Russians now in space too

NASA

U.S. and Soviet officials have met 10 times planning 1975 joint rendezvous.

On Dec. 19, for the first time, Soviet and American astronauts orbited the earth at the same time. At 6:55 a.m. EST, with the Skylab 3 crew on its thirty-third day in space, Soyuz 13 lifted off carrying cosmonauts Pyotr Klimuk and Valentin Lebedev toward a mission that seems to have been designed with Skylab in mind.

Science, apart from biomedical information on the responses of humans and other animals to the space environment, has never been a highly publicized part of the Soviet manned space program. As long ago as 1968, Soyuz 3 pilot Georgy Beregovoy was reported as making astronomical observations as well as spotting hurricanes, forest fires and other features on the earth below him, and photography has been a part of the program since its early days. But references to scientific—as opposed to technological—achievement have been few in the official Soviet press.

Western observers of the Soviet space effort have pointed out, however, that Russian citizens have been intrigued by the scientific accomplishments of Skylab, a factor which an image-conscious Soviet government might well interpret as disillusionment and a feeling of being left behind. Thus on Soyuz 13, science is, at least compared with previous missions, conspicuously present.

Instrumented telescopes were included—and announced—for studies of the ultraviolet spectra of stars "and other space objects." Some of Skylab's most spectacular work has been its observations of the sun and other stars. Also in a Skylab vein, Soyuz 13 was scheduled to carry out "spectral analyses" of various parts of the earth, photographing them by different wavelengths of light to seek deposits of valuable geological resources. The cosmonauts were also to gather spectral and other data useful in developing long-range weather prediction as well as in studying the physical processes of the upper atmosphere.

The flight's predecessor, Soyuz 12, which orbited the earth for less than two days in September, was the first Soviet manned mission in 27 months, and was intended to check out the redesigned version of the spacecraft in which three cosmonauts died during reentry in June of 1971. The major change was the redesign of the interior to hold two crewmen in spacesuits rather than three in simple coveralls. During that flight there was little time for scientific experiments, but U.S. space officials who have been visiting the Soviet Union periodically in preparation for the Apollo-Soyuz rendezvous mission in 1975 have since expressed "full confidence" in the modified spacecraft.

Within five orbits after its launching, Soyuz 13 raised its path around the earth to an ellipse ranging from 140 to 169 miles above the ground, an orbit similar to previous flights in which the spacecraft docked with an unmanned Salyut space station. Prior to Soyuz 12, however, which reached a Soyuz record altitude of 214 miles, no other spacecraft in the series had gotten much above docking altitude. This was one of the numerous factors involved in planning the complex joint rendezvous, in which the U.S. and Soviet spacecraft will dock at a height of about 167 miles. (Skylab docked at about 270.)

The Soyuz 13 cosmonauts also have something in common with the Skylab 3 crewmen in that all are rookies in space. Klimuk, the mission pilot and an air force major, and Lebedev, a spacecraft systems designer, are on their first orbital flight, though Klimuk has been in the cosmonaut program for eight years. Soviet space planners, however, have been less reluctant than their U.S. counterparts to send all-rookie crews into orbit. Of the 30 U.S. manned space flights, only 10 have included an astronaut who has flown one or more times before. Three astronauts, in fact—John Young, Charles Conrad and James Lovell—have flown on four missions each. Only six of the 20 manned Soviet flights have carried a "veteran."

There was no indication, beyond the inferences of the orbit, of whether Soyuz 13 would be joined by a Salyut or another Soyuz for docking maneuvers. Four days before it was launched, however, there returned to earth an unidentified Soviet space object that some observers believe to have been an unmanned Salyut station, which spent two weeks in orbit. In addition, a Soviet space official predicted early this month that there would be more of both individual and docked missions before the 1975 rendezvous flight. □

Science photo of 1973

Much of the beauty—the physical, artistic beauty—in science lies beyond the eye of the casual beholder. Sights too big, too small, too far away or at the wrong wavelengths for the unaided eye spring into view with the scientist's tools. Candidates for the 1973 Science News Photo of the Year were numerous, from a photomicrograph of antibodies preventing conception (SN: 2/10/73, p. 81) to the first pictures taken on the scene of the Mid-Atlantic Ridge, 9,000 feet below the ocean surface.

The editors' choice, however, is on this week's cover: mighty Jupiter, swathed in brilliant stripes, highlighted by the famous red spot and punctuated by the shadow of Io, the planet's second nearest and third largest moon. Taken from 1,580,000 miles away by Pioneer 10, the picture was reconstructed on earth from scan lines of the probe's imaging photopolarimeter, built by a team at the Santa Barbara Research Center and operated by Tom Gehrels of the University of Arizona. Impressive though it be as a photo, the fact of its making is the true milestone, symbolic of man's passage to the outer worlds.

Oil and water do mix! And it saves fuel

Everyone knows water and oil don't mix—usually. But ultrasonic sound vibrations can intersperse tiny droplets of the two liquids to form an emulsion that will not separate and can have some interesting uses. The most common such emulsion, of course, is homogenized milk, with its finely dispersed

droplets of cream (the oil).

Now two independent researchers have discovered ways to use water-oil mixtures as a fuel, which apparently burns more efficiently and cleanly than straight petroleum.

Eric C. Cottrell, a mechanical engineer who has formed his own company, the Tymponic Corporation of Plainview, N.Y., has prepared an ultrasonic fuel emulsifier that will mix water and oil in a 1:3 ratio for use in the campus heating plant at Adelphi University. No major changes in the heating plant burners will be required and the school expects to realize a 20 percent saving in fuel cost, while producing less pollution. Cottrell also runs his car on a mixture with 19 percent water —increasing mileage by one third.

