Salyut 3: Busy and comfortable

"The Salyut so readily answers the controls," radioed cosmonaut Yuri Artyukhin, "that at times it seems that it responds not only to the steering buttons, but to our wishes." Entering their second week aboard the Salyut 3 space station, Artyukhin and space veteran Pavel Popovich seemed, according to official Soviet accounts, to be both comfortable and busy.

The cosmonauts gave themselves and each other a variety of biomedical tests —lung efficiency, cardiovascular changes, sense of balance—but subjectively appeared to have adapted to weightlessness by the third or fourth day of the mission, with Popovich's pulse appearing "almost as an ideal, direct line on the chart," according to Tass, the Soviet news agency.

The mission was almost cut short at one point, when unexpected solar activity raised worries on the ground about possible radiation hazards to the crew. Some Soviet physicists "believed it was an extraordinary situation," reported Tass, "and even suggested that the flight program be curtailed." Officials decided to continue the flight, however, commenting that the danger would have been greater if the station had been in a polar or lunar orbit. Tass further cited data from Cosmos satellites showing that in orbits below about 250 miles, the radiation exposure is three to four times lower than in deep space.

The most important part of the flight for U.S. officials was the ascent to orbit and docking (SN: 7/13/74, p. 22), which will need to work smoothly next summer when an Apollo spacecraft couples with a Soyuz like the one that carried Popovich and Artyukhin into orbit. Soviet reports, however, made little mention of the planned rendezvous, stressing science instead.

There are no announced Soviet plans for long-duration missions similar to Skylab, which remained aloft for more than six months and sustained three separate crews, but one of the items on the Salyut 3 agenda was the testing of several water-recycling devices aimed at "expanding the resources of space." The cosmonauts also photographed the daytime and twilight horizons of the earth and moon as an aid to future improvements in onboard navigation techniques, the lack of which have prompted U.S. officials to comment on the lack of sophistication in the control systems of Soviet spacecraft. □

Looking with lasers into insect ears

Investigating the mechanics of hearing in live animals has been a difficult task for researchers because the inner ear structures are small and difficult to reach. Recently a team of Cornell physicists and neuro-bioengineers, while attempting to study frequency selection in crickets, devised an optical technique for measurement of mechanical vibrations of the eardrum which does not interfere with the motion of the membrane. The inventors—Watt W. Webb, Paul R. Dragsten, John A. Paton and Robert R. Capranica—describe their equipment and procedure in the July 5 SCIENCE.

The procedure involves the focusing of a helium-neon laser beam on the eardrum and analyzing the small shifts in frequency in the scattered light bounced back from the membrane onto a photomultiplier. The frequency shifts in the light are extremely small but can be observed by comparing them to unshifted light (reference beam) from a laser produced simultaneously with the scattered beam. The difference between the two frequencies is detected in much the same way that one hears a "beat" note when two sounds of slightly different frequencies are played together. The strength of the "optical beat note" indicates how much the eardrum vibrates. The equipment can measure vibration amplitudes as small as four ten-trillionths of an inch or one-tenth the diameter of a hydrogen atom on a surface as small as 10 square microns. The technique has been successfully used, Webb says, in measuring the mechanical response of eardrums in crickets.

The researchers hope that their studies will help to shed light on the mechanism of human hearing. The ear of man is probably unsurpassed in distinguishing tones of slightly different pitch and widely different quality. Hearing in man has acquired an importance second only to vision.

"We believe that it [the technique] is suitable for investigation of the movement of structure within the inner ear, such as the basilar and tectorial membranes in the cochlea, and for studies of mechanical excitation of sensory hair cells," the researchers report in SCIENCE. (Hair cells within the inner ear are sensitive to different vibration patterns.) "It could also prove valuable for use on nonbiological mechanical systems at the submicroscopic scale. . . . Since nothing contacts the vibrating structure, the technique does not perturb normal movement." □

Test-tube babies: Now a reality?

A feat that science fiction writers have been predicting for many years and that many members of the public have feared now appears to be a reality. One baby in England and two in Western Europe have been conceived during the past 18 months in test tubes from ova removed from the would-be mother and then placed back in her womb to develop to birth.

Certainly a totally successful test-tube achievement has been expected by scientists for some time now since previous efforts were partially successful (SN: 9/15/73, p. 168). The peculiar thing about these apparent achievements is that no one will claim having done them. They were leaked to the press by Douglas Bevis, professor of obstetrics and gynecology at Leeds University in England. But Bevis would not admit to having done them himself and now refuses to talk to the press about them. Aside from alarming the public in this titillating way, Bevis has also upset scientists dedicated to test-tube fertilization research, such as Patrick Steptoe of Oldham in Lancashire. "I am astounded that Professor Bevis would have made this statement," Steptoe declared. "As far as I know, no one in this country or anywhere else has yet succeeded in this technique."

The most crucial question, of course, is whether the offspring of the technique are normal. Bevis reports that they are. He admits, however, that the technique "is potentially dangerous for the child, and a lot can go wrong." If the technique is ever worked out so that it is relatively safe, it will probably help women who cannot bear children because of blocked oviducts. □

Health care and do-little Government

There has been pathetically little progress in Government health care programs during this past year. This message emerged rather surreptitiously from last week's White House conference on health for science writers. The lack of decisive action is not surprising in view of preoccupation with Watergate and impeachment possibilities.

At last year's conference, for example, Caspar W. Weinberger, secretary of Health, Education and Welfare, announced the formation of a national blood policy. The policy was to do away with the scandalous waste in blood collection and to stop paying

skid-row bums for blood—a major cause of hepatitis contamination of blood (SN: 7/21/73, p. 35). Now, a year later, the program has resulted in little concrete improvement beyond getting opposing factions such as the American Red Cross and the American Association of Blood Banks to talk to each other. An entirely volunteer blood collection program remains to be set up. "There have been needless deaths, I am sure, this year because we haven't had it in operation," admitted Charles C. Edwards, assistant secretary for health in HEW.

