in the planning phase, and it is not yet clear whether the bureau will mount a test program designed to improve evaluative techniques or will go directly to a larger operational program, which presumably would involve extensive seeding of clouds.

The bureau has set up a committee on atmospheric water resources, which draws members from the National Science Foundation, the Weather Bureau, and other federal agencies, to consult on the program. Relations between the bureau and other agencies at the moment are said not to be at their best. It is thought likely that the bureau will look to outside institutions with which it has already developed ties, such as the University of Nevada, the University of Wyoming, and the South Dakota School of Mines and Technology.

On the other hand, the bureau has a record of very substantial achievement in applying science and technology to the chief problem of the "reclamation states" of the West, and it is this record which has won the agency the senators' confidence.

Advocates of an operational program also point to scientific backing from inside and outside the government. In the hearing before the Moss subcommittee, for example, John C. Calhoun, science adviser to the Secretary of Interior, said in his statement on behalf of the department, "in summary at this point, our evaluation shows that the time has arrived for larger scale, well planned field experiments."

Calhoun went on to say that part of the department's role in weather modification should be sponsorship of a "continuing program primarily directed toward improving precipitation from winter storms." He added, however, that this program should be conducted in a "research atmosphere," and he later made the following cautionary observation. "To proceed into operational phases now without completely understanding the processes involved could lead to undesirable effects. These might range from decreases rather than increases in precipitation, to gross atmospheric contaminations leading to adverse weather and to possible handicaps to future research. So we believe it is essential that any new effort in weather modification be approached as carefully planned development research, which will take into account probable environmental consequences of experimental actions each step of the way."

A reading of the hearings produces the clear impression that the senators believe the "well planned experiments" (in Calhoun's phrase) are likely to produce results that can be counted in acre-feet in Colorado Basin reservoirs and ponds. The legislators candidly state that a gamble is involved, but they appear convinced by the evidence that the gamble is worth taking.

The Moss hearings were short and to the point. Only representatives from the Interior Department and its Bureau of Reclamation testified. No nongovernmental authorities were brought in, and nobody from other federal agencies engaged in weather modification research —including NSF—appeared.

Senatorial Displeasure

Among those most closely concerned with weather modification on Capitol Hill, the attitude toward NSF in this context seems to be expressed by one observer who said the legislators and their staff men feel that NSF has been "wishy-washy" on the subject of weather modification, because the agency kept recommending more research and the training of more weather modification researchers when the senators wanted action.

While there has been no showdown, it is fair to say that a significant split on weather modification policy has developed. On one side are scientists who are sanguine about the eventual development of effective techniques to modify the weather but are opposed to large-scale "engineering" programs now, since they feel that there is no sound way to design such programs at this time. They oppose proceeding on a trial-and-error basis because of possible unfavorable effects such as those mentioned by Calhoun, and because it would disrupt an orderly program of research in atmospheric sciences. Some feel that this, ironically, could turn out to be a year of unusual high precipitation in the Colorado Basin and that the apparent success of a seeding program could lead to misleading conclusions.

On the other hand, the legislators and their advisers feel that a lot of time and money has been spent on weather modification research without important practical results or signs of an approaching breakthrough. The states in the Colorado Basin area have exploited the last water sources available to them now, and the advocates of the new program believe that there are sound scientific reasons for gambling on finding a shortcut.

Among at least some of these advocates, it should be noted, there is also a feeling that research scientists—one salty veteran staff member called them "the Cosmos Club crowd"—are more interested in producing more scientific papers, while the senators are interested in producing more water.

Unfair as this may be, it nonetheless reflects an attitude which lies beneath the surface of relations between Congress and the research establishment but may come into play when friction develops, as it has over weather modification.

Aware of the storm signals, NSF has a commisison on weather modification, composed half of scientists and half of members distinguished in other fields, to survey the broad aspects of weather modification—legal, economic, biological, and sociological as well as scientific. The commission will make recommendations on long-range policy to the agency. The Weather Bureau is seriously reappraising its stand on weather modification. And the NAS panel hopes, next summer, to follow up its final report with an educational effort designed to make the status and prospects of weather modification research more widely understood.

While it should not be exaggerated, the current split on weather modification falls into the area of the problem of science advice for Congress. It represents, not a breakdown, but, rather, evidence that no adequate conduit between Congress and the community represented by the Academy and NSF has ever been soundly established.

—JOHN WALSH

Environmental Health Center: North Carolina Victorious in 4-Year Battle for PHS Facility

A 4-year political battle over the location of the proposed environmental health center ended last week, with an announcement that the functions of the long-sought Public Health Service facility are to be divided among three of the contending states, North Carolina, Ohio, and West Virginia.

The compromise solution grows out of congressional interference with the original PHS plan for a massive single center located in the Washington area. The center was to have taken the shadow environmental health units already

operating within the PHS and transform them into a single unit devoted to the study of such growing environmental problems as air and water pollution, the protection of the food and milk supply, and occupational and radiological hazards to health. As originally pictured, the center would have cost around $60 million and would have employed between 4000 and 5000 people.

