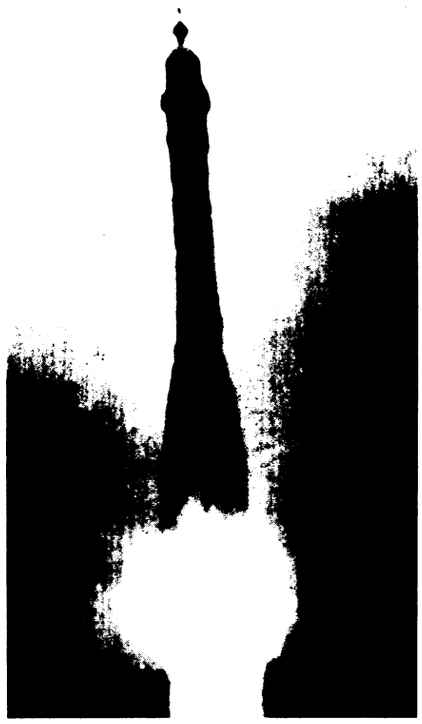
Flight of Soyuz 12: Short but successful

In June of 1971, three Soviet cosmonauts died, apparently from an air leak, as their Soyuz 11 spacecraft returned to earth from orbit. The tragedy stunned the Soviet manned space program, and more than two years of earthbound silence followed. This July, speculation arose that another manned flight was in the offing when space tracking ships moved out to their ocean posts and a delegation of Russian space scientists cut short a visit to the United States and returned home. But still, nothing happened.

Finally, last week, Soyuz 12 was launched.

The mission lasted just 44 minutes less than two days. Soyuz 12 completed 31 orbits of the earth before landing on target Sept. 29 in the Kazakhstan Steppe about 250 miles from its launching site at the Soviet space center at Baikonur. The crew included only two cosmonauts, Air Force Lt. Col. Vasily G. Lazarev and civilian Oleg G. Makarov. Television broadcasts from the spacecraft may have shown why.

Tass, the Soviet news agency, reported only that "the experimental flight is one of the stages in the work of further improving manned spacecraft." But the TV pictures suggested that Soyuz 12 had been modified into a two-man craft to make room for the bulky spacesuits of the crew, presumably a safeguard against the fatal leak of Soyuz 11, which was a shirtsleeve environment even during reentry.



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Soyuz 12 lifts off from Baikonur pad.

Soyuz 12 also reached new orbital heights for the Soviet manned space program when it lifted its flight path to a near circle ranging from 202 to 214 miles above the earth. The mission was a morale booster for officials planning a joint Soviet-American flight for 1975, when a Soyuz is to dock with a U.S. Apollo spacecraft. □

Skylab crew: Weaker, but rapidly readapting

"I feel a little bit weaker now than when I left," said Alan Bean, a week after splashing down in the Pacific with fellow astronauts Jack R. Lousma and Owen K. Garriott, but except for a little tiredness, the crew of Skylab 2 is very well, thank you.

The problem of returning to normal earth gravity after two months of weightlessness has been a key concern of manned space flight researchers. The Skylab astronauts, however, found that they readily adapted to the renewed pull. In fact, said Lousma, it took him only about 24 hours to reaccustom himself to the feeling of his normal weight. (It also took a day, he said, to get himself to stop "floating things around," reacting to objects as though they, too, had no weight.) Within a day or two after splashdown, even the heart rates and blood pressure of the crew had returned to the same levels at which they had been before the flight.

A week after splashdown, the astronauts still tire more easily than normal, possibly a symptom of their losses during the flight of up to 12 percent of their red blood cells and 20 percent of their plasma volume. The effect is fading as their bodies regain moisture and new red cells.

It seems to take longer for the body to adapt to the lack of gravity, in fact, than to reaccustom itself to the presence of it. Lousma says the feelings and reactions of the crew seemed to stabilize after about 25 days in orbit, and medical tests showed that cardiovascular changes leveled off in about 40 days. The fact that they do level off, says Lousma, suggests that plans for longer missions anticipate no serious physiological problems.

