State Scientific Advisers: The Effort in Michigan

In December, Governor William G. Milliken of Michigan will receive an 80-page report from his science adviser which presumably will recommend under what if any conditions the state should go along with proposed federal exploratory drilling efforts to find burial sites for nuclear wastes in northern Michigan salt deposits.

The adviser, William C. Taylor, who divides his time between his state duties and his job as the chairman of the civil engineering department at Michigan State University, is chairman of the ad hoc committee that has been studying the issue of nuclear waste disposal. He also chaired the ad hoc panel that advised Milliken about the Navy's controversial "Seafarer" project to build an immensely powerful radio antenna system on the Upper Peninsula. Further, he currently heads a budding science advisory committee that may soon be permanently established to advise the governor on a variety of scientific and technological issues ranging from such urgent questions as the one pertaining to nuclear wastes to such long-term issues as how to encourage greater economic diversification in a state now overwhelmingly dependent on the automobile industry. In sum, as science adviser, Taylor holds a position that is assuming increasing importance.

But, if "science advice" has now begun to come into its own in Michigan and a half-dozen or so other states (such as New York, Pennsylvania, and Hawaii), this is something relatively new. In fact, the National Science Foundation (NSF)—which has been supporting Taylor's work with study and demonstration grants amounting to $103,700 for the first two years of an anticipated 3-year funding period—has just received a congressional mandate to start a major new effort to have state government go beyond its past dalliance with science advice and really embrace it.

Nearly all states have, in years past, set up some kind of governor's science adviser or science advisory committee. But, in the great majority of cases, science advice has not been truly institutionalized and allowed to play a significant and continuing role at the statehouse. In the 1950's and 1960's, it tended to be looked on by the states as a means to help bring about the growth of the most desirable kind of new industry—for nearly every state, the fostering of another "Palo Alto" or "Route 128" complex of high-technology based enterprises was a much cherished dream. Only recently has science advice begun to be perceived by an increasing number of states as essential to coping with a wide variety of important near- and long-term economic and environmental issues, many of which are closely interrelated.

In September, Congress authorized NSF to spend $3,750,000 in fiscal year 1977 for studies, conferences, and demonstration projects directed chiefly at the institutionalization of science advice for the executive and legislative branches of state government. This would have meant almost a fourfold increase in NSF spending for this purpose, except that a shortfall in NSF's actual appropriations will make this impossible.

In fact, it seems not unlikely that the agency will, for this fiscal year, focus largely on holding a series of regional and national meetings at which state science advisers and others would discuss where the various states now stand in this matter of generating and using science advice. Then, with the information as to the state of the art well in hand, NSF could—given the necessary appropriations—provide for the kind of study and demonstration activities Congress has contemplated.

Developing science advisory mechanisms for state government is such a young art that no one presumes to know how best to go about it. Yet, by taking a look at what is being done in Michigan, one can get a sense of some of the problems and possibilities involved.

Taylor was named Governor Milliken's science adviser in 1972, but for several years this role was little more than nominal. In 1975, however, an NSF demonstration grant, administered under the Research Applied to National Needs (RANN) program, made it possible for Taylor to give half his time to the job and to have a full-time assistant, Craig Nern, who holds a master's degree in science policy from Wayne State University.

From NSF's standpoint, there was one particularly promising aspect to the science advisory mechanism taking shape in Lansing. Taylor, who had been associated with Governor Milliken ever since 1967 when he joined his staff as a transportation specialist, had been made a full-fledged member of the Governor's Program Council, an important body made up of several department heads, the state budget director, and several other important officials. Thus, his chance to have a voice in policy formulation at an early stage would be far better than that of most state science advisers.

Fortuitously, Taylor was assuming this role just as Michigan was about to be visited by an extraordinary set of disturbing issues. The Seafarer issue, which comes down to whether creating an intense electrical field over a large area of the Upper Peninsula could do environmental harm or jeopardize public health, had been simmering for some time but was still unresolved. An entirely new question, which first came to light in 1975, was whether *any* residues of the chemical contaminant PBB (polybromobiphenyl) could be safely allowed in livestock or animal products. After PBB was accidentally mixed into a feed supplement, some 30,000 cows had had to be destroyed, yet the number condemned would have been far greater still had it included all animals showing any trace of PBB. Then, this year, nuclear waste disposal became a public issue after it was reported that the Energy Research and Development Administration was considering test drilling in the northern part of the Lower Peninsula.

