Needs and Trends in Congressional Decision-Making

Charles A. Mosher

My job in Washington is to try to represent more than a half million Americans who live and work in a rapidly crowding, highly industrialized, and diversified, politically confused area on the shores of Lake Erie. Part of my job is to be actively accessible to those half-million people, to listen well to their suggestions, advice, and criticism.

And I suppose it is typical of the optimistic, affirmative, American "can-do" spirit that some of those people actually are saying to me, "Congressman, now that we can put a man on the moon and return him safely, why shouldn't we be able someday to put a man into Lake Erie and bring him back safely?"

But I also am getting letters from a lot of people who are not so optimistic, not so affirmative, who in fact express a very discouraged, cynical, or antagonistic attitude toward science and technology. If I must choose between those who today indict and fear technology, or those who still with some naiveté believe scientists and engineers can solve almost any problem, I will join the latter group. But I hope most of us understand why it is relatively easy for scientists and engineers to send men to the moon while, at the same time, achieving so little success as yet in applying their talents to man's more complex problems here on Earth.

Assessing the Community Problem

Perhaps Lake Erie is as good an example as any, to demonstrate the complexities in solving any such major public problem. I frequently get letters which demand, "Why don't you do something about our lake?" There is implied a naive assumption that in Washington we could, if we only would, do something, or just vote something that would cure the lake's pollution and eutrophication with the greatest of ease and almost overnight, so that lots of good fishing and good swimming could be enjoyed maybe by next spring. There also is sometimes implied that we politicians are either grossly negligent or under the thumb of some sinister selfish interest because we have failed to do that something to save the lake.

It is difficult to explain that the causes of Lake Erie's degradation are many; that they have been multiplying over generations and decades and are continuing to multiply; that to reverse the degradation process will at best require many years of organized effort, certainly billions of dollars in higher taxes and higher prices, plus severe legal restrictions and penalties, plus some social and economic disruption; and that in fact we as yet really don't know how, don't have an adequate technology to attack some aspects of the lake's problems. Nor is there much assurance that we can successfully mobilize and synchronize the almost unprecedented complexity of political jurisdictions—international, federal, state, and local—required to make a total effort to clean up the lake.

Yes, federal and state funds in small amounts (far from enough) are paying for some of the needed research. And increasingly immense funding from Washington will help subsidize construction of modern sewer disposal systems in almost any community where the necessary local matching support can also be voted. New, more forceful restrictions are beginning to tighten on industry, shipping, and the U.S. Corps of Engineers, in order to end polluting practices.

As yet there is no assurance that we will do enough to save Lake Erie. In that we are competing with other urgent public priorities, it is extremely difficult to obtain the needed research and development funds. That fact was emphasized when the Environmental Protection Agency (EPA) was denied $141.3 million for its 1973 budget request, monies earmarked to begin the necessary planning and preparation for a special, concentrated clean-up program for the Great Lakes. The Office of Management and Budget (OMB) refused to approve that EPA request and postponed it indefinitely "for further consideration," although there is a strong probability Congress would have approved it. We in Congress still could approve it, on our own initiative, but I doubt that we will in this session. And even if we did vote the needed appropriations, there is the probability that the OMB would persist in its priorities and would persuade the President to order a "freeze" on those funds, and would refuse to spend them.

I have outlined roughly the Lake Erie problems, only as an example, to make the point that essentially these same frustrations—severe budget constraints, jurisdictional fragmentation and rivalries, fickle popular and official support when the tax costs or price costs and required sacrifices become known—are likely to plague and impede severely the political decision-making that will be required to support nearly all of the public problem-solving efforts you will be discussing in this conference. It is political decisions which necessarily will precede, largely control, and often frustrate the technological efforts (which also are difficult) required to solve today's public problems.

Position of the Technologist

Earlier, I referred to the many good citizens and popular leaders who today seem very cynical, or at least very skeptical and suspicious concerning science and technology. There is considerable confusion and debate whether scientists and engineers are friend or enemy.

