NOAA to Try Rescue Rainmaking

Because of the urgent requests of farmers in southern Florida who are facing disastrous crop losses due to a severe drought, scientists from the Environmental Meteorology Laboratory of the National Oceanographic and Atmospheric Agency (NOAA) are going to attempt a large-scale program of cloud seeding during April and May.

The scientists still view their rainmaking technique as experimental and would prefer to do further research before widespread applications are made. But the farmers, like terminal cancer patients, are desperate and eager to try even experimental remedies, and the scientists find it hard to turn a deaf ear to this plea for emergency aid. Nonetheless the scientists are uncomfortable in their role—an unaccustomed one for meteorologists—and they are worried about being cast as miracle workers who may not be able to deliver.

Scientists at the NOAA laboratory, which is headed by Joanne Simpson, have been working for some time toward the eventual goal of finding a reliable technique for increasing rainfall by seeding clouds with silver iodide. The current program came about when officials from the central and southern water control districts in Florida, who were aware of the research work, approached NOAA scientists about the possibility of attempting a rescue effort. Eventually the state of Florida formally requested federal aid, and the federal government agreed to support a program to at least attempt to mitigate the drought in southern Florida. According to the understanding that was reached, the federal government will provide planes and the silver iodide seeding materials under the direction of the NOAA scientists, while the state will instrument the target sites with rain gauges so that rainfall information can be collected and will also provide public relations liaison between the farmers and the scientists.—ALLEN L. HAMMOND

argued that Boretsky's figures were "a bit misleading" because they spanned periods of time in which the economy was acting in different ways under different pressures. Cooper's own contention was that, in the period between 1955 and 1965, U.S. exports of research-intensive products did not suffer more than did other U.S. exports. Thus he suggested it is unlikely that our trade performance can be explained as due to "a loss of technological lead." Cooper suggested instead such factors as a rise in U.S. export prices and the formation of European trading blocs, which retained duties on U.S. goods.

In the period since 1965, Cooper said, inflationary pressures associated with the Vietnam war have been "the major factor by a long margin" in our deteriorating trade posture. "Exceptionally strong pressures of demand in the United States, resulting largely from expenditures associated with the war in Viet Nam, resulted in unprecedented increases in imports from other industrial countries, including imports of research-intensive goods," he said. Thus, where Boretsky assigns inflation a secondary role, Cooper gives it the primary role in recent years.

Moreover, Cooper does not seem greatly worried by the fact that European and Japanese firms are showing greater capacity to innovate and to diffuse new techniques. "While the United States should be alert to the possibilities that its own innovative capacity could diminish, it should not lament the growing innovative capacity abroad," he said. "There is a great deal of scope for commercial diversity, and specialization is mutually beneficial even—or perhaps especially—in invention."

Another analysis that conflicts with Boretsky's has been offered recently by Robert Solomon, an adviser to the Federal Reserve Board and director of the Fed's division of international finance. Solomon, like Cooper, argues that excess demand and rising prices caused by Vietnam war expenditures caused our balance of payments problems in the late 1960's. Studies done at the Fed, he said, "show that if the United States had avoided inflation while keeping the economy on a full employment growth path in 1965–69, our trade balance would not have deteriorated. The relevance of that finding is that the reduction in our trade surplus was not inflicted upon us; we lost it ourselves by tolerating inflation." Unlike the doomsayers, Solomon expresses "a fair degree of optimism regarding the future of the U.S. trade balance."

Still other analyses call into question some of the assumptions of those who are worried about trade deficits. A recent paper by Lawrence B. Krause, an international trade expert at the Brookings Institution, for example, suggests that substantial trade deficits in coming years may not be a bad thing, for they will almost certainly be offset by even more substantial income from American investments abroad. "It is not hard to visualize the United States in equilibrium even with a trade deficit quite large by world standards," Krause says. (Boretsky's analysis deals solely with merchandise trade, not with foreign investments). Another recent paper by Lester C. Thurow, professor of management and economics at M.I.T., published in the March 1971 issue of *Technology Review*, questions whether increased expenditures for R & D—a pet recommendation of many of those who seek to improve our international standing in advanced technologies—necessarily produce technical advance. "While it may seem almost axiomatic that more research and development activities should lead to more technical progress," Thurow writes, "it is difficult to postulate this axiom on the basis of American history since 1940. More research expenditures do not seem to lead to more technical progress."

Thus, there does not seem to be much agreement as to whether we are in danger of losing our vaunted technological superiority, or as to whether technological factors have played much of a role in recent trade problems. Some economists interviewed by *Science* felt that the technologists are getting alarmed over economic trends they don't understand. But some technologists retort that the economists pay too little attention to technology. As Myron Tribus observed: "Recently I took time out to study what economists do about technology in their mathematical models of national economies. To my amazement I found that technological indices play no real role. . . . I am quite concerned over the power wielded by economists in determining national