Taylor put together and chaired the ad hoc panels to study the Seafarer and nuclear waste disposal problems; along with some other state officials, he took part in the governor's appointment of a panel to study the question of what, if any, level of PBB residues could be tolerated.

In Washington recently for a RANN symposium, Taylor expressed the view that science advisers should not leave decision-makers confused by failing to recommend a clear course of action or to provide strong supporting arguments for the recommendations that they do make. He noted, for example, that Governor Milliken's PBB panel, while acknowledging that there was no direct evidence of toxic effects at the tolerance level of 300 parts per billion established by the Michigan Department of Agriculture and the

(Continued on page 972)

NEWS AND COMMENT

(Continued from page 923)

federal Food and Drug Administration (FDA), had nevertheless recommended that tolerances be reduced to 1 part per billion—the lowest detectable level.

"No matter which decision [the governor] made," Taylor added, "he was vulnerable to criticism from the opponents of that position, based on the report and recommendations of his advisory panel." In his view, science advisers should adopt "more of an advocacy position." As it turned out, Milliken followed the advisory panel's advice in recommending a drastic lowering of the tolerance level, but the FDA and the state agriculture department refused to change it.

In an interview with *Science*, Taylor said that an ad hoc panel is more likely to render useful advice if it is chaired by the governor's science adviser, as has been the case with the panels on Seafarer and nuclear wastes (but not with the one on PBB). The Seafarer panel could find no environmental reason why the state should oppose the project out of hand. Accordingly, no final state decision will be made until a final environmental impact statement has been prepared, a National Academy of Sciences report has been completed, and a regional referendum has been held. Milliken has said that his decision whether to oppose the project will be determined by the results of the referendum—a political commitment Taylor now regards as unfortunate.

Since late last winter, Taylor has presided over four meetings of a group of 10 to 20 people—top research administrators and medical and business school deans from Michigan's major public universities—which may eventually be formally ordained by the governor as his science advisory committee. The committee might play a triple role: validating the competence of the persons to be selected for ad hoc panels, reviewing or commenting on reports from such panels, and advising the governor on long-term problems.

In its initial meetings, this group has tried to identify several problems that can be addressed in a "proactive" (as opposed to a "reactive") mode. As a result, the Environmental Research Institute of Michigan is taking the lead in preparing a proposal for ERDA to support a project whereby electricity could be generated as a by-product of steam produced to heat a complex of new state buildings outside Lansing. Also, plans are being made for a number of public and private health agencies to investigate the reason for the varying incidence of cancer among Michigan counties. The committee also hopes to define useful inquiries bearing on the problems of economic diversification and of farm production in an era of increasing energy scarcity.

However promising, the Michigan experience cannot yet be said to conclusively demonstrate the value of science advice. "Like a lot of things, it has not been flexed enough to show how useful it will be," says John Cantlon, vice president for research at Michigan State University and a member of the science advisory committee. Nevertheless, lessons learned in Michigan and a small number of other states may figure importantly in the next few years, as state governments across the nation, with NSF's help, try to overcome the present absence of institutionalized science advice at the statehouse.

—LUTHER J. CARTER

RECENT DEATHS

Ada H. Arlitt, 86; professor emeritus of child care and training and psychology, University of Cincinnati; 13 September.

Merriss Cornell, 64; professor of social work, Ohio State University; 17 April.

Savino A. D'Angelo, 66; professor of histology and embryology, Jefferson Medical College, Thomas Jefferson University; 18 August.

Walter J. Gale, 62; former president, Pembroke State University; 9 September.

Martin E. Hanke, 78; professor emeritus of biochemistry, University of Chicago; 18 September.

Mordecai W. Johnson, 86; former president, Howard University; 10 September.

Alexander Joseph, 69; former chairman of science and mathematics, John Jay College, City University of New York; 3 September.

Walter Riese, 86; associate professor emeritus of neurology, psychiatry, and the history of medicine, Medical College of Virginia; 9 September.

Leopold Ruzicka, 89; retired professor of organic chemistry, Federal Institute of Technology, Zurich; 26 September.

William M. Sweeney, 55; director of medical research, Lederle Laboratories, American Cyanimid Company; 6 September.

Moddie D. Taylor, 64; former chairman of chemistry, Howard University; 15 September.