Although I am no historian, I do remember vividly the popular disillusionment and cynicism concerning the business community and our American

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capitalistic, entrepreneur system, which followed the stock market crash of 1929 and persisted during the depression of the 1930's. And I believe I am correct that it was the quite revolutionary Securities Act of 1933, which created the Securities and Exchange Commission and required full disclosure in any corporate stock prospectus of all facts and information necessary for a prudent and intelligent citizen to make an informal investment decision. I believe it was that 1933 act which did much to restore credibility and public confidence in the vital function of raising capital for business enterprise.

So, today I suggest there is a somewhat analogous need in the realm of science and technology. There is a widespread, virulent skepticism which very vocally confronts applied science and the technological entrepreneur. There are insistent doubts as to whether society is in control of technology or vice versa. There is an insistent need for definitive action that will earn renewed popular understanding and confidence in scientists, engineers, and their works.

Effort of Congress

We in the Congress have felt these doubts and these demands for greater credibility, as we consider national policy decisions that will largely determine the uses of science and technology. In response, we have been groping for more effective handles on the machinery of federal support and for direction of our research and development resources.

In our congressional efforts to improve the quality and credibility of government decisions, we are demanding better, more adequate, and more significant information. This places new burdens of responsibility on all parties involved in the decision-making process, including industry and other elements in the private sector of our society. That is one reason I mentioned the Securities Act of 1933. The added burden of full disclosure of information required by that act certainly was more than offset by the restored confidence of investors. Similarly, I suggest that the added burden of requirements for better information in advance of new technology ventures will be offset by greater public understanding and acceptance—including, in the case of industry, greater consumer confidence and increased willingness to pay for the new goods and services.

The remainder of my remarks here today will consist of a sort of "laundry list" of 13 items, a baker's dozen, which indicate a significant mood now in Washington, a many-faceted search for better information with which to make better decisions. (I do not pretend this is a complete list of the available examples. Nor are these listed in rank of importance. And I describe each item only briefly, superficially. These are only hints as to what's going on in Washington, in order to provoke your greater interest and possibly further investigation and better understanding.)

1) Within the legislative branch we have been increasing the number and quality of trained staff for our committees; and also increasingly we are developing new ad hoc arrangements to borrow or buy special expertise when needed—for example, contracting for special studies and reports from the National Academy of Sciences or the National Academy of Engineering.

2) The Legislative Reorganization Act of 1970 strengthened the Congressional Research Service in the Library of Congress, in its ability to do policy analysis and the assessment of alternative legislative approaches to complex public issues; and increasingly these new research services are being used by the Congress. The library's Science Policy Research Division and the Environmental Policy Division now comprise 60 professionally trained people.

3) The National Environmental Policy Act of 1969 was, in effect, a congressionally initiated environmental full-disclosure law. I assume most of you are familiar with its somewhat controversial requirement for "environmental impact statements" from every agency of the federal government in advance of almost every proposed new action.

4) Last year, the House-Senate Conference Committee on the 1972 appropriations for the EPA wrote the following significant instructions and mandate into its report:

> The conferees believe it most important that the various agencies of Government and the Congress, in the reviewing and appraisal of Federal Government programs, projects and activities, have full information available not only as to the impact upon the environment *but also the significant economic impact on the public and the affected areas and industries.*
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> The conferees, therefore, direct that, in addition to the environmental effects of an action, all required reports from departments, agencies, or persons shall also include information, as prepared by the agency having responsibility for administration of the program, project, or activity involved, on the effect on the economy, including employment, unemployment, and other economic impacts.

Obviously, these new requirements for the impact statements represent a sharp congressional reaction to the feared consequences of overzealous or emotional environmentalism—reaction to the possibility of unwarranted strictures on economic growth, regional development, or full employment.