The astronauts were a little wobbly when they arrived back on earth, but forward movements, the principal weight shifts in walking, seemed relatively unaffected, according to Bean. "Your lateral balance is kind of funny," he says. "When we lurched, we always seemed to lurch to the side."

Though the astronauts have fared well, Skylab 2's other passengers were not so fortunate. Arabella, sole survivor of the journey's two space spiders, was found dead when her vial was opened on earth, possibly from lack of nourishment, the same cause suspected of causing the death of her cohort, Anita. Four of 54 minnows that returned from the flight were alive at splashdown, but all were dead when they arrived in Houston.

The mission's rich scientific harvest, including 50 percent bonuses in solar and earth resources data, has inspired planners of Skylab 3. Scheduled to last from Nov. 11 to Jan. 6, the mission could be extended until Jan. 19 for longer studies and deep-winter earth resources photography. It could be launched as early as Nov. 6 to enable human-assisted observations of Mercury's passage across the sun on Nov. 10. □

U.S. science: Still big, but signs of decline

What many scientists have long suspected has now been confirmed in the recently published *Science Indicators*, compiled by the National Science Board: While America is still preeminent in most fields of science and technology, the international competitive edge is being eroded away and domestic retrenching has set in. Hardest hit are young, academic researchers. The indicators:

- International position. The proportion of the gross national product and the proportion of the population devoted to R&D has been declining in the United States but increasing in the Soviet Union, West Germany and Japan. Labor productivity in the United States has increased 39 percent in the last decade, but in the same period, labor productivity in Japan climbed 210 percent and in West Germany it rose 86 percent.
- Resources. Total national expenditures for R&D declined six percent from 1968 to 1971, in terms of constant dollars, with R&D falling from 12 percent of the Federal budget in 1965 to 7 percent in 1972. (Almost three quarters of the Federal R&D budget in 1972 went for defense and space exploration.)
- Universities. The number of institutions granting science and engineering degrees rose 18 percent during the 60's, with universities increasing their share of the basic research load from 43 percent in 1960 to 57 percent in 1972. But Federal obligations to such institutions for R&D plants and major equipment fell 75 percent between 1965 and 1971. The Federal retrenchment in the academic sphere coincided with an increase of funds to the Government's own intramural R&D programs, with the largest increase going to the Department of

The FDA as purveyor of dangerous drugs

Even aspirin, some scoffers charge, would not be found fit for human consumption if it had to be approved by the present Federal Drug Administration setup. Aside from what this has to say about aspirin, this criticism is primarily directed at the slow-moving bureaucracy of the FDA and at the testing procedures and safety regulations that some (especially drug manufacturers) feel are overly restrictive. But according to the results of an investigation sponsored by Sen. Abe Ribicoff (D–Conn.), just the opposite is true. In fact, says Ribicoff, "The FDA and the companies involved have shown a disregard for public safety which is incompatible with their responsibility to protect and promote public health."

As chairman of the Senate subcommittee on executive reorganization and government research, Ribicoff asked the Government Accounting Office to investigate the FDA's regulation of a number of investigational new drugs (drugs approved for testing but not for public sale) that have been administered in clinical experiments to human subjects. The GAO study, released last week, discusses only 10 of the more than 6,000 such drugs. The results of the study, along with supplemental studies by the subcommittee, says Ribicoff, "strongly suggest that FDA regulation of investigational new drugs has been lax and has not adequately protected the patients who take these drugs."

Specifically, the report found that in eight cases the FDA failed to halt human tests after receiving indications that the drugs were not safe. As a result, more than 2,000 people have been exposed to possibly unsafe drugs.

