

The Bomb Spreads

While 17-nation negotiations to avoid the spread of nuclear weapons continue at Geneva this week, the efforts gain new significance with the disclosure that China exploded her first hydrogen bomb—well ahead of schedule. That event followed hard on speculation that nuclear weapons could find their way into the still-simmering Middle East.

Last week's developments in China and the Near East could make it less likely that non-nuclear members will sign a treaty. But the thrust now is to get something on paper that the major nuclear powers can buy.

U.S. negotiators at Geneva are still confident that, despite the flareups, differences with the Soviet Union can be worked out and a treaty drawn up. The major stumbling block between the nuclear giants now involves inspection of European nuclear reactors, and that can be made the subject of later negotiations, they feel (SN: 5/13).

U.S. negotiators, long experienced with reading the mood of their Soviet counterparts, feel that a cooperative mood still exists in Geneva, despite the Mideast conflict. When outside events intrude at the negotiating table that mood disappears, they say.

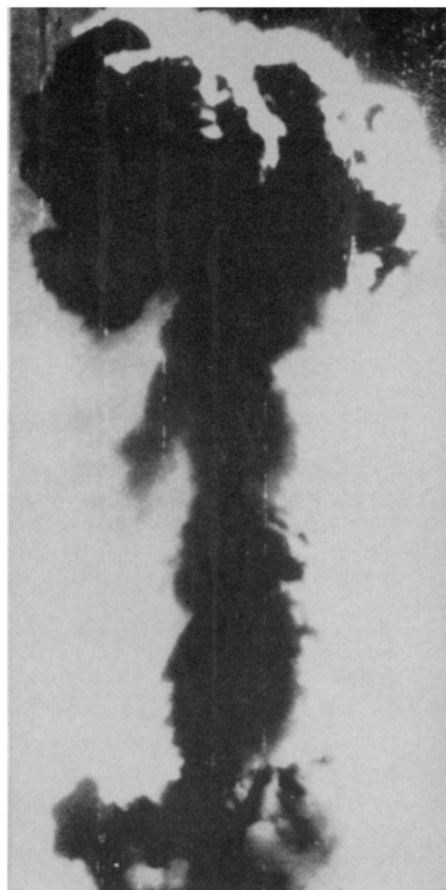
Meanwhile, estimates of China's nuclear threat capability are being hastily revised. Defense Secretary Robert S.

China's H-test casts

a shadow at Geneva;

the Middle East

could be next.



A Chinese bomb: an early test.

UPI

100 hydrogen bombs by 1970, along with the means to deliver them.

Dr. Lapp bases his estimate on the assumption that China would use all of her supplies of fissionable U-235 as triggers for H-bombs. The U-235, produced in a gaseous diffusion plant built by Russia at Lan Chow, can be used to make atomic fission bombs, like those tested by the Chinese on five previous occasions. But it can also be used to produce the heat to cause fusion of hydrogen atoms and become the trigger of the H-bomb.

It is only logical to expect the Chinese to go for the bigger fusion bombs, says Dr. Lapp, because they are so much cheaper. He estimates that ordinary A-bombs would cost the Chinese \$5 for the equivalent explosive power of a ton of TNT. The hydrogen bomb would cost a nickel a ton, he said. The latest bomb had a yield equal to several million tons.

As for delivery systems, Dr. Lapp predicts that China could develop an ICBM by 1970 that could hit such spread-out targets as Los Angeles. Sophisticated guidance systems, such as those in U.S. and Russian missiles, aren't necessary for China's purpose, he says. He also points out that China has 30 submarines that might also be used to carry nuclear weapons. They may already be carrying missiles.

The Chinese test also brought forth the controversy over the U.S. installa-

tion of an anti-ballistic missile system, which military men and some Congressmen have been urging.

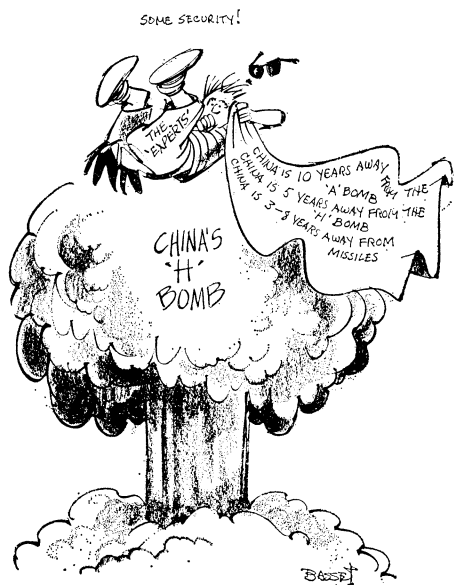
Secretary McNamara has held back from deploying the system, despite Russia's move to set up its own ABM, because he feels that the two systems would simply annul each other, at tremendous cost.

He also dismissed the need to build a light ABM shelter as a protection against Chinese attack because, he said, there was plenty of time to do so if the threat became imminent.

But the Chinese speedup may change that timetable, and legislators such as Chairmen L. Mendel Rivers (D-S.C.) and Richard Russell (D-Ga.) of the House and Senate Armed Services Committees say the deployment should be started right away before it is too late.

In fact, says Representative Craig Hosmer (R-Calif.), a member of the Joint Atomic Energy Committee, it's quite likely that the Chinese threat is what has stimulated Russia to install its ABM, which quite clearly isn't yet much good against the U.S. missile force. Hosmer contends that the Chinese explosion was a test of an actual bomb, not just an experimental device.