5) The Senate Public Works Committee (which traditionally has been an *un*critical advocate of all engineering technology) this year has used an authorization bill to require both the Federal Highways Administration and the Corps of Engineers to promulgate specific guidelines which shall apply to all future highways and rivers and harbors projects, and which shall be designed to insure against air, noise, and water pollution, destruction or disruption of man-made and natural resources, esthetic values, community cohesion, adverse employment effects, tax and property value losses, and several other specifically listed evils.

6) Senator James Buckley has inserted wording in the Senate's 1972 Water Quality Act (which I remind you is still being considered in a House-Senate conference committee), and also in the National Environmental Centers Act (which the House has not yet considered) which, if finally voted into law, would direct the Administration to:

> . . . initiate, and promote the coordination and acceleration of research designed to develop *the most effective practicable tools and techniques for measuring the social costs and benefits of activities* which are subject to regulation under this Act; and shall transmit a report on the results of such research to the Congress not later than April 1, 1974.

7) In 1965–1968, our subcommittee on research and development reviewed the charter and operations of the National Science Foundation (NSF) and recommended several changes that were enacted into law. One change was the insertion in NSF's charter, for the first time, of specific authorization for research in the social sciences. Previously, that authorization had been only tacit, with NSF rather nervous about it. Also then for the first time the Congress spe-

cifically authorized the foundation to branch out into applied research; but both the House and Senate committees in their official reports on that 1968 legislation specifically warned NSF that this new authorization must be used carefully and sparingly and must demonstrate that its proposals for applied research do not duplicate work being done elsewhere.

In addition, those 1968 charter changes gave NSF for the first time the authority to contract with private, for-profit organizations to do applied research, but only with the consent of the President in each case and only if the President officially found it to be needed in the public interest. Now, on 13 April of this year, the President has officially transferred to Guy Stever, the new director of NSF, that presidential authority to grant such permission. In effect, Stever has the President's proxy in such matters, as I understand it.

Those NSF charter changes signaled congressional support for broadening the emphasis in NSF's activities, which now is seen especially in its new division called RANN (Research Applied to National Needs). I have the impression that RANN's activities to date are largely confined to such areas as energy research and technology, disaster and natural hazard research, urban technology, technological opportunities (such as are found in new and better methodology or advanced instrumentation development), environmental systems and resources, and social systems and resources. Of course, these very general titles include research in a great variety of specific directions.

In our science committee report accompanying the NSF authorization bill this year, we inserted a cautionary note urging that NSF not be tempted to go too far too fast in its RANN programs, and insisting that NSF must not push applied research at the expense of its traditional emphasis on basic research and science education.

8) A somewhat similar broadening of emphasis is apparent in the National Aeronautics and Space Administration (NASA). Encouraged by vigorous urgings from our subcommittee on space science and applications, NASA has been restructured to create a new separate division, to emphasize and promote the applications of space technology to mundane needs, such as the earth resources satellites, better weather forecasting, and communications. (A basic claim for the reusable shuttle system is that it will be essential for these applications of space technology to Earth problems.)

9) For several years there has been much talk in our House subcommittee on science research and development (and I personally think it is talk that should turn to some authorizing action) about the wisdom of granting each of the big national laboratories—whether managed by NSF, NASA, Atomic Energy Commission, National Oceanic and Atmospheric Agency, National Bureau of Standards (NBS), Department of Defense, Department of Transportation, Department of Agriculture, Department of Interior, Department of Health, Education, and Welfare, or similar agencies—a greater degree of discretionary authority and encouragement to apply their talents and resources imaginatively and creatively to public problems outside their usual realms of responsibility. Most of these facilities tend to outlive their original missions, but they contain superb teams of scientists, engineers, and technicians who undoubtedly would welcome the stimulation of new opportunities and goals. In many cases it certainly would pay off in the national interest to give those existing teams new incentives, rather than hold them in status quo or break them up.

10) It is very significant that this year a President for the first time delivered to the Congress a special message on science and technology. In this message the President placed strong emphasis on the need for a much more vigorous, effective partnership between the federal government, private enterprise, the universities, research centers, state and local governments, in the stimulation and use of science and technology.