Meanwhile, the head of the University of Oklahoma's aerospace, mechanical and nuclear engineering department, Walter J. Ewbank, has prepared a water-gasoline mixture system for trucks, which is undergoing a four-month test at a nearby Postal Service facility. Ewbank says no engine adjustment is needed so long as the emulsion does not contain more than 15 percent water. The Postal Service trucks, however, which will use a 30 percent water mixture, will need some carburetor modification.

The principle of operation in both cases is using the water to "spread out" or increase the surface area of oil droplets. Just as a newspaper burns faster when fanned out than when rolled tightly, because of greater area exposed, so do the tiny oil droplets, created by interspersing droplets of water, burn more quickly. The water also helps transfer heat within the burning mixture, again speeding the reaction time. Faster burning in this case means more complete burning, and therefore fewer pollutants, which are usually the products of incomplete combustion.

Cottrell says ultrasonic fuel emulsifiers or "reactors" could be made for home use for between $100 and $200. □

Lane/ESN

"Ladies and gentlemen, due to circumstances beyond our control the talk on the energy crisis will be cancelled."

Gay liberation at the APA

I know not whether laws be right,
Or whether laws be wrong;
All that we know who lie in gaol
Is that the wall is strong . . .

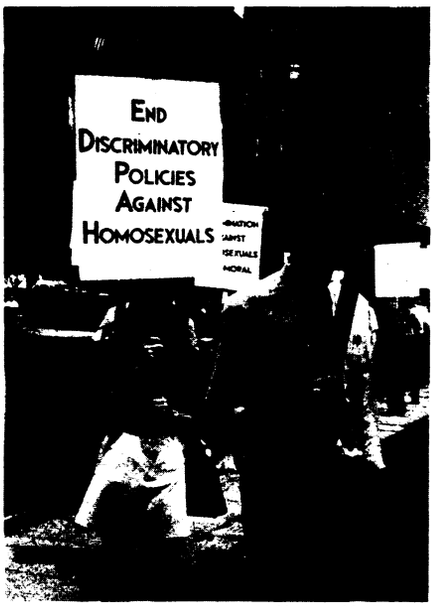
So wrote Oscar Wilde in 1898 after spending two years at hard labor in Reading Gaol—where he was sent because he was a homosexual. But the laws and walls that held him are slowly tumbling down. Last year the American Psychological Association removed homosexuality from its "abnormal psychology" category. Last week the American Psychiatric Association's board of trustees voted to remove homosexuality from its Diagnostic and Statistical Manual of Mental Disorders (the official nomenclature followed by all medical groups in North America).

The change came after years of debate and under pressure from several gay liberation groups that have been demonstrating at the APA's annual meetings. Groups such as the National Gay Task Force charged that "the diagnosis of homosexuality as an illness has been the cornerstone of oppression for a tenth of our population." This labeling, they say, forced many young women and men to think of themselves as freaks. It has burdened their families and friends with fear and guilt. It has been used as a tool of discrimination in the private sector, and in the civil service, military, immigration and naturalization service, health services and adoption and child-custody courts. It is, they go on, the rationale for perpetuating the sodomy laws of 43 states.

But all of this is going to stop, feel the optimistic representatives of the gay movement who were present when the APA announced its change. "A psychiatric turnaround," "the greatest gay victory," "a major socio-historic change" and an "instant cure for 20 million gays," they said.

What the APA actually did was replace the term "homosexuality" with "sexual orientation disturbance." This category, says the APA, is for individuals whose sexual interests are directed primarily toward people of the same sex and who are either bothered by, in conflict with, or wish to change their sexual orientations. The APA does not say that homosexuality is normal, but it does say that it is a form of sexual behavior and like other forms of sexual behavior, not a psychiatric disorder.

In addition, said the APA, homosexuality per se implies no impairment in judgment, stability, reliability or general social or vocational capabilities; and, therefore, there should be no public or private discrimination against homosexuals in such areas as employment, housing, public accommodations or licensing. The APA board of trustees also said that it supports and urges the repeal of all legislation making criminal offenses of sexual acts performed by consenting adults in private. □



Nancy M. Tucker

Gay demonstrations force a change.

'Catch 22' of psychopharmacology

Statistics suggest that anxiety is on the rise in most parts of the world, thanks to one war after another; terrorist murders, bombings, muggings and knifings; drastic shortages in food, fuel, lumber, paper and other products; blacks versus whites, young versus old; a decaying moral and physical environment. . . . The poet W. H. Auden appropriately dubbed the twentieth century the "Age of Anxiety."

An upsurge in anxiety is also reflected in the rapid rise in the use of antianxiety drugs (minor tranquilizers) over the past eight years, as Barry Blackwell reported in the Sept. 24 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. In 1972 minor tranquilizers were prescribed by physicians 144 million times, accounting for about six percent of national drug use. Over 70 million prescriptions were written for two of the most popular tranquilizers, at an estimated cost of $200 million. Blackwell is a member of the University of Cincinnati College of Medicine's psychosomatic unit, one of the few such units in the United States. Psychosomatic medicine deals with psychological conflicts and how they relate to bodily symptoms and diseases. It's a hairy business since psyche and soma, as any good mystic or physician knows, are intricately intertwined.

Blackwell concluded in his JAMA article that while minor tranquilizers are being appropriately used for anxiety, or for anxiety mixed with depression, such drugs tend to be overused. But Black-