

The Gap, The Drain and Non-proliferation

**U. S.-Soviet differences postpone
treaty talks. Nuclear nations seek
monopoly on explosives; have-
nots want in despite problems.**

As the 18-nation conference on non-proliferation of nuclear weapons prepared to resume in Geneva (SN: 2/25), problems of the technology gap and the brain drain refused to be buried under the assurances of the nuclear powers.

And continued differences between the United States and the Soviet Union over inspection have caused a postponement of negotiations from a scheduled May 9 resumption to May 18.

Both Europe and the rest of the non-nuclear world worry that overwhelming expenditures in research and development will put this country so far ahead in science that they will lose out completely in international trade.

Asking them not to develop nuclear weapons technology is like asking a fat jockey to carry extra weight riding a 100-to-1 shot in the Kentucky Derby. It might not make any difference, but then again, maybe it might.

The one area where weapons technology is directly applicable is in the peaceful use of nuclear explosions, for digging canals and harbors or mining.

Here the U.S. is a victim of its own enthusiasm. Under the Atoms-for-Peace program, the Government did a fine job of selling the wonders of nuclear excavation, to the point that other countries were intrigued.

Now the idea has to be de-emphasized; the Atomic Energy Commission indefinitely postponed a planned excavation test in February to avoid underlining the fact that we can set off nuclear explosions while other countries, under the treaty, could not.

What the U.S. seems to be saying to the non-nuclear powers is that nuclear weapons technology is not all that useful; that if it turns out to be useful we will be able to supply them with it be-

cause we are developing the excavation technology; and that we have called off experiments in excavation technology so as not to offend anyone anywhere.

The U.S. still proposes to explore the technology, and hopes to resume the postponed test, Project Cabriolet, when the political heat is off. In addition, in the fiscal 1968 budget is a request for funds to set off, after July 1, a row of five charges simultaneously, a project designed specifically to test the practicality of blasting a new canal across the Isthmus of Panama.

If the explosive is buried deep enough, no radioactive fallout will be released into the atmosphere. But in that case most of the energy is spent crushing rocks, and little goes into throwing earth out of the crater.

On the other hand, a bomb buried just under the surface wastes energy on the air and also sends up fallout.

An ideal depth has to be found so that enough crushed rock and earth falls back in the crater to bury most of the radioactive wastes without filling the hole completely. This depth can be found by experiment—by testing.

U.S. atomic engineers are more enthusiastic about the use of atomic explosives for underground mining. Here the problem of fallout is eliminated because the bomb is buried deep enough to keep fission products from escaping.

In a deep explosion, a cavity is formed whose walls are of molten rock. Hot gases keep the walls from collapsing, but as the gases cool the roof caves in and the cavity is filled with rubble. A column, or "chimney," of rubble is created in this way.

Such chimneys could be used for mining ores, for releasing natural gas trap-

ped in hard rocks and for recovering oil from shale.

Underground tests have shown that almost all of the radioactive waste from the explosions is absorbed by the molten rock that falls to the bottom. Very little is collected by the rubble.

Still, some means of monitoring and eliminating chance radioactivity has to be provided in any atomic mining operation. More serious is the problem of making buildings and shafts strong enough to withstand the shock.

Undeveloped and trouble-plagued as nuclear explosion technology is, the non-nuclear powers are reluctant to give up their right to work on it.

This showed up in the Mexico City conference in February, where the Latin American nations drafted a treaty banning nuclear weapons in the area. The U.S. was caught by surprise when several countries insisted that a clause be included allowing the development of "peaceful" nuclear explosives.

The U.S., whose position is that a bomb is a bomb, managed to squeeze in an amendment saying that explosives for peaceful uses could be developed only if there were some way of distinguishing between a weapon and a non-weapon explosive.

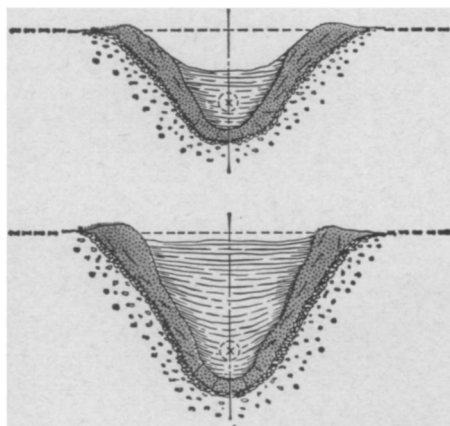
But Brazil last week issued a statement in Geneva interpreting the Mexico treaty statement as allowing the development of peaceful nuclear explosives.

The European countries, which are in a much more equal competition with the U.S. and U.S.S.R. in advanced technology, have doubts about renouncing any weapons technology.

They feel that somehow weapons development ties into advances in computer science, in rockets and space, in nuclear power and in many other areas

where the nuclear nations spurred ahead during the 1950's. They are trying to catch up in these fields, and they fear that renouncing one advanced technology will put them farther behind in others while their top scientists would depart to the U.S. and other nuclear countries.