Prompted by the President's recommendations, the Congress is about to complete authorization and substantial appropriations for new programs in the NSF and the NBS, to fund controlled experiments seeking much better ways for the federal government to stimulate and support private, risk-capital investment for innovative research and development activities by industry, the universities, and independent research centers. These proposals recognize that as yet we really have not learned how best to promote those cooperative arrangements.

Similarly, the NSF has programs which I believe need a lot more muscle to stimulate and coordinate science and technology efforts in the state and local governments. Obviously, the separate states offer excellent opportunities for various prototype experiments testing alternative solutions to public problems, with federal and state sharing of the costs.

(Two very significant new reports on that general subject have been published within the last few days. One is in two volumes from the Council of State Governments and is entitled "Power to the States." The other is from a committee of the Federal Council for Science and Technology and is entitled "Public Technology—A Tool for Solving National Problems.")

11) Our subcommittee on research and development has in the past 2 years given considerable attention—as have also other congressional committees and several offices in the executive branch—to the crucial need for a more direct, purposeful use of research and development to beneficially expand our national economy, especially for the development of intensive technology products likely to increase our exports and improve our balance of trade position. Our national economy and well-being depend on our working vigorously to maintain America's preeminence in science and technology.

That goal implies not only the new cooperation between various levels of government and the private sector I previously mentioned, but also probably some changes in our patent laws, and probably careful consideration of modifying the antitrust laws, to provide opportunities and incentives for effective cooperation and combining within the private sector to support and share the results of innovative research and development, with the government's encouragement and blessing. We must develop faster, more efficient ways to transmit and share information, to facilitate the quicker, more effective utilization of new technologies; the traditional time lags can be shortened.

12) Another pertinent activity this past year in our committee is a very aggressive task force effort to assess all the existing research and development related to our energy crisis. We will publish, probably in December, what I hope will be a significant report, with recommendations, especially concerning the directions, levels, and timing of federal governments efforts to obtain new and improved sources of energy. I suspect that report will approve a continuing short-run emphasis on developing such sources as the breeder

reactors and coal gasification, but that it may also place a much greater emphasis for the long run on increased efforts to perfect fusion reactors and the use of solar energy, or some of the even more exotic possibilities for energy production. I am confident that it also will urge much greater attention to development of the more efficient, economical use (conservation) of energy and transmission of energy; and of course it will consider the intimately involved environmental problems.

Various aspects of the energy problem are being studied in several other congressional committees; it is today a deservedly fashionable subject on Capitol Hill. We must recognize that our traditional sources of energy have finite limits and are being too recklessly exhausted, to say nothing of the pollution they produce. Within 30 to 50 years, or sooner, we should have turned to the massive, economical use of such abundant energy sources as the hydrogen of the oceans and heat of the sun.

Just 3 weeks ago, Congressman George Miller, chairman of the House Science Committee, publicly stated his belief that research and development for solar energy is being neglected, and that the national interest cannot afford that neglect, cannot afford any assumption that solar energy is "too far out." Acting on that conviction, Miller now has invited the heads of NASA, NSF, NBS, and the Congressional Research Service, to join with our committee in thoroughly considering what must be done to give much greater thrust for solar energy research and development. That effort may begin in Washington within the next few weeks.

I can only mention other legislative efforts (i) to approve a national policy for orderly conversion to the metric system; (ii) to control ocean dumping; (iii) to create a national land use policy or a federal coastal zone management policy (or both); (iv) to create marine sanctuaries; and (v) to propose the consolidation of many scattered federal offices, bureaus, and agencies into an immense new Department of Natural Resources, superseding the Department of the Interior.

I believe it should be recognized here that, pending possible reorganization of the agencies dealing with natural resources, considerable jurisdictional rivalry exists between elements in the Interior Department, the Commerce Department, the EPA, the Corps of Engineers, and other agencies, as well as somewhat parallel rivalries between their congressional oversight committees.

