Science and Technology Task Force Papers [1]

Folder Citation: Collection: Records of the 1976 Campaign Committee to Elect Jimmy Carter; Series: Noel Sterrett Subject File; Folder: Science and Technology Task Force Papers [1]; Container 93

To See Complete Finding Aid:

http://www.jimmycarterlibrary.gov/library/findingaids/Carter-Mondale%20Campaign_1976.pdf

This tends to be a local issue (where NASA facilities or contractors might be fearful of cutbacks). However, questions about space policies are often tests of a candidate's attitude toward big technology initiatives by government.

The attached paper, by President G. Low of R.P.I. - a former NASA executive - represents a "pro-NASA" point of view. Some others, however, favor an even more aggressive space commitment. Strong voices are urging support for a solar-emergy-from-space (relayed by microwaves) project, larger than Apollo was. Many others would willingly see NASA cut back to earth applications work and would kill NASA's main project - the shuttle.

Best political posture is: keep options open - acknowledge general value of space technology - support useful applications but avoid major commitments to multi-billion dollar projects - treat future of NASA as a matter for comprehensive reorganization of R & D agencies.

THE UNITED STATES SPACE PROGRAM

1. The Challenge and Opportunity

- The exploration of space appeals to the human drive for adventure and thirst for knowledge. It inspires our younger generations, and evokes the spirit of all people of all ages. It provides the spark for optimism about the future.

- The use of space has become indispensable in today's world. Communications and weather satellites provide essential services. Environmental and resources satellites are beginning to provide accurate reports on global earth and ocean resources and conditions. Accurate agricultural forecasts are just around the corner.

- Space technology is the pacesetter for other technological developments. Our economy is driven by productivity; productivity is tied directly to technological advances; and space technology is at the cutting edge of all technology.

- Space projects provide opportunities for international policy initiatives. Options exist for cooperation or for competition with advanced or developing nations.

- Space projects demand an advanced and innovative aerospace industry -- an industry essential to our national defense. In time of peace, space projects can help maintain the readiness of that industry by involving it in productive civilian efforts.

2. Current Thrusts

- The civilian space program today is funded at a level of approximately $3.3 billion.* When inflation is taken into account, this

---

*The total NASA budget for FY 1977 is $3.7 billion. Of that amount $364 million is devoted to aeronautics; the remainder to space.

represents only about one-third the effort of the middle 1960's. These reductions have eroded U.S. space capabilities to a dangerously low level.

- The central core of today's program is the Space Shuttle. When the Shuttle becomes operational in the early 1980's (it will first fly in 1979), it will provide an economic, flexible launch service for all civilian (government and commercial) and military users in the U.S. and the Western World. It will open up broad new opportunities for the use of space as well as for exploration.

- Space communication services comprise two-thirds of the approximately 20 annual civilian launches in the present timeframe. U.S. communication services are generally limited to communications between distant points served by large antennas, with the subsequent distribution being ground based. Japan and other nations are developing "broadcast satellites" for direct communications and information services between industrial plants, educational institutions, hospitals, and health service activities, and even for home use.

- Experimental earth resources satellites show high promise in areas such as global crop forecasts, mineral exploration, land use planning, water management, etc. No decisions concerning the deployment of operational resources satellites have yet been reached.

- Space exploration is continuing to focus on the search for knowledge about our nearby planets (Venus and Mars), a cursory understanding of some of the outer planets (Jupiter and Saturn), and a fundamental study of the high energy processes which were recently discovered in the universe. However, there is insufficient effort in any of these areas for comprehensive work.

3. Future Opportunities

- Space Communications. With the rapidly expanding need for communications and information services (commercial, industrial, health and educational), advanced space communications techniques could and should play a major role. There is every indication today that the U.S. industry will lose its leadership role in this field to foreign industries unless an imaginative U. S. program is started almost immediately.

- Global Information Systems. It is now possible to put in place a resources information system which could provide frequent accurate information about food, energy, climate, and the environment on a global basis. The economic benefits would be enormous.

- Space Exploration. The opportunities here are unlimited; Sample returns from Mars; probes into the atmospheres of Jupiter or Saturn; the search for life on Saturn's moons; telescopes in space to let us see more distant faint objects, to begin to understand the high energy processes which have recently been discovered in the universe, and perhaps even to revise our concepts of physics. Fundamental questions about the origin and evolution of the universe, about its dynamic processes, about life elsewhere and its relationship to life on Earth need to be answered. Only a well integrated program in space exploration can provide these answers.

- Space Utilization. Ultimately there will be factories in space. Experiments have been conducted (in space and on the ground) which show promise that new materials for electronic devices, ultra pure pharmaceuticals, and even new high temperature alloys for energy-efficient turbo-machinery could all be manufactured in the weightless environment of space. Some studies have even shown that eventually it may be economically feasible to collect solar energy in space, and then beam it down to Earth via microwaves to meet a portion of our energy needs.

Although many of these uses of space are still some time in the future, the opportunity to build toward them, to test and to experiment, is now. The central element here would be a permanent manned orbital platform to serve as a core for experimental laboratories, to service commercial enterprises, and to be the construction base for the assembly of the very large orbital structures needed for future information and communications systems.

4. Conclusions

The U. S. space program peaked in the 1960's, and since then has declined to a minimum viable level.

Opportunities exist now to build on the remaining base of capability to:

a. Provide new services from space
b. Start an exciting program of space exploration
c. Develop an orbital platform leading toward permanent human beneficial occupancy of space.

The benefits of such an effort would be economic and inspirational, while at the same time enhancing our international position.

The National Aeronautics and Space Administration has the capacity and the skill to undertake a dynamic space program of the kind envisioned in this paper. It has a demonstrated record of working in partnership with industry and delivering the "impossible" within cost and on schedule. Most important, NASA and the space program are unique in Government in that their objectives are focused squarely on the future.

GML/August 10, 1976

Not an issue the candidate should introduce, but can provide material for any possible answers from the floor at (for example) M.I.T., etc.

Briefing paper for Carter/Mondale Science Policy Task Force

by David Baltimore

Basic Research in Biology: Recombinant DNA

Basic research in biology is rapidly leading to a profound understanding of how biological systems work and how they can be manipulated. The issue to be faced is, in broad terms: Do we want the knowledge we can get from basic biological research? This question has numerous elements:

What good can come from the knowledge?

What harm can come as a result of the knowledge?