Also promised last year, and still to be implemented, is a national health insurance program. There are eight bills before Congress. Whether any of these will pass Congress this year is doubtful. Actually it may be just as well that national health insurance is held off a while in view of the financial burden already on Americans because of inflation. The essential thrust of the major bills before Congress, according to Stuart Altman, deputy assistant secretary for planning and evaluation in HEW, would be to help finance health care for the 40 billion Americans who have no health insurance or substandard health insurance (no comprehensive coverage such as outpatient care). This is a laudable aim, but the cost to the American public would be anywhere from $6.5 billion up to $13 billion more annually than it is already paying for health care ($103 billion).

In addition to this extra tax burden, there is also a hefty chance that national health insurance would inflate health care costs that are already soaring. After the Government lifted cost controls from hospitals and doctors on April 30, physician fees rose 17 percent and hospital charges 15.4 percent during May. This rapid rise compares to America's current inflation rate of 12.6 percent annually. And it's good to keep in mind that when Medicare and Medicaid were implemented in 1966, there was a striking rise in hospital and physician charges, largely because of increased demand for services. The same thing will probably happen with national health insurance, but on a vastly bigger scale since it will be covering 220 million Americans.

When national health insurance is implemented, it will have to be subject to cost controls, Weinberger said. Yet he admitted that he doesn't "know that anybody knows how to do cost control."

There is one area where progress is evident, however, and that is in the implementation of the Professional Standard Review Organizations (PSRO's) enacted by Congress in October 1972. PSRO's are to consist of groups of physicians around the United States who set standards for health care. While the standards will be used to reimburse physicians who treat Medicare and Medicaid patients, the standards will undoubtedly be used to maintain quality care once national health insurance is implemented. At this point 115 PSRO contracts have been awarded to physicians in all but four states. The American Medical Association, which previously fought PSRO's, now agrees to support them. The Institute of Medicine of the National Academy of Sciences studied the PSRO concept and reports that it should be a valuable addition to the American health care system. "The program," declared Henry E. Simmons, deputy assistant secretary for health at HEW, "is complex, sensitive and extremely important."

PSROs will decide, for example, which operations are appropriate (hernia repairs have doubled since 1965 although the operation is usually riskier than the condition); how many days in the hospital are appropriate for a particular condition; which diagnostic tests are necessary for which medical conditions. With PSRO decisions to back them, physicians should stop practicing defensive medicine—ordering unnecessary diagnostic tests—in order to ward off malpractice suits. Diagnostic tests are one of the most inflationary components of hospital costs.

The PSRO's will deal with general problems that detract from the quality of American health care, such as the overprescribing of antibiotics. Sixty-two percent of 10 million Americans were found to have had antibiotics prescribed for them although they did not have bacterial infections. The PSRO's will also deal with hospital-caused infections, Simmons indicated. This is a major problem for hundreds of thousands of patients (see p. 44). □

Health research aims for visibility

Status reports on broad areas of Government-funded health research and research policy were given last week at a White House seminar for health writers.

Health, Education and Welfare Deputy Assistant Secretary for Health, Theodore Cooper, says biomedical research should be reviewed and coordinated on a national level to eliminate duplication and to establish goals and priorities. A newly proposed National Biomedical Research Commission would serve this function, he says. HEW Secretary Caspar W. Weinberger proposed the formation of a seven-member "distinguished study group" to be appointed by the President. A status report on the national biomedical research effort would be completed in 15 months, Cooper says.

Another major policy concern and direction for National Institutes of Health projects will be "the effective translation of research findings into medical practices," Cooper says. Several such "people projects" are now being funded by the National Cancer Institute (NCI) and the National Heart and Lung Institute (NHLI).

Robert Ringler, acting NHLI director, reviewed that agency's "people projects." The largest project, the Multiple Risk Factor Intervention Trial (MRFIT), was begun in February. About 12,000 men judged to be in the nation's highest coronary-risk group are being recruited in MRFIT centers throughout the country. Half of the men will be treated with an experimental regime of exercise, diet and smoking control, and the other half (the control group) will be treated with the best conventional preventative coronary care. After six years of testing, solid information should be available on the best method of managing the coronary-risk patient.

A Lipid Research Clinic program to study high blood-cholesterol treatment will also involve volunteers in various clinical settings, and Ringler announced another trial program to begin this summer. About 3,600 volunteers who have had myocardial infarctions (death of heart tissue by vein blockage) will be tested at 30 local centers to determine whether the administration of aspirin will improve their chances to escape further heart attacks. Data from the Aspirin Trial will be finalized after about four years.

The approach of bringing research to the patient is planned to improve awareness of biomedical advances and to provide scientists with information on the best new clinical techniques. The approach will also be used to study atherosclerosis, hypertension, pulmonary diseases, thrombosis and heart diseases, Ringler says.

NCI Director Frank J. Rauscher, described the "people projects." These are needed, he says, because "cancer research is the largest, most visible, emotional subject in the history of biomedical research." The Breast Cancer Detection program in 27 centers, begun in March, has been quite successful thus far, he says. "Each unit will access about 5,000 women per year over the age of 35. The encouraging thing about the program so far is that 70 percent of the cancers detected have been still localized lesions, whereas the overall figures for cancer detection show that 66 percent are disseminated when found."

Other projects include a "tobacco clearing house" for smoking motivation studies and testing of lung cancer detection techniques. "We intend to