A typical case was the drug Practolol, sponsored by Ayerst Labs. Evidence of cancer was found in animals given the drug, and on March 11, 1970, the FDA recommended to Ayerst that human testing be discontinued. One month later human testing was still going on and the FDA again advised that it be stopped. No really effective action was taken by the FDA, however, and the testing continued. In January 1971, the FDA tried for a third time to persuade the company to discontinue tests on humans. Ayerst not only refused to comply but even refused to make the findings of the mouse studies (indicating cancerous tumors) available to the doctors who were conducting the human experiments. The doctors thus had no way of evaluating the risks to which their patients were being subjected. Finally, on Aug. 27, 1971, the tests were stopped.

This case is not unique. The GAO found the time lag between discovery of the effects of human and animal tests and reporting them to the FDA ranged from 40 days to 19 months.

Another problem the FDA has had is getting drug companies to do follow-up studies on patients who have used investigational new drugs. E. R. Squibb and Sons, for instance, sponsored a drug called Cinanserin. Human tests were discontinued in August 1969 because of the appearance of tumors in the livers of rats taking the drug. The FDA suggested that Squibb do follow-up studies but Squibb decided not to. Realizing that its lack of follow-up regulations was leaving patients unprotected, the FDA contracted with the National Academy of Sciences for a study of the situation. An NAS committee was formed and its chairman was Lawrence Marks—a Squibb vice president who had participated in the controversy over the follow-ups on Cinanserin. Marks advised an FDA inspector of his position as both chairman of the NAS committee and a representative of Squibb and went on to say he did not feel he should commit the firm to a follow-up procedure until it was standard throughout the industry.

The Ribicoff report states: "It was poor practice for FDA to tolerate a situation where the chairman of a committee established and funded by the FDA for the purpose of recommending follow-up procedures is at the same time personally attempting, on behalf of his firm, to dissuade FDA from requiring follow-up examinations in a particular case."

Reviewing these and other potentially dangerous situations within the FDA, Ribicoff has made several recommendations that would tighten FDA controls of new drug experimentation. Substantial animal testing, he says, should be completed and evaluated before human testing begins. Under current FDA regulations, a drug may be given to humans for up to two weeks after only two weeks of animal studies and prior to full evaluation of those studies. Ribicoff suggests that Congress provide FDA with the resources to hire enough personnel to investigate and evaluate all applications efficiently. He further suggests that any company that fails to perform adequate follow-up studies should be disqualified as a sponsor of any investigational new drugs.

These and other recommendations have been forwarded to FDA Commissioner Alexander M. Schmidt. In what is described by the subcommittee as a "receptive letter," Schmidt responded this week. He stated that the GAO report made some good points and that he would review the matter further.

Defense. At the same time, privately sponsored research was also becoming more concentrated so that by 1970, 100 large companies accounted for 80 percent of the total industrial R&D expenditures.

- Personnel. The total pool of active scientists and engineers grew by 50 percent from 1960 to 1971 and the number of those with doctorates doubled during that period. The effect of more personnel and less money hit university investigators particularly hard, resulting in a net 15 percent drop of funding per individual, in terms of constant dollars, from 1968 to 1972. (Physics and clinical medicine were particularly hard hit, with net individual decreases of 32 percent and 21 percent respectively.) Support for young investigators (those holding a Ph.D. less than seven years) fell the fastest, with the proportion of supported young scientists falling from 65 percent in 1964 to almost 50 percent in 1970.
- Enrollment. Total enrollments in high school science and math courses continued to climb during the 60's at a rate faster than total secondary school enrollment. Physics was the only exception. Undergraduate science enrollment in physics, chemistry and engineering declined in the 1970-71 school year, and graduate science enrollment declined four percent between 1969 and 1970.

The National Science Board interviewed panels of experts in various fields to determine some of the causes and effects of these trends. Causes cited include: economic recession forcing emphasis on quick payoff research, public and political disaffection with the perceived effects of technology on society, lack of understanding of the discovery process and the increasing association of R&D with the Defense Department. All panelists interviewed agreed that decreased funding and the rapid and frequent changes of programs and directions of funding will be detrimental to research. □