What harm can come from the process of securing the knowledge?

What yardstick allows one to balance the good against the harm?

How do you translate decisions about these issues into regulation?

Can you really prevent research, given the international capabilities--if not, should you focus on control of the application of knowledge rather than on its procurement?

Some of the facts and factors to be considered in making a judgement:

-The diseases medicine has so effectively eradicated or brought under control in the last hundred years are mainly infectious diseases caused by external agents like viruses and bacteria. Because these were the major killers of the young, we now have a population that faces mainly the diseases of older age. These diseases are not infectious but rather are cellular diseases, ones in which cells malfunction. Examples are cancer, heart disease and arthritis. These also affect younger people and some cellular diseases like lupus often affect younger people.

To deal with these diseases we need more knowledge of how cells function. Modern biology, left free of regulation, can provide the knowledge to understand the diseases; whether cures or preventative measures will result is unpredictable but very likely. Without the new knowledge, however, it is hard to see how the toll from these diseases can be dramatically reduced.

-The latest tool of molecular biology is "recombinant DNA." In a sentence this is a technique that allows us to isolate individual genes from any organism and grow these genes as part of bacteria. The technique removes the greatest stumbling block in the way of applying the sophisticated tools of molecular biology to the problems of people. The problem had been one of the sheer size and complexity of the information bank that makes people develop and function. Recombinant DNA methods are like a molecular microscope that can focus in on one gene at a time and let us understand what it does and how it is regulated. With this tool, major theoretical and practical advances can be confidently predicted over the next decade or two. Not the least of these is new ways to manufacture compounds that are badly needed for therapy of certain diseases. Such substances as insulin, growth hormone and specific antibodies could be made. Another major benefit from recombinant DNA work will be the knowledge itself; our frontiers today are intellectual rather than physical and knowledge of ourselves is one of the most challenging of them.

-But there is a dangerous side to recombinant DNA. The new genes put into bacteria could, at least in theory, make a hazardous combination, one that could produce disease if it were to get out of the laboratory. The likelihood of such an event is hotly debated: some biologists think it is sure to happen; others feel that is is almost inconceivable. A series of conferences, hearings and committee deliberations led to the formulation of Federal guidelines which became NIH policy this summer. The guidelines require measures of precaution in doing recombinant DNA work that are more stringent than for any other form of research, even research with known hazardous organisms. Most biologists consider that the guidelines provide more than adequate safeguards but a vocal few continue to argue that no recombinant work should be done or it should be done only in a few special places where the highest security is maintained.

-There are many other areas of equally great concern. The ability to stigmatize people by learning that they have odd chromosomes; the potential ability to fertilize human embryos outside of the body and then reimplant them; the ability to control personalities through drugs and brain surgery; the use of fetuses in research.

Recommendations: There are no simple answers, we must balance benefit and risk. What we need is a general policy that will allow us

to reap benefits without suffering great damage. A solution often offered, "If a technology could conceivably be harmful, surpress it!", is a self-defeating response because we get no benefits. I think we should explicitly acknowledge our willingness to take risks. As individuals we have no problem--we are willing to drive our cars, to indulge in dangerous sports, etc. As a nation we have always been ready to push out into the unknown and we have gained our world leadership from that audacity. Why must our concern for social welfare completely stultify progress? What we need is a policy that acknowledges the need for caution and encourages continued progress. The NIH guidelines on recombinant DNA are just this: they ban many experiments and regulate most others but they do not completely block the application of this powerful methodology to biological problems and they provide avenues for continued reassessment of hazards and benefits.

Maybe the recombinant DNA issue provides an opportunity for a wider judgement about how to handle new technological advances with caution but without the irrational fears that can totally impede progress.

Nixon-Ford position: There is none. Not having any science advisor they could take no stand either helpful or harmful. The problem has been entirely in the hands of bureaucrats and the Congress.

Four issues are identified that will probably not be covered by the Defense Task Force. They have reviewed by Harold Brown, who is on both task forces.

These ideas help relate a positive attitude toward an appropriate defense to the alrger community of scientists and engineers.

Carter needs to avoid an adversary posture of defense versus civil, but get acceptance of defense activities as a necessary and acceptable part of American life. The wedge driven in by Nixon and Vietnam should be removed by Carter.

A separate task force is dealing with the substantive issues of arms control and national security strategies. From the general point of view of science policy several issues should be dealt with:

1) How can the defense agencies be brought back into contact with the scientific and intellectual institutions of America? In a democracy it is politically dangerous, financially burdensome and militarily risky to permit the military establishment to be estranged from the mainstream of the nation's intellectual life too long. A President with a new mandate can put the past behind us, and with his background in both technology and the military should be in an ideal position to heal these wounds. The scientific community has not forgotton the decisive role the Office of Naval Research performed after World War II in matching the navy's needs to the capability of our universities. Young people will understand that their fears of war can be lessened by insuring that the military leadership is making effective use of the research talent of the nation to bring in new ideas, to question and evaluate long range goals of national security to question the effectiveness of expensive, rigid weapons systems vulnerable to technological obsolesence.

2) What value can the research community be to the military in areas other than weapons development? In years past the extensive network of basic research support programs by defense agencies not only solved important scientific questions, but helped to stimulate new ideas and cooperation among the defense agencies themselves. Perhaps most valuable would be a broadening of public participation in research to define the goals of national security programs, indeed to clarify in the public mind the elements of national security, which goes well beyond defense preparedness.

3) What contribution can defense sponsored academic research make to the general development of U.S. technology and thus to the economy?

The notion that defense technologies have a measurably large "spin-off" through direct commercialization has been overdrawn (except for civil transport airframes of the past). However, when the services go about satisfying their own objectives in a cost-sensitive, technically clever way - and use a broad base of research institutions to lay down the basic technology -- the result can be to drive the state of the art of materials, engineering design, measurement techniques and technical information on which all industrial progress rests. The extent of stimulation of civil technology from military/space programs is a strong function of the way in which these programs are carried out. The simple spending of money on R and D in defense industry can well have a negative impact if proper policies are not followed.

4) Are there areas of national security technology that make a positive contribution to stabilization and thus to peace? Yes, there are. Aside from arms control research itself, the technology for non-intrusive technical intelligence has that effect. The rebuilding of public confidence in our intelligence services could be enhanced by insuring that they are properly supported by the best technical thinking to do the job of assessment of capabilities and intentions of potential enemies. Only in this way can we avoid the political pressure to accelerate the arms race by allowing for large margins of uncertainty in the magnitude of the enemy threat.

