

Quickening pace toward space cooperation

Talks with Russians on docking compatibility may point way to agreements on mutual efforts



Spacemen James Lovell and Nikolayev: U.S.-Soviet accord.

While Russia and the United States were in a race for space and the moon, the chances of scientific and technical cooperation on an international level were slim. With the space race temporarily in abeyance, that once-utopian goal is looking more realistic. But progress is slow: Hostility and competition must be replaced by mutual trust and cooperation.

The quiet diplomacy begun last year by former Administrator of the National Aeronautics and Space Administration Thomas O. Paine is now paying off with rays of hope in both the East and West. Although mutual exchange with both Europe and Russia often bogs down in the political arena, there is cause for some restrained optimism in scientific and technological circles.

Hopes rose this week when NASA announced that the Soviet Union had agreed to "preliminary technical discussions on possible compatible space docking arrangements." The announcement, the result of correspondence begun months ago between Dr. Paine and Academician Mstislav V. Keldysh, President of the Academy of Sciences of the U.S.S.R., came on the heels of the 21st annual International Astronautical Congress last week in Konstanz, West Germany. In the announcement, Dr. George Low, NASA's Acting Administrator, confirmed that he had made final arrangements for the technical talks to begin in Moscow, Oct. 26 and 27, between officials of both nations. In addition, at the conference in West Germany, Apollo 13 astronauts discussed the possibility of international space crews with Soyuz 9 Cosmonauts Andrian G. Nikolayev and Vitali I. Sevastyanov. (The cosmonauts plan a 10-day tour of the United States, beginning Oct. 18, to visit space installations and attend the annual American Insti-

tute of Aeronautics and Astronautics meeting in Houston.)

Exchanges of scientific information on space between the Soviet Union and the United States have been going on for the past five years (the most notable example being an upcoming joint publication on space biology and medicine), but this will be the first technological exchange of details about spacecraft hardware with the Russians. If methods for docking Soviet with American spacecraft can be worked out, the way would be opened for a wide range of cooperative activities in space ranging from space rescue to joint scientific projects.

Actual implementation, if it occurs, may take several years since not only the docking ports of the spacecraft but also the life support systems differ. But the October meeting is a step.

Meanwhile, European participation with the American post-Apollo program is being studied by the European space community, and some decisions are expected before January. Major questions were resolved when Belgian Minister Theo Lefevre, chairman of the European Space Council, visited the State Department in September "to explore means of space cooperation." Although previous discussions had begun last year between American and European aerospace industrialists and space officials (SN: 8/29, p. 165), this was the first meeting on a political or governmental level.

The talks centered on several European concerns: the availability of United States' launch services for European satellite systems until shuttle development; the extent to which the Europeans would have access to the space station and shuttle after development; the extent to which they would have access to technological informa-

tion, and their role in the decision making and management processes of the post-Apollo developments.

Central to European participation and very much at stake is their own launcher development program, Europa. The limited European space budgets prohibit substantial participation in both the advanced American space transportation systems and their own program.

The Washington talks established some basic ground rules, should the Europeans choose to participate in the United States space development program:

- American launchers would be available for satellite systems not in conflict with international agreements already in effect. (These include the Outer Space Treaty, which limits space to peaceful uses, and the INTELSAT agreement—the international communications satellite organization.)

- The space shuttle and station would be available under the same conditions.

- Technological information, and management and decision-making power, would depend on the extent of each nation's involvement or commitment to a program.

The interim INTELSAT agreement—a major stumbling block over the past few years—is now going through a revision. Under the interim agreement, there were questions whether the United States could sell launchers to Europe for orbiting regional communications systems that would conflict with INTELSAT. The current draft of the new agreement has more latitude. When concluded, it will allow any member nation to launch a regional communications satellite system, provided that the nation first consult with the 76-nation consortium and that two-thirds of the

nations do not disapprove. (Such disapproval is deemed unlikely by United States officials.) Thus INTELSAT would no longer be an impediment to the sale of rockets to Europe.

European and American industry would have much to gain and little to lose on the agreement on technological flow. Information exchange would occur on two levels: detailed technology (defined as blueprint knowledge enabling reproduction of systems) and general technology (a broad understanding of spacecraft systems). Detailed knowledge concerning shuttle thrusters, for example, would go only to that nation

MARINE GEOLOGY

Mountain-building in the Mediterranean

Early studies of mountain geology revealed that mountains are sites of tremendous folding and thrusting of the earth's crust. In many places the oceanic sediments of which mountains are composed are inverted, with the older sediments lying on top of the younger. Terranes of Jurassic and Cretaceous limestone several hundred feet thick are commonly found displaced by several miles from their original locations.

Geologists had proposed that these features could be explained if mountains were formed by compression of the crust, and the theory of plate tectonics provided an explanation for the origin of the necessary compressive forces (SN: 8/15, p. 143).