The threat of atomic weapons entering the still threatening Near East conflict was also heightened by the events of last week. Reports from Israel indicate that that country is planning on



Basset-Scrapps Howard

McNamara's assertion that China will pose a small threat even in the 1970's are now under attack as unrealistic. Nuclear physicist Dr. Ralph Lapp, whose predictions of China's nuclear capacity have been most accurate, says following the successful thermonuclear explosion that China could easily have

developing atomic weapons as a deterrent for further war. At the same time the possibility that Egypt or other Arab countries could get A-weapons from China or even Russia was suggested.

In spite of these threats, U.S. arms control officials are hopeful that the Nonproliferation Treaty, once drawn up, will be adhered to by Israel and the Arab countries. They feel that a nuclear race, and the inevitable stalemate, would gain neither side any advantage, and hope to persuade them of this.

Israel's Government said that it has no plan to pursue nuclear weapons development, but its last statement on the subject was before the Mideast war broke out. There is little doubt that Is-

rael has the technical capability to build a bomb, and it also has a French-built atomic reactor, the highly secret 26 megawatt Dimona facility in the Negev, where bomb-quality plutonium can be produced.

Arms control people also doubt that China would take the risk of putting nuclear weapons into the hands of such volatile leaders as Egypt's Gamel Abdel Nasser. And they consider it inconceivable that the Russians would do so.

Dr. Lapp doesn't share that feeling. He points out that the Russians actually did send nuclear weapons to Cuba in 1962, and while the mood might have changed since that time, there's nothing to guarantee that it won't change back again.

PSAC REPORTS

World Food Supply Faces 20-Year Deadline

The world food crisis has been treated so much and so often that its true dimensions tend to get lost in rhetorical overkill.

Yet predictions of impending mass starvation are real: Developing nations that once exported grain now import it. Those parts of the world where two-thirds of the people live will need twice as many calories in 1985 as they had in 1965, and food production is not increasing fast enough to meet that need. Programs of birth control, though essential, cannot show results quickly enough to modify food supply during the critical years—which for India should reach a peak in 1980. All in all, the world has about 20 years to work out a solution.

At the moment there is a chance to solve the problem of food shortages permanently—in 20 years, there may not be. But a solution will take considerably more intelligence, foresight, money, ingenuity, steadfastness and commitment than nations are prone to display during times of peace.

Commitment is what the President's Science Advisory Committee hopes to inspire with its three-volume report on world food supply released last week after a year's study by more than 100 authorities.

The report spells out in the strongest possible terms the action nations must take during the next two decades. Employing adjectives like "mandatory," "absolutely essential," and "unparalleled," the food panel calls upon hungry nations to revolutionize their agriculture and well-fed nations to help them do it.

"It is absolutely essential," says the report, that the developing world accept commercial farming. "There is no alternative." Nor is there an easy answer in exotic food stuffs, such as

single-cell protein or fungi. Though some new protein sources offer future promise as a food supplement, their commercial production is several years away; the critical period is now.

The food panel reached the unsurprising but crucial conviction that poor nations will have to feed themselves from conventional sources—farm crops and fish. Richer countries, on the other



Food needs will double by 1985.

hand, must design a long-range strategy of technical and economic assistance—the panel did not specify how much aid, but used the term "war-like mobilization."

Both parts of the world together must mount a financial and technical effort "unparalleled in the peacetime history of man."

What are the chances the world will take such advice?

"I'm pessimistic, but not without hope," says Dr. Ivan L. Bennett, deputy director of the Office of Science

and Technology and chairman of the food panel.

He personally feels President Johnson is interested in launching the kind of attack recommended by his science advisers, but political realities may forbid it.

"The difficulty in getting other advanced nations involved is very real," says Dr. Bennett. "Until now there has been a singular lack of interest in economic aid." And Congress itself is unlikely to move unless the U.S. public puts up a clamor.

Aside from politics, the key to increased agricultural yield is a thing called "adaptive research." Agriculture, like other types of culture, cannot simply be transplanted from one country to another. Each needs its own plant and animal varieties, according to soil and weather conditions, not to mention the tastes of the populace.

No one at the moment has the answers, but developed nations know how to find them.

Therefore, technical aid cannot be a "know-how, show-how" operation, says Dr. Bennett, but must be designed to promote scientific, technical and managerial skill in recipient nations. According to the food panel, skilled manpower capable of laying out agricultural blueprints is the scarcest and most needed resource in developing countries.

Despite years of talk, U.S. aid has never really come through on this score. Every 365 days, Congress doles out financial help, after calling up the aid agencies to justify their requests. "It's a kind of yearly show," says Dr. Bennett, "and Congress gets just the right response from the aid people when it teases them. They tend to do things that produce obvious results."

This trend must be reversed to long-term technical assistance if the United States is to have any impact on the food crisis.

GEOHERMAL ENERGY

Tapping the Heat Engine

Geothermal energy is simply energy extracted from heat in or under the ground. The ancient Romans bathed in natural hot springs centuries ago; the Italians have been extracting borax from steam and hot water vents in the earth since the time of the American Revolution, and natural hot water in Iceland has been used for almost as long to produce salt from seawater.

In 1904, however, came a milestone that has since resulted in a pounding at the gates of Congress and the U.S. Department of the Interior. In Larderello, Italy, engineers succeeded in hitching underground steam to a turbine in the world's first geothermal power