Foreign policy task force may cover most of the S and T issues, but several specific issues have been highly visible in the technical context.

These 4 items are intentionally sketchy to identify issues. More constructive briefings could be jointly prepared, working with Dick Gardner in New York if desired.

ISSUES:

a) Importance of scientific affairs in the Department of State. Historically, the state department has a major responsibility for government policy in scientific matters because of the naturally international character of natural events, and the importance of technology in trade, national security affairs, international development and the global problesm of environoment, population and food. Yet the bureau within State that must staff these questions has always been a step child. During the current administration, it has not even enjoyed stabile leadership. Governor Carter should ensure that his Secretary of State will strengthen the departments capabilities and seek outstanding leadership for them to ensure that the U.S. is correctly postured and has an effective presence in international scientific affairs.

b) Bilateral versus multilateral relationships. Reversal of the current administration's pattern of bilateral negotiations, which has tended to weaken the multilateral relationships with freendly nations has left us more isolated than necessary. U.S. leadership in science and the strong commitment of our scientific community to non-governmental international institutions such as the international scientific "unions" (discipline — professonial oriented associations to foster cooperation and information exchange) make such institutions a great asset, particularly as the U.N. agencies become more and more hopelessly embroiled in red-tape and politics. Another excellent example of a non-governmetnal multilateral institution is the Consultative Group for International Agricultural Research (CGIAR). It is the managing agent for the international complex of laboratories drivign the "green revolution". This mixed government/private multilateral institution is almost uniquely effective, is well suited to U.S. strengths and should

form the basis for U.S. initiatives in other fields, suchas energy.

c) Technology and trade. New policies must be developed to be sure that U.S. interests (employment, trade balance, future market opportunities) are properly protected in those trade areas where technology leadership is critical to success. Thus the many new forms of non-tarrif barriers to U.S. companies and the direct subsidies to R and D in foreign companies by their governments must be factored into GATT and other trade negotiations. U.S. companies also compete in a totally different anti-trust environment, for example, than Japanese competitors. But in the pursuit of these objectives we must guard against a temptation to erect barriers to the free flow of non-proprietary information and the movement of scientists.

d) Technical assistance to poor nations requesting our help. The need for a new initiative, divorced from the traditional notion of concessional "foreign aid", is needed to build bridges to the people of 3rd and 4th world contries desirous of a relationship with the U.S. The President should be careful to avoid a trap that has characterized many U.S. programs in the past: because our political strategy has sought to strengthen certain governments, we have supported the elites of those countries with our assistance programs. They often do not speak for the well being of the people. Where this is glaringly the case, we must have the self-restraint to decline participation. Where the country genuinely desires to seek help from the US, emphasis should be placed on building up indigenous capabilities.

Nixon-Ford record

Science and technology matters increasingly dominate in foreign affairs, but the Nixon - Ford administration has a sorry record of leadership. Some specifics:

a. The congress provided a new bureau in the state department to deal with fisheries, oceans and scientific affairs. Sec. Kissinger has indicated his lack of attention to the establishment of this office by the delays in making appointments to lead it, and the embarrassingly short time his appointees remained. Dixie-Lee Ray headed this office after leaving the AEC, and made it clear she felt she could not get the Secretary's attention and support. Other scientists have come and gone even faster. The search for a scientist to fill this post has met so much reluctance that finally it was filled by a career diplomat. With no office of Science and Technoloyg inthe White House, the U.S. has been bereft of adequately well placed governmental leadership to deal with science adn technology issues in foreign affairs.

b. Mr. Kissinger's preference for bilateral relationships, negotiated in secret - the secrets being kept from our own government agencies as well as the public - has tended to weaken the unity and effectiveness of leadership in scientific matters that the western alliance ahs traditionally enjoyed. Deep suspiscions have been building about our bilateral relations with the USSR, initiated by Nixon in May 1972, and today we seen increasing tendencies to scientific and technological protectionism in our relations with our allies and major trading partners. Kissinger frequently commits the U.S. to programs of technical coopeation - for example with the Saudi Arabians and in the major address in Africa - in which he commits an exchange of technology which involves private sector capabilities not necessarily available for this purpose . The agencies chosen to emplement agreements of this type are poorly funded and managed for such programs, and frustration of the foreign policy objectives of such hasty public initiatives is the inevitable result. Clearly we need a consistent long range policy governing the balancing of political, economic and technological interests.

c. The whole concept of "foreign aid" is politically bankkupt. The public has made clear its impatience with the mixture of military assistance, consessional capital aid and the shoring up of regimes whose opposition to communism cloaks reactionary and authoritarian policies most likely to bring communism. Yet Americans have always been eager to lend a helping hand when poor nations genuinely wanted our professional and technical advice and help rather than just our weapons or our money. A new concept in technical cooperation arrangements with poor countries is urgently nedded, one that mobilizes private institutions that have the needed talent, one that insists the receiving nation pay if it can and sets its own goals and internal commitments to achieving them. The only effort of this kind in the last four years was the proposal to create the International Development Institute. It died in 1970. Since then our relations with the 3rd and 4th worlds has been a pattern of increasing hostility.

TO: NOEL STERRET 1 of 23
(FROM SHEPHERD)

GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332

MELVIN KRANZBERG
CALLAWAY PROFESSOR OF
THE HISTORY OF TECHNOLOGY

September 9, 1976

Dr. Michael Michaelis
Arthur D. Little, Inc.
1735 I Street NW
Washington, D. C.

Dear Mike:

This is in quick response to your memorandum of August 30 asking for Carter/Ford debate material. I was going to write some comments in response to the Branscomb/Michaelis memorandum of August 20 -- but this debate obviously takes precedence. Besides, I see no need to write lengthy position papers (as requested in the August 20 memorandum) when so many of my ideas are already incorporated in the Branscomb's "Ten Issues in Science Policy." Why bother to repeat what he has already said so well?

Also, some of my ideas have already been incorporated in "Governor Carter's Response to the Questionnaire Submitted by 23 Engineering Organizations." (Incidentally, I think it was a remarkable feat to turn that questionnaire around within 48 hours and come out with a document which should win a number of votes for Carter in the engineering community, rather than losing them as the original version might have done.)

