

ships together shouldn't be much harder than two," says a National Aeronautics and Space Administration official, "but somebody has to do it."

The three spacecraft were far from failures, however. Soyuz 6 studied the potentials and problems of welding in space, probably based on Soviet research into cold diffusion welding, a spontaneous phenomenon that occurs when surfaces in contact in high vacuum fuse by an exchange of electrons. Predictable cold welds could offer a valuable technique for manufacturing in space, and are planned for study in the Apollo Applications Program. Soviet scientists indicated that the welding tests, involving several pairs of materials, were an important step toward a permanent station, since mechanical couplings, such as those made in docking, would be only temporary.

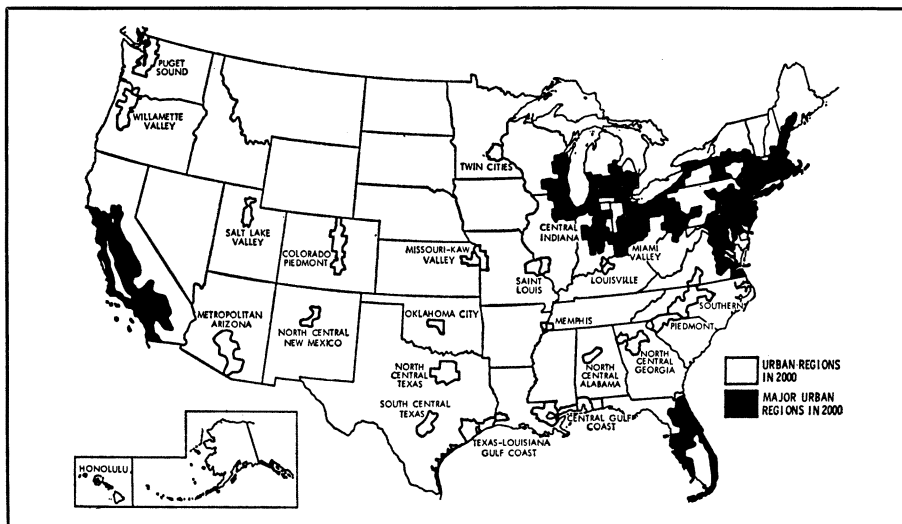
Earth-resources photography, similar to that performed by U.S. spacecraft, was carried out from one or more of the vehicles. Most of the interest was centered on the region between the Caspian and Aral Seas in Russia north of Iran, with an aircraft covering that area to provide comparison data from lower altitude. Besides observing geological formations, the cosmonauts observed and photographed cloud formations.

From less than 1,500 feet apart, Soyuz 7 and 8 performed several hours of detailed star sightings and earth landmark tracking exercises. Visual acuity tests were conducted—U.S. astronauts have reported seeing objects as small as railroad trains from orbital heights—and detailed biomedical data, possibly more elaborate than that on Apollo, was telemetered to earth from all seven cosmonauts in the three spacecraft. Russian researchers have reported more biomedical difficulties from space flight than have their U.S. counterparts, including difficulties with balance reportedly encountered in every Soviet mission.

Other experiments included micro-meteoroid flux measurements and manual performance of formerly automatic navigation functions. The latter is in contrast to the Soviet view in pre-Soyuz days that the ideal cosmonaut would be a full-time researcher in a fully automatic spacecraft.

But the space station remains in the future. U.S. plans call for the Apollo Applications stations by 1972, with maximum stays of 56 days, and a relatively permanent station four years later. Soviet plans do seem to be oriented to orbiting stations, possibly at the expense of manned interplanetary flights, but until more successful flights are in the Russian books, the timetable remains unknown.

Bare-bones program



Coastal problems, coastal states: Targets for priority oceanographic effort.

Since coming into power in January, the Nixon Administration has been reviewing ideas and proposals for a national policy in marine affairs.

Facing the President when he took office were the some 120 recommendations of the Commission on Marine Science, Engineering and Resources (SN: 2/1, p. 111), covering everything from the management of coastal areas and the development of fish and mineral resources to basic research in oceanography and the improvement of technical and operating services. In addition, the commission called for a National Oceanics and Atmospheric Agency, and, as all official Washington knows, any such proposal threatening the domain of present agencies faces a long and difficult trail toward acceptance (SN: 10/11, p. 325).

But some things can't wait. This week the Administration announced the selection of five areas of marine science activity that it says are too important to await the development of a long-range program. They will comprise an interim program that will be given immediate special emphasis in the next fiscal year.

The five areas:

■ **Coastal zone management:** A program of Federal grants would be set up to aid the states to plan and manage activities along coastal areas and the Great Lakes.

■ **Coastal laboratories:** to accelerate environmental research needed for effective management of coastal activities.

■ **Lake restoration:** to test the technological feasibility of restoring the Great Lakes. A pilot study will be conducted on some still-unselected lake of manageable size, slightly more than

100 square miles.

