

Soyuz 26 cosmonauts link with Salyut 6



Soyuz 26 flight commander Romanenko (left) and flight engineer Grechko.

Spacecraft linkups in orbit are always tense affairs, perhaps especially so in the troubled Soviet manned flight program, and cosmonauts Georgi M. Grechko and Yuri Romanenko had yet an additional weight on their shoulders. The Soyuz 25 mission of their predecessors, Vladimir Kovalenok and Valery Ryumin, had failed at what was to have been a specially timed spectacular, a docking with the Salyut 6 space station to have the cosmonauts aboard for the 60th anniversary of the Nov. 7 Bolshevik revolution.

On Dec. 11, flying Soyuz 26, Grechko and Romanenko managed the rendezvous, subsequently transferring to the station for an unspecified period of time. Cosmonaut training chief Vladimir Shatalov, monitoring the mission from the ground, said later that he had awaited the Soyuz 26 docking "with more excitement than my own" (the 1969 coupling of Soyuz 4 and 5). He perhaps hinted at the mission's duration with the expressed hope that "the finish of the jubilee year for the Soviet astronauts will be marked with the successful fulfillment of [their] tasks...." □

HEAO raises X-ray source score

X-ray astronomy began with rocket flights that gave quick and tantalizing glimpses of parts of the sky. Astronomers were sure from the first results that if they ever got a platform from which to do sustained surveys of the sky in the X-ray part of the spectrum, the number of catalogued celestial X-ray sources would rise significantly.

Satellites that have done X-ray observing have generally lived up to that expectation. The latest of them, the first High Energy Astronomical Observatory (HEAO-1), which was put into orbit on Aug. 12, is expected to raise the ante from the present 200 to about 1,000 or 1,500, according to extrapolations from the satellite's first 100 days of observation. The useful life of the satellite appears now to be as much as three times the original estimate of six months, and observing programs are

being extended accordingly.

HEAO-1 is equipped with two experiments to determine precise locations of the X-ray sources it sees. One is precise but multivalued, providing several possible locations for a given source that are precise to 5 or 10 seconds of arc but in different parts of the sky. The second eliminates the ambiguity by providing a single rough determination that makes a choice among the candidates presented by the first.

Such determinations will help in identifying X-ray sources with objects that emit light and/or radio waves. This is especially interesting in the cases of the so-called X-ray binaries, systems in which a visible star is bound to a dark object that emits X-rays. Some astrophysicists think that there may be black holes among the dark objects. So far HEAO-1 has observed two black hole candidates, Circinus X-1 and Cygnus X-1.

HEAO-1's capabilities include very-low-energy X-rays and very high energies (gamma rays). It has already found one star, U Geminorum, that emits very-low-energy X-rays and has also recorded one of the mysterious celestial gamma-ray bursts. □

New drug laws prescribed

A bill that makes sweeping revisions of the country's pharmaceutical regulations is circulating in the Department of Health, Education and Welfare and in Congress. Drafted at the direction of FDA commissioner Donald Kennedy, the proposal attempts to simplify and strengthen all previous drug legislation.

Major goals of the proposal include speeding both the approval process for new medicines and the removal procedures for drugs found to be dangerous. Drug firms and doctors have charged that current FDA procedures keep crucial new medicines off the market for unnecessarily long periods of testing and paperwork. And consumer health groups deplore the complicated legal process, taking as long as two years, now required to get a potentially harmful drug off the market.

The proposed bill would simply require issuance of an official order describing the drug, its uses and the evidence by which the HEW secretary approved it. The secretary could then revise, suspend or revoke the order at any time as new evidence developed.