The following remarks, therefore, are neither exhaustive nor comprehensive. Why repeat what has already been said so well by Lew Branscomb or in Carter's response to the Engineers' Questionnaire? Hence, what I have to say below simply represents a series of what Marshall McLuhan would call "one-liners," which might help to distill or epitomize positions that have already been carefully thought out and expressed in other campaign materials.

First, I should point out that the preceding Republican administrations have not had a science policy. Instead, they have employed fiscal policy to deal with scientific and technical matters. Fiscal policy is no substitute for science policy; indeed, it bids fair to "kill the goose which laid the golden egg."

This fiscal policy has been founded upon a political philosophy of laissez-faire which no longer corresponds to the needs of today's highly complex, interdependent, and dynamic scientific-technological society. True, some areas of technology can flourish under conditions of free competition and without much in the way of government regulation, control, or even support. However, there are other areas of science and technology which the government

must foster because the necessary expenditures are too great to be borne by private enterprise, and because the public interests involved are too important to be left to the vagaries of the marketplace. The real "trick" of science policy is to determine just which areas require different kinds of treatment at differing stages of development -- because this is a dynamic process -- and to "fine tune" the government's science policy to provide the incentives and guidance which are necessary. This requires a very broad-guaged science policy and an alert and sensitive bureaucracy to carry it out.

The public should also be made aware that we have already a great deal of scientific knowledge and technical expertise available. The problem is to marshall these into the service of our national needs. The recent Republican administrations have failed to do so; they have abdicated their responsibility to stimulate scientific research and technological development, and they have neglected to develop new socio-political mechanisms to help guide technological advance in behalf of the common weal.

I do not think that Governor Carter need give specific policy statements for every one of the eleven items mentioned in your August 30 memo. In those cases where he already has worked out an answer, that would be fine. But in other cases, he might not know yet what exactly should be done in specific terms; in those cases, he should state that the methods of the Republican Administration have been ineffective or misguided (or both), that he is seeking for new approaches, and then lay down the general guidelines which he will apply in order to arrive at a more enlightened science policy.

Now to go quickly through the specific items listed in your August 30 memo.

(1) Stimulating U. S. Economic Growth -- Technological advance has fueled American progress for the past two centuries. American ingenuity has enabled us to bring more goods and services to ever-larger numbers of people more efficiently and economically.

Unfortunately, the current Republican policies have been restricted to fiscal and monetary policies as a stimulant to economic growth.

Yet, the key to economic growth lies not in financial manipulation -- although this may be necessary at times, as a tool to stimulate technical advance -- but in technological innovation itself.

If we look at America's outstanding industries today, both in terms of their contribution to American life and their economic importance, we find that all of them are based on major technological innovations. I select three example in which America excels; (1) automotive industry; (2) electronics; and (3) agriculture.

The automotive industry represents the American genius in the organization of mass production. Electronics displays the science-based nature of the American technological effort. Agriculture is a wonderful example of how a whole "package" of scientific and technical advances can come together to produce startling increases in the amount of food which is available to the American public -- and, through us, to the rest of the world.

A major element in the success of American agriculture is the close tie between the farmers and the agricultural experiment stations, through the medium of agricultural extension services. This linkup between the producer and the consumer of scientific and technical information is unique, and it might provide helpful guidelines for increasing the contribution of American science and technology to future economic growth.

Current science policy -- or lack thereof -- fails to link meaningfully the market (or the need) with our store of scientific knowledge and technical expertise. We already have a vast storehouse of scientific knowledge with more being produced daily, and we also have a high degree of managerial and technical competence. But the problem is how to link what we already know and can do with what we must do in order to stimulate the economy.

Republican efforts have been dismal and futile. The Experimental Technology Incentives Program, for example, has been starved and ineffective. Project Independence has displayed the futility of an advertising slogan which was not backed by a carefully thought out and multi-faceted scientific and technical approach for dealing with our energy needs in the future.

In the case of something like coal gasification, we already know about the chemistry involved, but we don't know how to apply our knowledge to achieve economies of scale. Here the government can work together with private industry to develop the technology and make it effective. My emphasis is on the application of existing scientific and technical knowledge to practical needs, with the further realization that there must be additional basic research in order to uncover new means and to provide for future needs. The "balanced" effort between basic research and technical

application, as stated in Branscomb's "Ten Issues" paper, would seem to be the way to go.

But the essential point I am trying tomake is that the federal government cannot always arrive at solutions to problems simply by "throwing money" at them. Instead, government can be most effective in providing the mechanisms for linking together knowledge and needs.

(2) Creating Jobs --An advancing science and technology creates new jobs. Whole new industries have been created; for example, the automotive and petroleum industries earlier in this century, and, more recently, electronics, synthetic fibers, and nuclear power.

When the Environmental Quality Control Act was under discussion, the charge was made that it would result in many factories going out of buiness and large-scale unemployment. The fact is that only a few paper mills went out of business -- and they were scheduled to be closed anyway because they were obsolete and no longer economically competitive -- and a whole new environmental industry has developed, bringing employment to thousands.

The same goes for automation. We have but to look at the mechanization of the textile industry in 18th-century Britain, which deprived hand spinners and hand weavers of their livelihood. But in the long run, many more people were employed in the mechanized spinning and weaving of textiles in England in 1850 than had been employed in the old handcraft process of textile manufacture a century earlier. By lowering the price of goods, mechanization increased consumption and actually increased the number of people employed in the textile industry. In addition, many more found employment in the auxiliary industries which were required to build and maintain the textiles machines, and in the processing of the increased amount of raw materials needed, and in the finishing and distribution of the mass-produced goods.

A dozen years ago there were dire prophecies of large-scale unemployment as a result of the automation of factories. Today's high level of unemployment is certainly not due to automation.

True, automation and mechanization can lead to short-range dislocations of people who are thrown out of jobs when automated machinery can perform the same work with less manpower. But we must make a distinction between short-range and long-range unem-

ployment, between cyclical and structural unemployment. Throughout history the introduction of new and better technology has always resulted ultimately in greater employment and greater opportunity. For short-range dislocations, that is, workers thrown off the job by the introduction of new labor-saving equipment, there should be government provision for retraining, relocating, and the like.

