NASA abandons plan to save Skylab

With the concurrence of President Jimmy Carter, the National Aeronautics and Space Administration has abandoned its attempt to keep the huge Skylab orbiting workshop aloft. As a result, NASA officials estimate, the heavy space station could make its fiery descent through the atmosphere as early as April 1979, with pieces weighing as much as two and a half tons possibly reaching the surface intact.

Skylab, whose final astronaut crew left it on Feb. 8, 1974, was predicted at the time to stay aloft until 1983, leaving plenty of time for space shuttle astronauts to attach a remotely controlled rocket engine that would carry the facility up to a higher, longer-lived orbit. However, subsequent recalculations of expected sunspot activity — which correlates with changes in the vertical extent of earth's upper atmosphere and thus with increased drag on Skylab — indicated that reentry was more likely in late 1979 or early 1980.

Earlier this year, NASA successfully reactivated the space station from the ground and commanded it into a streamlined orientation that would minimize the drag in hopes of keeping it aloft until the shuttle could reach it. But the shuttle schedule was delayed, key components on Skylab were in marginal condition, sunspot activity was exceeding even the revised estimates, and the costs of keeping the station under control and developing the remote-control booster had reached $26 million. On Dec. 19, NASA announced that it was dropping the idea.

The agency estimates that without the full-time control effort Skylab will probably come down some time between July and September, but that further sunspot increases could hasten the time to May or even April. Reentry will take place within the 50°N-50°S latitude band covered by Skylab's orbit, a region that includes parts of North America (including most of the United States), Europe and Asia, most of South America and all of Africa and Australia, although three-fourths of the area is ocean.

Predicting the actual impact region, however, is another matter. There are uncertainties about the upper atmosphere, and Skylab's drag characteristics are poorly understood. A NASA official estimates that the time of reentry may be predictable perhaps 12 hours in advance from early signs of tumbling, but that the location may be uncertain until there is only an hour or less remaining. The agency plans to continue monitoring the workshop as long as possible, since the knowledge of onboard guidance systems could yield more precise information than could earth-based radar "skin-tracking."

The impact "footprint" — the area on the earth's surface over which debris may fall — could extend more than 6,000 kilometers along the reentry track and about 80 km to either side, NASA estimates. Though most of Skylab will burn up in the atmosphere, some substantial chunks are likely to reach the surface. The largest, according to the agency, could turn out to be the girder-packed "airlock shroud," weighing about 2.5 tons and perhaps capable of getting down intact. A two-ton film vault is another candidate. Such pieces, officials calculate, could hit with speeds as high as 200 to 300 feet per second, although more lightweight, aerodynamic objects, such as sections of Skylab's metal skin, may just "float down like leaves."

NASA maintains that the likelihood of damage or injury from descending bits of Skylab is less than the chance of getting hit by a meteorite. In 1975, a 45-ton piece of space hardware, including five rocket engines, reentered the atmosphere bound for points below, yet one official says, "We never heard hide nor hair of that." The item? The upper stage of the mammoth launch vehicle that sent Skylab into orbit in the first place. □

Ultraviolet monochromator

Ultraviolet light from the sun provides the energy for a lot of the chemistry that takes place in the earth's atmosphere. It is especially important in the reactions that produce the compounds we call pollutants. ("Pollutant", after all, means an atmospheric additive we find uncomfortable. There was a time when oxygen could have been called a pollutant. Anaerobic bacteria certainly found it uncomfortable.) Ultraviolet also gets under people's skin — quite literally. It is involved with the skin pigment melanin in reactions that lead to sunburns and occasionally to cancer.

So a group of scientists and engineers at the University of Adelaide in Australia have built what they call the world's most precise ultraviolet monochromator to study such reactions. The device uses a diffraction grating housed in a 6-meter vacuum tube to spread white light into a spectrum. Precisely located exit slits select the desired wavelengths. The idea is to study which ultraviolet wavelengths are responsible for what particular happenings in the chemistry they affect. The vacuum tube is necessary to prevent absorption of the ultraviolet by the air before it gets to the samples to be studied. Key people involved in construction of the instrument are Donald G. McCoy, Frank Smith, John Wright, Keith Powell, Gerald Haddad, Trevor Hobbs and Brenton Lewis. □

Australian Info Service/McNaughton

McCoy, Smith and UV *diffraction tube.*

Cholesterol can counter cancer

A high-cholesterol diet is a well-documented heart attack risk factor, but cholesterol native to the body has now been found to protect the body against cancer. This surprising, and seemingly contradictory, finding is reported in the November PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES by Hans-Jorg Heiniger of the Jackson Laboratory in Bar Harbor, Maine, and K. T. Brunner and J.-C. Cerottini of the Swiss Institute for Experimental Cancer Research in Lausanne, Switzerland.

Dietary cholesterol precipitates heart attacks by clogging the arteries that supply the heart. In contrast, cholesterol native to the plasma membranes surrounding immune cells, called T cells, appears to be necessary for these cells to destroy tumor cells or other "enemies" they encounter.

Cholesterol is known to be an important constituent of the plasma membrane of the mammalian cells and is known to modulate the membrane's fluidity. This fluidity, in turn, seems to be vital to the mobilization of cell membrane receptors and some other membrane functions. Cell synthesis of cholesterol for cell plasma membrane use is also known to be inhibited by a chemical called 25-OH-cholesterol. What's more, T cells are known to bind to target tumor cells, kill them and then detach from them. Armed with this and other information, Heiniger and colleagues conducted various experiments to test whether cholesterol in the plasma membranes of T cells is crucial for their ability to contact tumor cells and kill them. The researchers incubated T cells for 24 hours with the chemical known to inhibit cell synthesis of cholesterol destined for plasma membrane use — 25-OH-cholesterol. This resulted in a strong depression of the T cells' killing ability. In contrast, T cells incubated for 24 hours without 25-OH-cholesterol retained their ability to kill. These results strongly suggested that plasma membrane cholesterol is necessary for T cells to kill tumor cells. What's more, when cholesterol was added to T cells incubated with 25-OH-cholesterol, their killing ability was restored, further substantiating the importance of plasma