Not to be overlooked is the considerable controversy over the unprecedented act by Congress in 1970 of legally establishing rigid deadline dates for pollution control devices to be installed by the motor car industry in all new cars; also established by the law is that the pollution control devices be certified to meet very low emission standards.

A somewhat similar controversy concerns two quite different water quality bills voted by the Senate and House, respectively, and now being considered in Conference Committee—whether a final rigid deadline date for pollution-free water shall now be set by law, or whether the National Academy of Sciences shall be commissioned to research that problem and report back in 2 years its recommendation for a perhaps later deadline date.

13) Finally, our Science Committee has produced, after 3 years of preliminary consideration, legislation to create as a new arm of the Congress, an Office of Technology Assessment, for the purpose of strengthening our competence in the making of science and technology policy decisions.

We are convinced that the Congress urgently needs its own independent capability for technology assessment, urgently needs better information, more accurate, comprehensive, significant information concerning the probable impacts of the many complex, sophisticated technology proposals we are asked to approve and fund.

Nearly every committee of the Congress is faced with decisions that are related to technology. We need much more adequate and accurate evidence and expert advice—concerning both the immediate impact of any proposal and its probable secondary and tertiary consequences, whether economic, social, or environmental.

Decision-Making by Congress

Many of the decisions we must make concern proposals from the federal executive agencies. The Congress is today seriously outmanned and outgunned by the expertise in the executive branch. That is an added reason for our need for a professional source of informational and advisory help that shall be solely responsible to the Congress.

The new office would have a relatively small, interdisciplinary staff—a carefully selected team knowledgeable in the sciences, technology, government, and public problems, and surely including some people successfully experienced in mobilizing and managing technical and public enterprises.

The Office of Technology Assessment (OTA) staff would not itself do the actual assessment studies and reports which the congressional committees request of them. The essential functions of the OTA staff will be only administrative. They will be expected to identify, recruit, and employ on an ad hoc contract basis the best available expert talent, wherever it may be found, to do the actual assessment studies and reports—undoubtedly different experts or groups in almost every case, depending on the peculiar nature of each proposal to be assessed. Estimates vary, but my own guess is that the OTA would begin with no more than 20 to 25 employees, and over a period of years might top out at between 60 and 100.

Obviously, the further development of an OTA would depend directly on the willingness of congressional committees to use its services. Congress itself shall determine how best to use the OTA, when to expand it, or to cut it off.

It also is essential to recognize that the OTA shall not in itself be a decision-making body. It is fundamental to the whole concept, that it shall not in any way usurp any of the intrinsic powers or functions of the Congress itself, but shall be solely advisory to the Congress, its functions being strictly neutral, to supply the Congress with much more comprehensive, objective, accurate, significant technical information and advice than is now available to us.

The OTA bill has strong bipartisan support, unanimous support in our committee, and it was approved by a wide margin in the House several weeks ago. It seems also to have strong bipartisan sponsorship in the Senate, but for various political reasons it is currently stalled in the Senate Rules Committee. We are pushing to break it loose. But there are some rather serious intramural rivalries concerning the nature and composition of the board that would control the OTA.

Technology assessment often has been referred to as an "early warning system." But I suggest it is important

not to conceive of it as essentially a defensive mechanism. Our OTA bill is intended neither to enshrine the negative, fearful view of technology, nor to study good ideas to death, in order to postpone action. We intend it to be a positive, creative, effective instrument for seeking and identifying greater opportunities in technology development, as well as giving advance warning of dangers, and for proposing alternatives.

That now completes my list of 13 items. I could list many more. But I hope these are sufficient for my purposes here today which are (i) to remind you of the nature and variety of congressional decisions which affect science and technology, and to indicate some of the current trends—not necessarily coherent—in those decisions; (ii) to reveal some of the intrinsic difficulties and weaknesses, such as jurisdictional fragmentation, which exist—and probably to some degree always will—in our decision-making process, and also to indicate our current efforts to improve the process; (iii) to impress upon you the crucial impact of government policy-making decisions in all the ventures you are met here to discuss (to a very large degree, decisions in the Congress and the federal bureaucracy will define and control the levels and directions of your research and development activities); and (iv) to invite all of you, to urge all of you to become better informed and more active participants in the political decision-making process.