(3) Improving Social Well-being -- The great productivity of American technology has given us one of the highest standards of living in the world. The only other places which rival us, such as Sweden, are those which also have a highly advanced technological base. Even those who live at the so-called "poverty-line" in America have much more in the way of food, clothing, shelter, and creature comforts than the vast bulk of people throughout the world. (But, of course, that is no consolation to those living at or below the poverty level in our country, whose standard of comparison is their fellow citizens who have more than they have.)

Yet we should not always look to a "technological fix" in order to cure social ailments. Because of our past successes of science and technology, we tend to resort to such "technological fixes." But not all of our problems are caused by technology, nor can technology cure all of them. It is true that the solution to some of the problems created by technology is more and better technology -- take the case of the environment and ecological damage, for example -- but let us be realistic in our hopes and expectations for science and technology, not expecting them to cure all of our ills.

We have a recent example of an unsuccessful "technological fix" dealing with the crime problem. The Law Enforcement Agency was created and it has provided policemen with more sophisticated equipment for communication, for responding to emergencies, riot control, and the like -- but the number of crimes has continued to rise. Crime will probably not decline until something is done about some basic social ills -- for example, the vast unemployment among disadvantaged teenagers, which is one of the primary causes of social malaise and hence of much crime. To deal with such a complex phenomenon requires more than technological fixes; surely we need improvements in our criminal justice system and in our penal system, but we also need much more fundamental changes to get at the root causes. Technology might assist in better detection of criminals, but we cannot expect it to put an end to crime itself.

Another point. We already have lots of "unemployed technology" which could improve social well-being. Government science policy could help us define that technology and put it to use.

(4) Energy -- I am quite in agreement with the major points made by Governor Carter in his response to the Engineers' Questionnaire. About the only thing I can suggest here is that the public be made aware of the "tradeoffs" between energy advance and environmental control, between immediate inconveniences and future energy supplies. The hope is that the American public, when it understands the need for such "sacrifices," will be willing to make them. (N.B. They must be convinced that the sacrifices will eventually lead to some future benefit and that there will be equality of hardship and sacrifice.)

(5) Defense -- Lew Brancomb's "Ten Issues" paper is excellent on this point. I have nothing to add, except I do want to reinforce the notion that there should be constant movement back and forth of scientific and technical personnel from the military to the universities and to industrial laboratories. Only in that way will there be some basic questions asked.

(6) Education -- In answering Question 16 on the Engineers' Questionnaire, Governor Carter combined some general principles for support to education at various levels with a rather vague statement of the importance of science and engineering education because of eventual "economic payoffs."

More might be said about this, although I doubt if this would "grab" anybody as a burning campaign issue. My point is that we must educate non-scientists and non-engineers on the meaning, nature, and scope of science and technology, showing their potential as well as limitations. When, in a democratic system, we attempt to guide and direct our science and technology in order to serve our national goals and purposes, we must have an electorate that is somewhat knowledgeable about what science and technology can do and cannot do. Just as war is too important to be left to the generals, who view things very narrowly, so science and technology are too important to be left to scientists and technologists. They have achieved success in their respective fields by the process of reductionism, that is reducing problems to their simplest scientific and technical parameters. This works find if the solutions are for scientific and engineering problems, but we are talking here

about large-scale social and economic problems which have social and human components as well as scientific and technical ones. Hence the process of reductionism will not work. Instead, we must employ a systems approach. We must get the engineers and scientists to some understanding of the social and behavioral parameters of their work, while at the same time getting society to an understanding of the potentials and limitations of science and technology.

Only when the people are aware of the tradeoffs involved in making scientific and technical decisions will they be able to make enlightened decisions. The citizen can only make informed choices if he knows something about the social parameters of science and technology. But he need not be a scientist or engineer himself. After all, my wife drives a car without creating any accidents, even though she does not know how an internal-combustion engine works; yet she knows how to put on the brakes, the safe speed at which to operate it, and the safety parameters of its performance under different road and traffic conditions. Although we cannot make scientists and engineers out of the entire population (who would want to?), we can at least educate informed citizens who will help us guide and direct our science and technology to the fulfillment of our national goals.

(7) Health -- The problem here is only indirectly one of science and technology; again it is a question of linking existing knowledge and capabilities with the needs. After all, our medical specialists and our bioengineering are among the most advanced in the world, and can provide our people with the most nutritious diet known to modern health science. Our problems lie in the area of health care delivery, so as to make our medical knowledge and public health expertise available to the entire population of the United States. Social innovations are probably more needed than technological innovations in order to meet this problem. (Social innovations, like technological innovations, can fail or require more research and development before they succeed; look at Medicaid and Medicare.)

However, this should not deter us from applying resources to improve our scientific knowledge and practice of medicine, as well as the other sciences and technologies which make up the entire public health field. Sometimes technological fixes work. A few years ago, for example, there was a shortage of beds in mental hospitals; now, as a result of the introduction of tranquilizers and other chemotherapeutic treatments, many patients can live at home and function normally, so that many mental wards are being closed down because of a shortage of patients. Thus science policy

can have some effect as well as social policy. But there should be no campaign promises of cancer cures or the like. Instead, a fresh look must be taken of the health needs of the American people with new social innovations (or improvement of old ones) to be investigated to meet those needs.

(8) Transportation -- Carter's answer to Question 9 of the Engineers' Questionnaire repeats much of the standard liberal approach to urban transit systems during the past couple of decades. I remain unconvinced that mass transit is the answer to our urban transportation problem. The reason that I am unconvinced is that I think that the love affair between the American and his automobile has blossomed into a marriage which will not easily be dissolved. Strip away the automobile as a status symbol, a sex symbol, or what have you -- and the fact remains that the automobile provides the most convenient transportation to the individual today. Furthermore, we have organized our lives spatially -- suburbia, shopping centers, and the like -- so that there is no economic or effective substitute for the private automobile (without revolutionary changes in where and how we work, live, play -- and pray).

Furthermore, our limited experience with new mass transit systems indicate that they simply take riders away from other forms of public transportation, and do very little to rid the streets of the congestion caused by private automobiles. A few people might take public transportation rather than private cars, but we want it to be the other fellow, not us.

Once we realize that the American does not want to give up his automobile and will not do so except under strong compulsion, we can begin to take some realistic measures. Here I think a technological fix is called for. True, urban mass transit is one form of technological fix, but I do not think that it will resolve the problem. What would resolve it is a series of innovations in the automobile so that it will be more economical of fuel and material resources.