Other key proposals of the bill are:

- Safety test results would be available to the public during the approval process.
- Drug companies would be required to monitor side effects of their products.
- One drug company could use safety data submitted by another company.
- Patient-information statements would accompany most drugs. □

Managing bowhead, sperm whale hunts

Whether the Alaskan Eskimos would be allowed to continue subsistence hunting of bowhead whales has received considerable attention since the International Whaling Commission's decision in June to ban all bowhead hunts. Eskimos, environmentalists and legislators, battling over suspected biological and anthropological consequences, generally agreed that a small, carefully managed subsistence hunt would probably not hurt herd size. It seems the Eskimo contingent convinced the IWC in Tokyo last week (SN: 12/10/77, p. 389).

This week Richard Frank, U.S. commissioner to the IWC, announced a management plan for Eskimo bowhead hunts that he believes was helpful in selling the IWC on the ecological "safety" of the small (12 whales) subsistence hunt. The program, drawn up by the National Oceanic and Atmospheric Administration, which Frank heads, requires that qualified whaling captains obtain a permit to hunt, subject to approval by a panel of experienced whalers. It also sets criteria on how to catch whales and on the number of whales that each crew can legally strike (not land) or catch.

Frank also explained that the IWC's sharply revised figure for the allowable international harvest of North Pacific sperm whales — from less than 800 to more than 6,000 — resulted from new Japanese data on the effectiveness of asdic (the British equivalent of sonar), used in tracking sighted whales, and to the revised speed and efficiency of catcher vessels weighing more than 600 tons. The commission also agreed to divide the North Pacific herd into two divisions, permitting separate management quotas for each, and to prohibit hunting of males from March through June. William Aron, former U.S. IWC commissioner, said the IWC's scientific committee was "squeamish in June" about setting any sperm whale quota because the data were so weak. Hence the initial drastically reduced quota — from 7,000 in 1977 to less than 800 in 1978. □

Woodrat slights rattler venom

Even with the housing shortage as it is, few would want to room with a poisonous rattlesnake. But a common southwestern rodent, the woodrat, finds the Western diamondback rattler an acceptable burrow-mate. Researchers at Texas A&M University in Kingsville have discovered that it is the woodrat's blood chemistry, not temperament, that allows this particular cohabitation.



Univ. of Research Resources, NIH

Good immunity makes good neighbors.

Observations that woodrats can survive multiple rattlesnake bites prompted the laboratory experiments. John Perez and colleagues injected rodents with dilutions of rattlesnake venom. They found that 2 milliliters of full strength venom is required to kill half of a sample of woodrats. That dose is 140 times higher than that needed to kill the same proportion of mice.

"The natural resistance in woodrats is not surprising," says Perez, "since woodrats and rattlesnakes live in the same habitat — often in the same burrows."

The venom used in the experiments comes from caged rattlesnakes that are "milked" every week. Most of these snakes come to the laboratory from an annual rattlesnake roundup held in southern Texas.

"There is no good way to measure the amount of venom released in a rattlesnake bite," Perez says. "A large rattlesnake could release 3 milliliters. So a large snake could kill a woodrat, but a small snake couldn't."

Immunity to rattlesnake venom is transferable between animals. Perez and co-workers removed the cells from woodrat blood and injected one-half milliliter of the resulting serum into mice. "This increased protection by a factor of 3.6," Perez says. "The mice could then withstand about three times the amount of venom."

The scientists are now working to isolate and purify the protective factor. Preliminary experiments indicate that the agent is not just an antibody. Mixing woodrat serum and venom does not produce a visible antibody-antigen complex, as in a typical immune system response. The anti-lethal factor may instead be an enzyme that actually breaks down the venom components.

Perez proposes that factors isolated in these and other studies will be useful in snakebite treatment. Snakes are typically resistant to their own venom, and Perez also finds immunity in the Mexican ground squirrel, a vicious rodent that can kill a rattlesnake. "Venom is a very complex toxin. It destroys muscle and affects blood," Perez explains. A combination of factors isolated from the blood of rattlesnakes and rodents might be most effective against the many toxins and enzymes acting in the venom. □

And the neutrons go round and round

In the conventional technology of particle physics, electrically neutral particles are not affected by magnets. Magnetic fields will bend the paths of positive particles one way and those of negative particles the opposite way, but neutral particles go straight through. Among other things, this means that a storage ring for neutrons, in which the neutrons would circulate in a round path, should be impossible.