■ **International Decade of Ocean Exploration:** The United States will contribute to the project and will suggest emphasizing six international goals; the primary one is to "preserve the ocean environment by accelerating scientific observations of the natural state of the ocean and its interactions with the coastal margin."

■ **Arctic environmental research:** The oil rush on the North Slope of Alaska (SN: 9/27, p. 265) stimulated this phase of the program, which will aim at developing the region without degrading the Arctic environment.

"This is the Administration's view of those areas that are in the first order of priority," says Dr. Edward Wenk Jr., executive secretary of the National Council on Marine Resources and Engineering Development.

"These are the areas where there is a clear and present danger." He estimates the cost of the five projects at \$25 million to \$30 million in fiscal 1971, all of it on top of the approximately \$500 million now being spent on Federal marine science activities.

The new program is strongly oriented to the management and protection of coastal and inland waters. The United States' coastlines extend a total of 13,000 miles, and one forecast is that, by the year 2000, 75 percent of the nation's population will live in counties along the sea coasts and Great Lakes.

From these shallow waters, man draws much of his sustenance. The problem is that they are ecologically fragile, and man has been slow to realize it. "There has been a long neglect of the coastal zone," says Dr. Wenk. "Each man wants to do his

thing without regard to the effects it will have."

The plan regards the states as a pivotal element in any plan to improve the management of coastal resources. But they are hampered by lack of funds, jurisdictional difficulties and a dearth of information on coastal ecology. The program of matching Federal grants would initially aid the development by the states of the needed planning and regulatory mechanisms and then assist in operating the systems that are evolved. □

CBW

Choice in the making

For some months, a reevaluation of the United States' chemical and biological weapons policy has been under way. The review was brought to public attention by criticism from Rep. Richard D. McCarthy (D-N.Y.) and revealed in a subsequent letter to him from President Nixon (SN: 6/28, p. 610).

At stake is whether or not the United States should ratify the 1925 Geneva Protocol outlawing the use of lethal chemical and biological weapons. Although the United States signed the treaty, the Senate refused to ratify it.

The President has asked Government agencies such as the Defense and State Departments for their views on CB weapons. Most of their replies have been sent to the National Security Council, which last month was to have submitted policy choices to Mr. Nixon. The agencies' answers will determine the alternatives the council will suggest to Mr. Nixon. The council's recommendations are expected shortly, perhaps within a month.

One of the critical issues being considered is whether the Geneva treaty should apply to the use of incapacitating agents, such as tear gas. Neither the Protocol or prior international gas warfare resolutions spelled out clearly enough whether they were meant to include such nonlethal agents.

The problem for Mr. Nixon is that if he rejects the Geneva agreement, he will incite criticism of his effort to end the Vietnam War and of the seriousness of his intention to ban a weapon generally regarded as repugnant. Even if he accepts the treaty with a reservation excluding incapacitating agents, he will still be criticized by people here and abroad, especially neutral nations, who fear that their use could lead to full-scale chemical and biological warfare.

Noting, for example, that tear gas has been used in Vietnam to drive the enemy out into the arms of B-52 bombers, Dr. Matthew Meselson, CBW authority at Harvard University, feels that, "this makes the use of tear gas

almost equivalent to the use of poison gas and therefore likely to stimulate escalation and proliferation of gas warfare."

Dr. Meselson favors the swift ratification of the Geneva Protocol, now signed by 65 nations, without reservations, a move that would satisfy some but would bring down the wrath of those who feel that it would weaken the U.S. military posture.

Essentially, Mr. Nixon's choices narrow down to accepting the Protocol without reservation, which would mean outlawing the use of lethal and non-lethal CBW agents, or accepting the Protocol with the reservation that such nonlethal agents can be used, or refusing to accept the treaty at all.

The National Academy of Sciences addressed itself to the ratification question last week at its fall meeting at Dartmouth College. From the meeting it appears clear that there is preference among NAS members for ratification. But even if the use of CBW agents were banned, the treaty would not necessarily mean the U.S. would stop work on them.

Han Swyter, an economist formerly with the Defense Department, for example, favors ratification but says that U.S. CBW policy should depend on the purpose it serves. This would limit variety in the arsenal.

Said Swyter, "The objectives should be principally non-proliferation and deterrence." He concludes, "We need only lethal chemicals without any need for any biological weapons or for incapacitating chemicals to meet these objectives." □

NEWS BRIEFS

Water treatment; homosexuals

Three treatment steps are considered necessary to purify sewage completely: sedimentation (primary), biological treatment (secondary) and chemical treatment (tertiary). In an effort to get communities to upgrade the quality of their treated water, the Interior Department announced this week that it would deny all Federal funds for the construction of purely primary treatment plants. □

Two years ago a report of the British Wolfenden Commission resulted in legalizing homosexual acts between consenting adults in Great Britain. Now a task force appointed by the National Institute of Mental Health wants a similar law for the United States.

"The opprobrium that our society has attached to homosexual behavior," said the 14-member task force this week, "has done more social harm than good." □

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