What should we do about traffic jams? In the past we have looked to technological fixes, such as building more freeways, which soon become even more congested than the congested streets that they were supposed to relieve. When the traffic conditions get so bad that people will find it quicker and easier to take a subway or a bus than to use their private automobiles, they might do so. Finally, I don't know of any society which has disappeared because of traffic congestion. They had it in ancient Rome -- all

roads led to Rome, and they met right in the center. The Romans issued many edicts in an effort to relieve congestion, but they never solved the problem. In medieval London, we find complaints about traffic congestion -- and in every major city throughout history. Maybe this is a problem to which there is no solution -- so why promise to do anything about it other than apply ameliorative measures. Do not promise the end of pollution, congestion, and safety problems. (I could show you editorials in Scientific American at the turn of the century which praised the automobile as a solution to the safety, congestion, and pollution probblems created by horse-drawn transportation!)

What about intercity transportation? I am unimpressed by the foreign examples which are constantly held up as an example. Yes, the Japanese have a great system of fast trains, and so do the Germans and the French. But as more and more people get private cars in those countries, they ride in their autos, not in the trains. The population density is different from ours and the like, so that these examples might not provide very much guidance to us.

On the other hand, we have a body of evidence that when Americans do not drive on the highways, they want to take planes. Who would have thought that one of the limits to air transportation nowadays is the availability of airspace surrounding our major airports? How about vertical and short-takeoff-and-landing planes (V/STOL) instead of trying to rehabilitate a railroad system which the public no longer seems to want?

In brief, we might take money from the Highway Trust Fund and while diverting some of it to urban mass transit, we should use part of it to develop interurban mass transit through inexpensive V-STOL air buses, in order to relieve the congestion at major airports and bring better service to thinly populated areas.

The point I am trying to make here is that technology should be in the service of human wants. In this case, the public wants individual transportation in the form of the automobile or very quick intercity transportation by airplane. When we support public mass transportation, we want the other people to take the subway or the bus, so that it will be easier for us to drive our cars through the less-congested streets! I must admit that I am baffled in the face of public insistence upon the right to drive one to a car in a traffic jam, bumper to bumper through smog, rather than take public transportation. But let us not try to change public attitudes!

(9) International Affairs -- In one sense this is a subset of the Defense category, but it is much more than that. We can utilize our scientific and technical prowess to develop a better and friendlier world, and we should certainly look at the scientific and technical components of our foreign aid programs as part of our foreign policy.

It is to our economic advantage to give technical assistance to foreign countries, especially those which share our democratic system. When these developing countries become modernized, they become competitors of ours, to be sure, but they also become our best customers. To test this position, we need merely look and see whether or not we do more business with industrially advanced countries or with underdeveloped nations. One can easily see that it is to our advantage to build up the production and wealth of the underdeveloped nations as quickly as possible so that they can become better trading partners for us.

In terms of international affairs, Governor Carter might be asked about policy toward the multinational corporations. These are looked upon with fear by developing nations, even though they are also invited in because these nations need the jobs and know-how which these corporations can provide. Perhaps Governor Carter already has a policy about multi-nationals or is developing one. My suggestions for such a policy are as follows: (1) Insofar as American law applies, they will be held to the same legal standards of fair competition in their overseas operations as in their domestic American operations; (2) the multinationals will be subject to the laws of their host countries, and the American Government will not endeavor to assist them in subverting or violating the conditions set down by the host nation; and (3) the American government will encourage and assist the multinationals to transfer scientific and technical expertise to developing nations.

Also, in terms of international affairs, I think that Governor Carter might come out for greater exchange of foreign students, with perhaps some government assistance for foreigners to pursue graduate studies in the United States -- and then return home! One can develop a lot of goodwill among foreign governing elites by this process with but a small expenditure of funds. Mike, I recently returned from a round-the-world tour. At a conference in the Soviet Union, I discovered that all the scholars from East Germany, Poland, Czechoslovakia, Bulgaria, and Hungary had done part of their graduate work in the Soviet Union -- and they were

ideologically "safe" from the Communist point of view. Then I went to Southeast Asia giving seminars on the transfer of technology to developing countries under the auspices of our State Department and USIA; many of the scientists and engineers with whom I talked in Indonesia, Singapore, Malaysia, Taiwan, HongKong, and the Philippines had done graduate work in the United States, and they were our friends.

(10) Federal Science Policy Organization -- As part of its swansong, the Ford administration has finally established a new Office of Science and Technology Policy. Guy Stever is a fine person, but as NSF Director, he has already shown himself to be ineffectual -- which is not all his fault. The new Carter administration can take this structure which has just been erected and, with only minor changes, make it into something vital.

Harvey Brooks has written on how science and technology have lagged behind our social needs, in contrast to the usual argument that science and technology are moving so fast that society cannot keep up with them. As individuals, we certainly accept new science and technology without difficulty; we easily incorporate in our lives anything which makes life pleasanter and easier, gives us more speed and power, and in general, enlarges our capabilities and pleasures. However, the institutions which direct and control our technology have not kept pace with the changes. They continue to follow economic policies derived from an era when resources were scarce and production was small. Neither government nor business understood the possibilities of an economy of abundance, nor have they responded to possible limitations of the future. The corporations can be excused for thinking in short-range terms of immediate profits. But someone must think in long-range terms, and that will have to be the government. The federal government must think in long-range solutions for energy and materials, for ecology and environment. Also the federal government should encourage state and local governments to think of science/technology policies.

In this connection, I should point out that the trend is toward democratic control of technology -- participatory technology, if you want to call it that. The new OSTP must have some opportunity for public input.

(11) Basic Research and Academic Sciences -- The usual argument for support of basic science is to demonstrate various

Finally, thank you for your part in helping to develop Carter's answers to the Engineers' Questionnaire. It is a much better document now than the one originally turned over to me by the Issues people. The input from professional engineers certainly helped in strengthening that document, which now becomes not only an effective campaign document, but also a blueprint for specific studies and actions to be taken when the Carter administration takes office.

Sincerely yours,

Mel

Melvin Kranzberg

MK:tm
cc: Dr. Lewis Branscomb
Mr. Carl Shepherd

8- Stewart 15 of 23

CASE WESTERN RESERVE UNIVERSITY · CLEVELAND, OHIO 44106

Case Institute of Technology

August 30, 1976

Carl W. Shepherd
2000 P. Street, N.W.
Washington, D. C. 20036

Dear Carl,

In response to your call I have assembled ten + issues which I feel are most important and relevant to societal needs involving science and technology and its administration. Since Gov. Carter seems to be coming under increasing attack for being a "big spender" it seems important to stress that emphasis should lie on effective management and economic benefits to be derived from science and technology, rather than new and expensive plans that may backfire. With exception of the first item, each of the ten is directed at national needs, both with regard to internal needs and international policy.

