concerned at first that possible lung damage might develop into bronchitis or pneumonia, but Stafford apparently saved the day during the reentry by quickly hauling out oxygen masks for all. "He really moved fast," says John Young, chief of the astronaut office, "and he did the right thing." □

Johnny's dad can't add either

A few months ago, the National Assessment of Educational Progress (NAEP) dismayed educators by revealing results of a "science literacy" test that showed school children dropping steadily in their knowledge of science and health in practical life situations (SN: 3/29/75, p. 206). Now NAEP has produced an even more shocking revelation: The average American adult can't even add straight.

A survey of 17-year-olds and adults, aimed at determining the level of basic math skills useful in daily situations, shows the vast majority of both age groups unable to cope with such simple tasks as balancing a checkbook or figuring the best bargain in a supermarket. Only 16 percent of adults (26-35 years) could correctly balance a sample checkbook statement, in one exercise, though most said they balanced their own checking accounts.

In another exercise, slightly over half the adults correctly looked up the figures in a standard tax table to compute the proper tax, but then flunked miserably

when asked to pick the best bargain in a supermarket. Given the choice of 12 ounces of rice for 40 cents, 14 ounces for 45 cents, 1 pound 12 ounces for 85 cents, or 2 pounds for 99 cents, only 39 percent correctly picked the third alternative. One of the worst showings occurred in figuring a taxi fare—only 20 percent of the adults could do it correctly.

Still, the adults generally did better than the 17-year-olds, which the testers credit to the necessities of daily life more than any additional schooling. Males did better than females in most categories, and blacks, Southerners and slum dwellers did more poorly than the average. Americans, it seems, have trouble working with fractions, percentages, graphs and tables. J. Stanley Ahmann, former director of NAEP, speculates that the "New Math" is partly to blame, while Roy H. Forbes, the director, says students often fail to see any connection between the math they study in school and the math they will use in daily life. □

Sample Questions

- A recipe for punch calls for equal amounts of lemonade, limeade, orange juice and ginger ale. How many pints of ginger ale would be needed in order to make two gallons of this punch? (Ans. Four pints. Only 30 percent of the 17-year-olds and 38 percent of the adults answered correctly.)
- A turkey is to be cooked 20 minutes for each pound. If a turkey weighing 12½ pounds is to be done by 5 p.m. what time should it be put in to cook? (Ans. 12:50 p.m. Correctly answered by 35 percent of 17-year-olds, and 42 percent of adults.)
- In a school election with three candidates, Joe received 120 votes, Mary received 50 votes and George received 30 votes. What percent of the total number of votes did Joe receive? (Ans. 60 percent. Only 45 percent of the 17-year-olds and 47 percent of the adults got this one right.)