Obviously, there is no such thing today as a fully organized, coherent, articulated national policy for science and technology. Personally, I doubt that there can be or should be, if much greater concentration of authority is required to formulate and administer such a policy.

We are making progress, but we can and should do a lot better. There is abundant room and a very real need in the political policy-making system for more participation by you business, academic, scientific, and engineering people who are here today. We politicians need your help. I do invite you—urge you—to become much more politically "concerned," "relevant," "activist"—in all the more positive, affirmative meanings of those somewhat hackneyed phrases.

I suggest that in the past, too often you have been much too shy, timid, or diffident, sometimes too disdainful.

NEWS AND COMMENT

Sickle Cell Anemia: The Route from Obscurity to Prominence

Have you ever heard of a disease known as sickle cell anemia? Most people have not. Yet sickle cell anemia is one of the more common and one of the most serious of all childhood diseases. . . . The lack of attention that has been given to this disease is truly a national disgrace. At least now, we hope more people know about this terrible disease. And we promise you this is definitely not the last you will hear of sickle cell anemia on this station.—LEONARD J. PATRICELLI, President, WTIC Television and Radio, Broadcast-Plaza, Inc., Hartford, Connecticut.

On 12 November 1970, Hartford television viewers who were tuned in to channel 3 heard about sickle cell anemia from station president Leonard J. Patricelli, who pronounced the name of the disease slowly and emphatically each time he used it so that no one would forget it. That night Patricelli delivered what would be the first of four prime-time editorials he would give as part of a major campaign by WTIC to do something about sickle cell anemia. He went on the air just before the "CBS Evening News" with Walter Cronkite. During the next few months, the station ran four documentaries on sickle cell disease as well—each in prime time. Before raising the sickle cell issue on the air, Patricelli talked to about a dozen black leaders in Hartford. "Three," he recalls, "were against our going ahead with this. They feared the stigma it might place on blacks. But the others felt it was time to get this disease out in the open."

"The response we got to that first editorial was overwhelming and convinced us to go ahead with a full-scale effort," says Patricelli, who assigned a couple of staff members to stay with the story. He had heard from viewers who wanted more information and from community leaders, who formed an advisory committee to guide the station with its shows and help develop proposals for action. Staff members Rufus Coes and Richard Ahles recall that Patricelli told them to do "whatever has to be done" to bring the issues before the public effectively. They worked from a virtually unlimited budget, produced the four shows, and, ultimately, spent "many, many thousands of dollars" to pay for the programs, convene a meeting of health professionals, and publish a variety of educational booklets, which explained the nature of sickle cell anemia and sickle cell trait.

Sickle cell anemia is a grim disease that affects an estimated 1 in every 500 black children born in the United States. Between 25,000 and 50,000 individuals in this country have the disease now. Another 2 million blacks carry the trait, or gene, for sickle cell anemia and could pass the disease on to their children if their mate also has the trait. Based on Mendelian laws, there is a one-in-four chance in every such pregnancy of producing a child with the disease.

Physicians who treat sickle cell families emphasize the difference between sickle cell anemia, the disease that kills many of its victims by the time they are 20 years old, the rest by age 40, and sickle cell trait. The latter is a benign, symptomless state; the former, a painful disease that arises from abnormal blood cells. Sickle hemoglobin cells, which differ from normal hemoglobin cells by the substitution of only two amino acids, have a shortened life span and are unable to transport oxygen as normal hemoglobin cells do. Distorted, sickle-shaped cells that cannot pass easily through small blood vessels create jam-ups that block vessels and prevent oxygen from reaching body tissues. When this happens, a painful sickle cell crisis ensues. Other symptoms of sickle cell anemia