Issue One Planning-Science Advisory Council

The issues surrounding science and technology in the next decade or so are likely to be so complex that an effective National Science Advisory Council along the lines proposed by the National Academy of Science, is imperative.

Issue Two Science/Technology and Jobs

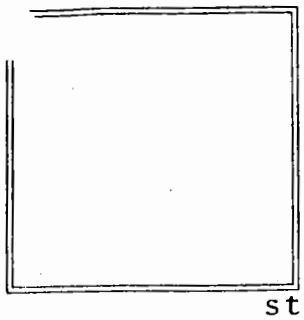
The majority of jobs in this country have been created by or modified by the advent of technological advances. (I have not had time to research figures but have heard quotes of 60-70% of jobs dependent on technology developed in the past twenty years). Thus it seems evident that development of new technology promotes consumerism and jobs. Most of the technological development springs from industry but in times of recession, research and development are often the first items out. This may lead to short term book balancing but in the long run slows technological advancement, enables foreign countries to make technological gains on U. S. and hurts employment.

Mechanism for stimulation of industrial research and development is needed, particularly in area of long term research. This item particularly true for small industries that find research a heavy financial burden. Suggest

School of Engineering
Department of Macromolecular Science

CASE WESTERN RESERVE UNIVERSITY · CLEVELAND, OHIO 44106

Case Institute of Technology



stimulation of academic/industrial collaboration in wide range of areas. (Note failure of RANN and patent problems later).

Issue Three Science/Technology and Energy

ERDA seems to have some of the traditional birth pains of new agencies suddenly flooded with money to get a job done i.e it has to develop a manpower pool, research and development programs etc. (Note education requirements later). As the agency becomes more mature we can expect to see progress on a broad front. The general impression seems to be that ERDA is heavily staffed by ex AEC and Bureau of Mines people who naturally promote nuclear energy and fossil fuels over other forms, particularly solar energy. Despite the heavy controversy in this area it does seem appropriate, in the short term to favor these two forms of energy production. Obviously nuclear pollution etc. are touchy issues but Gov. Carter's position seems very sound in this area.

As I have stated previously it would seem appropriate in the long term to preserve oil for materials purposes (plastics) and perhaps fossil fuel also, whilst concentrating on nuclear and solar energy. Since the internal combustion engine is going to be around for a while one is faced with the necessity for continuing trends to more efficient car engines. Figures show that even if public transportation attracts double its current ridership less than 1% fuel (gas) consumption saving will result. There really seems little alternative to allowing gas prices to increase unless energy saving engines can be legislated.

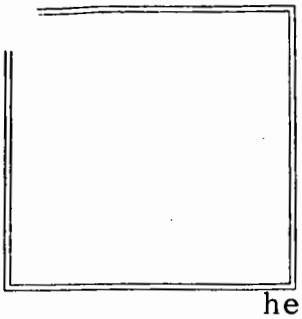
Issue Four Science/Technology in Medicine

1. Although research and technical developments are continually producing considerably improved health care, they also seem to be inducing cost increases. Medical technology is a bandwagon that many companies have jumped on (though it is now getting quite difficult to reap profits through methodology). Researchers might be encouraged to produce medical instrumentation which does the job more economically and is therefore more cost effective. (Several manufacturers are doing just that).

School of Engineering
Department of Macromolecular Science

CASE WESTERN RESERVE UNIVERSITY · CLEVELAND, OHIO 44106

Case Institute of Technology



he has left and, in some cases, the job market in this country.

(Incidentally the problem is not limited to foreign students coming here. In India and Yugoslavia, which I am particularly familiar with, graduates rarely can find a suitable job in industry because the industry is not sophisticated enough to handle them).

Ideally, U.S. educators might set up suitable programs in foreign countries (e.g. the Indian Institute of Technology system) supported by PL480 funds, in practice few staffing volunteers are available. Perhaps selected programs at a few Universities in this country would be useful.

The sale of technology is obviously a tricky area. My own view is that high technology products should be sold abroad but dispersal of high technology "know how" should be soft pedalled.

Issue Six Science/Technology and Environment

Whereas the E.P.A was met with enthusiasm at public and scientific levels, we seem to have been forced into retrenchment by energy crises and economic slump. Most of the technology money seems to have gone into bigger and better sewage plants rather than widespread monitoring and new technology. It seems imperative that the public be protected from such disasters as the "kepone" outrage. Some formal link with the F.D.A and biological toxicology practitioners is necessary to protect the public from dumping or escape of toxic materials. Afraid this will cost money but could come under auspices of an N.I.H agency.

Issue Seven Materials Planning and Conservation

Efforts should be made to follow up on the studies of the past few years on materials needs and planning. (Materials and Mans need-National Academy of Sciences). Mechanisms should be sought to catalyse industry into recycling materials where possible. Exponential consumption of materials (and everything else) cannot continue indefinitely.

School of Engineering
Department of Macromolecular Science

CASE WESTERN RESERVE UNIVERSITY · CLEVELAND, OHIO 44106

Case Institute of Technology

Issue Eight Space Technology

My personal view is that the space effort has been worthwhile for three reasons

1) It has helped national morale (like a national football team) when the country has been undergoing emotional trauma (Vietnam, Watergate etc.).
2) Tremendous public relations boost abroad.
3) Spin off of science and technology, communications systems being one example. Although miniaturization of computers, new materials (ceramics etc.) may well have been developed without a space program, the program itself catalysed rapid development of technology and jobs.
Some numbers-Midwest Res. Inst. Study-the $25 billion invested in NASA from 59-69 will result in $180 billion in technology sales by 1987.

Issue Nine Science and Technology in Education

Some national disillusionment with S & T because of apparent offshoot problems e.g pollution. Need now trained personnel to "clean up" and to solve energy problems. Over past years most government fellowships (NASA, NDEA, NIH,NSF) have been cut back or eliminated. If going to solve new generation of problems, need personnel trained in new areas. Colleges and Universities can be made to respond to national needs by national programs and fellowships.

Rather then give a tenth issue have listed possibilities below.