The results of the Deep Sea Drilling Project's Leg 13, in the Mediterranean Sea (SN: 7/4, p. 20), add further support to the theory that mountains are created by compression between adjacent crustal plates.

The Glomar Challenger, led in its latest voyage by Dr. B. F. Ryan of Columbia University's Lamont-Doherty Geological Observatory and Dr. Kenneth J. Hsu of the Swiss Federal Institute of Technology, returned to port last week with 640 meters of core from 14 sites on the floor of the Mediterranean Sea and one from the North Atlantic. These cores indicate that for the past 5 million years Africa and Europe have been drifting together and that the resulting compression is raising mountains on the bottom of the Mediterranean.

At a trench in the eastern Mediterranean, one oceanic plate is sliding beneath another. Sediments from the subsiding plate, says Dr. Ryan, scrape off against the upper plate and pile up. This accumulation, he explains, constitutes an embryonic mountain.

It had been known for years that mountains are composed of ocean sediments. What the Leg 13 team wanted to learn, Dr. Ryan says, is

which had chosen to produce the thrusters. That nation, therefore, would retain its proprietary information and not be obliged to share detailed information with other nations. Decision-making authority would also depend on a nation's financial and technological commitment to a project.

The major problem now facing the Europeans is something over which they have no control—the United States Congress. And it is not likely that any major commitment will come from Europe, until Congress decides whether to begin NASA financing of space shuttle and station studies. □

how the peculiar arrangement of strata found in mountains comes about.

By drilling along the trench, something not previously attempted, the scientists recovered cores astonishingly similar to sediments and rocks found in many parts of the Alpine chains of Europe and North Africa. In one location, they found limestones 120 million years old directly above oozes only 5 million to 10 million years in age. The researchers had expected this, says Dr. Ryan, but were surprised that the drilling technique could reveal it.

The researchers concluded that the beginning phases of thrusting actually occur on the ocean floor. The style of thrusting they found at the trench was identical to that found in the Alps.

One of the original goals of the expedition was to learn something of the Mediterranean's history. The researchers succeeded in this, but what they found was completely unexpected: evidence that the Mediterranean Sea had once been cut off from the Atlantic and had become a veritable desert. The clues that led to this conclusion were thick layers of salt brines and a mineral known as anhydrite that forms only at temperatures exceeding 104 degrees F.

To say that the scientists were surprised at this discovery would be an understatement. The idea that the Mediterranean could have dried up, says Dr. Ryan, seemed preposterous. But it was the only explanation for the data.

Even more mysterious, the layer of salt is broken at intervals by layers of normal oceanic oozes. Dr. Ryan concludes that there must have been a long period 5 million to 10 million years ago during which the Mediterranean basins were alternately flooded and dried up. He believes this could have been caused by mountain building in the lands to the west, which periodically opened and closed gateways to the Atlantic. □

DRUG LABELING

Implementing a review

With much fanfare, the Food and Drug Administration four years ago asked the National Academy of Sciences to review the effectiveness of all drugs marketed between 1938 and 1962, when Congress passed a law saying that drugs ought not only to be safe but to work as well. Confusion, controversy and legal entanglements have been the order of the day ever since the NAS completed its three-year study and turned its findings over to the FDA.

Currently, battle lines are being drawn over a new FDA proposal to require drug-makers to include in their advertising and labeling any adverse opinions of the NAS report. Although manufacturers are already required to cite the pros and cons of a given drug somewhere in the small print of ads that may run four colorful pages or more, they are clearly unhappy about FDA's suggestion that NAS judgments be conspicuously relayed to practicing physicians in a box titled "Important New Information." Because it is generally agreed that doctors obtain a fair portion of their information about drugs from ads in medical journals, FDA's newest proposal carries a particular sting. The industry plans to fight.

In reviewing data on close to 3,000 drug products, the NAS rendered one of six verdicts: effective as claimed, effective *but* (meaning there exists a better drug for the same purpose), ineffective as a fixed combination (which subsequently forced dozens of combination antibiotics off the market) probably effective, possibly effective and outright ineffective. The FDA now has all of the NAS decisions in hand. It has reviewed and published about 15 percent of them. Its troubles have been, and will continue to be, legion.

Concurring with the NAS "ineffective as a fixed combination" rating of combination antibiotics, FDA moved to ban such products. That led to a year-long court fight waged by the Upjohn Company in defense of Panalba, an \$18-million-per-year earner (SN: 3/7, p. 242). Only recently did FDA emerge victorious from that one.

Then, just before the final Panalba verdict, the American Public Health Association and other consumer groups brought action to force FDA to release all of the NAS findings immediately, charging that the FDA was willfully allowing the public to take drugs it knew to be questionable (SN: 8/1, p. 95). Legally that case is in limbo. Practically, the present move regarding drug advertising is something of a compromise.

Because the FDA itself is reviewing