Their fears are not eased by U.S. statements that the technology gap can only be closed by creation of bigger markets through European political union. Neither is the U.S. assurance, issued by an interagency committee last week, that the brain drain is not a serious threat, liable to be received with enthusiasm. The report said the



Nuclear cratering: peaceful A-bomb.

U.S. could take some remedial steps to help developing nations lure back their people, but no steps should be taken to prohibit the migration of scientific talent.

Despite this unrest, the non-proliferation treaty will probably contain a blanket prohibition of nuclear explosives development. This is because both the U.S. and the Soviet Union agree that the treaty would be meaningless without it.

Although the U.S. and Russia are on the same side in the technology question, the problem of controlling the flow of fissionable material produced by nuclear reactors has raised controversy.

There are two agencies that monitor the movements of fissionable material: the International Atomic Energy Agency in Vienna, and Euratom, the West European agency. Euratom was set up first, and has regulated the use of material among its member nations. The IAEA, which the U.S. has strongly supported, also regulates the flow of fissionable material among member nations.

The Euratom nations are reluctant to give up authority to the IAEA, and the U.S., although aiming for a single, world-wide inspection system, has sup-

ported Euratom's claims. But Russia, which considers Euratom as an agency of NATO, has insisted that the European club join the rest of the world in the inspection system to insure against the proliferation of nuclear weapons.

The Phillips Report's Tortured Trail

It was the most mysterious piece of writing since the Dead Sea Scrolls.

Within days after the Jan. 27 fire that killed three astronauts in an Apollo space capsule, guarded references began appearing to a scathing report sent more than a year before from the National Aeronautics and Space Administration to the prime Apollo contractor, North American Aviation. Produced by a NASA team under program director Gen. Samuel Phillips, the elusive document reportedly blasted North American for the same shoddy work and poor engineering that the accident investigators found 13 months later.

Yet Congressional investigators were unable to dig the report up. North American President J. Lee Atwood testified under oath that "Gen. Phillips has not given us a copy of any report." Even NASA head James Webb, notorious for his loud protestations that he always gives Congress whatever it needs, produced only a watered-down summary when pressed by the House Science and Astronautics Committee.

In the 10 days that followed, the Phillips report was sought unsuccessfully both by Congress and the press. Then on April 26, came the climax: Representative William Ryan (D.-N.Y.) announced that he, at last, had a copy. Declining to reveal his source, he gave NASA three days to make the entire report public on its own, which it tacitly refused to do. When Ryan revealed the document himself neither NASA nor North American would comment on its authenticity, but prompt signs of life in both organizations gave it weight.

On the same day, NASA announced a series of conferences with half a dozen other large space companies to work out "a revised plan for the Apollo program" that almost certainly meant the space agency was thinking of taking some of its business elsewhere. Included among the conferees was the newly-merged McDonnell-Douglas Corp. McDonnell built both the Mercury and Gemini spacecraft.

That was on a Saturday. North American waited until the weekend was over to announce a high-level shakeup in which the head of its Apollo-building Space and Information Division, conveniently on sick

leave at the time, was replaced by William B. Bergen, one-time head of Martin-Marietta Corp., who had been with North American for scarcely three weeks. At the same time, the division's executive vice president was kicked downstairs to the new post of assistant vice president, while the vice president formerly in charge of manufacturing took over his seat.

Ryan's "Phillips Report" should have been enough to curdle blood all over North American's California domain. Complete with a signed letter dated Dec. 9, 1965 and addressed to company president Atwood, the 20-page document accused the company of featherbedding, submitting misleading reports to NASA, delivering unfinished hardware and being more interested in money than in performance.

Even though the company was on the receiving end of the NASA report, the space agency is likely to fry as well. Though it is written in harsher terms, the Phillips report is shockingly similar to that of the Apollo accident investigators (SN: 4/22). NASA thus knew about North American's incredible mishandling of its job, yet did little or nothing about it. The Phillips report recommended strongly that North American come up with some good excuses within about six weeks, and said that the investigators would probably return a month after that to see what was done.

But what happened? Someone knows and isn't telling, so Congress has to start prying again, giving the Phillips report what amounts to its own investigation. Webb is scheduled to appear this week before the House Subcommittee on NASA Oversight, and several of the other past witnesses from the weeks of hearings on the Apollo fire are likely to face return bouts.

Representative Ryan, who belongs to the House space committee, but not its NASA Oversight subcommittee, will unfortunately be on the outside looking in at the hearings. He has been frustrated before in his overseeing attempts, such as when subcommittee head Olin E. Teague (D.-Tex.) invited him to accompany the subcommittee to Cape Kennedy in the course of the accident investigation. Ryan's plan was vetoed by committee chairman George Miller, a Democrat from North American's home state of California, who said that only subcommittee members could go on such trips. Miller also has the power to appoint new subcommittee members.

When the Oversight subcommittee does take up the Phillips report, the document's specific criticism and recommendations will be examined intently in the light of NASA's action on them since they were made. Here are