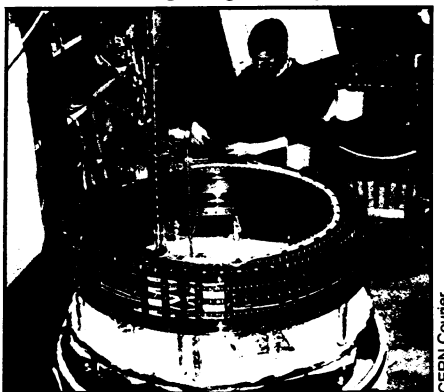
It turns out, according to a report in the November CERN COURIER, that a group of physicists at the University of Bonn in West Germany have designed and built a neutron storage ring which has been put into operation at the Institut Laue-Langevin in Grenoble, France. The ring comes about because neutrons, although electrically neutral over-all, have within them a distribution of positive and negative electric charge. Neutrons spin, and the spinning of this charge distribution gives them a small magnetic moment, or intrinsic magnetic field. This magnetic moment is impervious to the influence of the magnets usually used for bending and focusing the paths of particles. When more complicated magnets are introduced (quadrupoles substituted for dipoles and sextupoles for quadrupoles), it proves possible to take hold of that magnetic moment and

make the neutrons go in circles.

The ring is a small apparatus, 1.2 meters across, and accepts only neutrons with very low energy, about two millionths of an electron-volt. But the ring holds the neutrons well: Some neutrons are detectable in it up to 20 minutes after injection.

This will permit two important experiments, a more precise determination of the neutron's half-life (free neutrons decay radioactively with a half-life of about 15 minutes) and of whether it has a small electric dipole moment — that is, a slight imbalance in its electric charge distribution. □

Neutron storage ring is fed by reactor.



CERN Courier

WHO announces end to virulent smallpox

Halfdan Mahler, director-general of the World Health Organization announced Dec. 13 the global eradication of variola major, the blinding, maiming and often lethal form of smallpox. In an intercontinental news conference via satellite, Mahler and Donald Henderson, former head of who's smallpox eradication campaign, spoke from Dacca, Bangladesh with reporters in this country. They said that in signing the death certificate for variola major there was no longer any need for smallpox vaccinations, although vaccinations would probably continue as a safety measure for another decade in Asia. And they hope to see an end to smallpox entirely, within a few years, they said. A less virulent form of smallpox, variola minor, still officially exists, although the last known case occurred in Somalia more than seven weeks ago.

"The last case of variola major on earth" was identified Oct. 16, 1975, in Bangladesh, Mahler said. There has never been more than nine months between occurrences of the disease, but just to be sure, a team of 12,000 health workers and a staff of 100 who and international specialists made repeated house-to-house searches throughout previously afflicted areas for new cases during the past two years.

Henderson said that the variola major virus is extinct except for small quantities

in research laboratories. And because it has "bred remarkably true and does not shift, as with influenza, every few years," it is not likely that a mutant variety will suddenly appear, he said. Although it's hard to prove whether the virus exists in animals, "in the past 10 years we've searched very hard and not found any," Henderson said. Twenty-nine cases of "monkey pox," a disease resembling smallpox, have appeared in Africa recently but do not appear to spread between humans. A major triumph of who's campaign is eradication totally through prevention; it had to be done that way, Henderson said, because the disease still lacks a cure. □

Holing the Ross Ice

Using a high-speed jet of hot gas, researchers in Antarctica have succeeded in drilling a 420-meter-deep hole through the Ross Ice Shelf into the chilly waters beneath the earth's southern cap. Besides lowering cameras, test instruments, sampling devices and fishnets to the bottom of the hole, scientists in the five-nation project intend to sample the overlying ice at different depths, representing many thousands of years of accumulated snowfall. An attempt nearly a year before had ended in failure when a different type of drill stuck in the ice. □