Since the center was first proposed, however, Congress has been hostile to the PHS's contention that it had to be located in the Washington area. The PHS position was based chiefly on the argument that the new unit would have to work closely with other government agencies involved in environmental studies—the Food and Drug Administration, the Atomic Energy Commission, and several others. The PHS, supported by the conclusions of two separate advisory panels, argued that the necessary administrative liaison would be possible only if the center were in Washington, and it also alleged that Washington's cultural and scientific superiority would help attract top-flight personnel to the new installation.

Congressional Hostility

Congress reacted to these arguments by belittling them, but mixed in with genuine disagreement that the Capitol is a scientific mecca were a host of political factors. Many representatives wanted the environmental health center for their own districts. But even those who had scant hope for themselves were sympathetic to the grumblings of their colleagues that "the East" was getting a disproportionate share of the government's research funds and that the center should be placed outside the Boston-Washington corridor.

The PHS fought its opponents doggedly for 3 years. As time passed, however, and the agency still failed to come up with a specific proposal for a Washington site, another charge—bureaucratic muddleheadedness—was also brought against it. Within the executive branch formerly submerged doubts began to surface, and Kennedy, who had specifically asked congressional approval of a Washington site in his 1963 health message, let it be known that he was casting a more favorable eye on the energetic representations of his friend Governor Terry Sanford of North Carolina.

It was Congress, finally, that put an end to the struggle last fall by authorizing construction of the health center but stipulating that it be located more than 50 miles from Washington, D.C. The unusual proviso grew out of a difference between the House Appropriations Committee, which had disallowed the request altogether, and the Senate Committee, which had finally approved the PHS-favored site in Beltsville, Maryland.

The prohibition of a Washington site had two consequences: it reopened the entire site question and reactivated the occasionally flagging lobbyists from several states; and it forced the PHS to redefine and modify its conception of the center. The PHS established a site selection group that studied 41 potential locations, weighing them against several criteria. The most important, according to a PHS spokesman, were proximity to academic resources, the availability of at least 400 contiguous acres, existence of a community that would be attractive to the type of scientific and technical personnel the center would need to attract, and sufficient proximity to Washington for round-trip visits to be made easily in a single day.

Using these criteria, the PHS selection committee arrived at a decision happily compatible with the political omens—North Carolina. The major portion of the new facility—and the one that bears the closest likeness to original proposals for the center—will be located on land donated by the state in its Research Triangle, an industrial complex bounded by the University of North Carolina, North Carolina State College, and Duke University.

The new facility will be known as the National Center for Environmental Sciences and will conduct basic research on a variety of environmental health problems. Partly because of its distance from Washington, however, and partly because of the general attrition that accompanied 4 years of disagreement, the center will be on not nearly so grand a scale as was originally planned. Instead of the 5000 people proposed in 1961 or the 1600 proposed as recently as 5 months ago, the new center will house about 1000 people, chiefly in research. Administrative and supporting work will continue to be done in Washington. Costs have been similarly scaled down, with the present estimate at about $25 million.

About the remaining components of last week's compromise so little is known—even within the Public Health Service—that the suspicion is great that they were last-minute brainstorms, with more than a little political overtone. The simplest is the plan for Ohio, which consists solely of proposed construction of a new building to house the functions of the Taft Sanitary Engineering Center, some of which are now scattered about the city of Cincinnati. The Public Health Service will try to encourage the distinction between applied research, which will continue to be done in Ohio, and basic research, which will be the function of the new unit in North Carolina.

The most unexpected feature of the PHS's plans is its intention to build a small, highly specialized research facility in West Virginia. West Virginia is part of the area known as Appalachia, which has been the object of great government solicitousness in recent years, and PHS officials say their plans are part of a general government campaign to "do all we can" for the troubled region. (They neglected to say that it is also the home of Democratic Senator Robert Byrd, a key member of the Senate Appropriations Committee, who was long one of the most determined opponents of the agency's plans to locate the health center in Washington.) The West Virginia center will consist of "upwards of 200 persons" who will devote themselves to environmental health problems that stem from the particular industrial character and economic and social condition of the area." These problems, Secretary of Health, Education, and Welfare Anthony Celebrezze said last week, "include acid mine drainage, resulting in water pollution, and the burning of waste piles, resulting in air pollution, and occupational diseases associated with the mining industry." As of now, the specific site has not been chosen, and it is not yet known when funds for either the Ohio or the Appalachian facility will be requested.—ELINOR LANGER

Announcements

The National Science Foundation has announced opportunities for U.S. scientists to participate in the Antarctic expeditions of foreign countries as exchange scientists from the **U.S. Antarctic Research Program**. Nations with Antarctic programs are Argentina, Australia, Chile, France, New Zealand, the Republic of South Africa, the United Kingdom, and the U.S.S.R. Fields of research include atmospheric physics,