Identifiable problems concerning scientists not on issue list or issues not covered previously.

1. Genetic engineering-prominent because of recent articles, T.V. coverage etc. David Baltimore's approach of "Yes with care" seems appropriate.
2. Patent policies of govt. agencies
Many people feel that industry and academic institutions will not work together effectively until patent situation changed-needs looking into. (Quoted as one reason for downfall of RANN).

School of Engineering
Department of Macromolecular Science

CASE WESTERN RESERVE UNIVERSITY · CLEVELAND, OHIO 44106

Case Institute of Technology

3. Office of Science and Technology/Office of Technology Assessment
Impression-not too effective, see enclosed article. I am not knowledgable in this area.

4. National Science Foundation seen as shining light. Many scientists annoyed that Foundation, which is main supporter of fundamental research, continually has to justify achievements in applied terminology. Percentage of GNP going into fundamental research in this country is significnatly lower than in several others.
-yet country will need to maintain long range living standards, based in part on research. Assignment of funds with "hands off" policy sought by most scientists. N.S.F should have specific charter.

5. Science/Technology and Defense
Have no particular knowledge in this area but obviously important viz more expensive but potentially inappropriate developments.

6. Concern that planning committees should be neutral and not railroaded by private, industrial or biased groups.
-government policy should be to see that private interests do not win out-to the detriment of the people..

7. Science in Agriculture-detailed analysis in latest Scientific American.

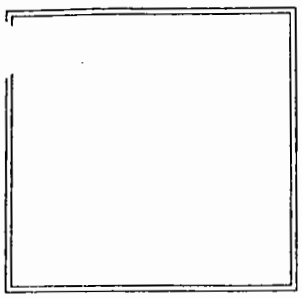
Facts and Figures

Midwest Research Institute Study (1970-71)
For every $1 invested in technology development there is approximately a $7 return in 18 years.

Chase Econometrics (1975)
An increase in 1 billion (1958) dollars per year in technology has the following effect
a) Increase in GNP by 2% by 1984
b) Lowers cost of living increase by 2%
c) Would cut unemployment by 1.1 million (4/10%)
Details of how these effects come about are available in their report.

School of Engineering
Department of Macromolecular Science

CASE WESTERN RESERVE UNIVERSITY • CLEVELAND, OHIO 44106



Case Institute of Technology

Hope the above, brief and unpenetrating as it is, is the sort of material you need.

Sincerely,

Alan G. Walton
Professor of Macromolecular Science

AGW/jl

P.S. "The aim and very purpose of all technology is to respond to human needs as defined in some way by society" (National Academy COSMAT Report).

School of Engineering
Department of Macromolecular Science

Congress' technology group rebuts criticism

Office of Technology Assessment releases status report defending its organization, performance, and administration

Congress' Office of Technology Assessment (OTA) has come up with a status report on its activities up to July 1976 that gives a rather detailed description of what the agency has been up to since its inception and takes more than a few pains to describe OTA's mission, organization, accounting, contract administration, and personnel practices. Although not billed as a response to criticism leveled at the agency by a House Commission on Information & Facilities report (C&EN, July 5, page 20), the OTA status report, in effect, is just that. In essence, the OTA status report says that overall the agency far more efficient, organized, and useful to Congress than the House commission report gave OTA credit for.

OTA's status report was prepared for the use of its Congressional Technology Assessment Board at the direction of the board's chairman, Rep. Olin E. Teague (D.-Tex.), who is also chairman of the House Science & Technology Committee. Indeed, a preface to the report by Teague goes strongly to the defense of OTA operations and effectively summarizes the thrust of the status report.

Among other things, Teague observes that "as a new institution, undertaking a unique enterprise within a dynamic and unpredictable political environment, OTA after two and a half years remains in a developmental and institutional building phase. Common sense and good reason would lead one to expect this to be the case." He goes on to observe that all of the reports produced by OTA so far have been used in the legislative deliberations of Congress.

Concerning criticism leveled at OTA's management arrangement by the House commission, Teague comments—although not directly responding to the House commission's report—that "management procedures developed and implemented by OTA, which have made possible the creditable performance record achieved thus far, are simple and readily understandable, and—as the published OTA products demonstrate—they have proved to be functional."

OTA's organizational effectiveness—another area criticized in the House commission report—has been demonstrated, Teague says, by OTA's ability to produce reports in conformance with fluctuating Congressional schedules, while maintaining the high level of staff morale noted in the House commission report.

Another area drawing criticism from the House commission was OTA's selection of personnel, personnel procedures, and acquisition of outside support resources such as contracting for out-of-house technology assessment efforts. To this point, Teague says that he has been informed and advised of the procedures, has reviewed them, and is "satisfied with the manner in which they have been carried out." And he believes they have been shown to be "both appropriate and effective in enabling OTA to apply the best possible resources to its mission-oriented goals. I am similarly satisfied with my review of OTA's accounting and contracting procedures."

Finally, although offering his comments as a personal summation of the state of affairs at OTA, Teague's summation is effectively one of the OTA status report. Rep. Teague says that he has concluded that the "simple, direct, and unbureaucratic approaches taken in the development of OTA's organizational structure have been appropriate and effective for the current stage of OTA's evolution. When measured against the objectives that have been set for the office in the statutory mandate of the Technology Assessment Act and in the policy directives set forward by the Technology Assessment Board, these procedures seem entirely suitable."

OTA director Emilio Q. Daddario tells C&EN that he doesn't have any comment on the House commission report. He adds that he discussed the House commission report with OTA board chairman Teague and that it was decided that rather than do a chapter and verse response to the House commission report, OTA would issue a status report on its operations. He notes that the House commission ceased gathering information for its report well over a year ago. Judging from the content of the OTA status report an OTA observer might well conclude that either a lot has changed since then or that the House commission investigators missed the point.

In any event, Daddario did comment to C&EN on two key criticisms of the House commission report: OTA's management organization and alleged strained relations between OTA and its outside advisory group. Concerning the management organization, Daddario says it's designed to be a "simple, unbureaucratic, not overly burdensome programatic structure" that OTA can deal with and that helps OTA meet the ebb and flow of Congressional demands where the time scales are very fluctuating. Concerning the alleged strained relations between OTA and its outside advisory group, Daddario indicates any such problems are part of institutional development. Resolving any problems there is going to take some effort over the course of time, he says. Daddario adds that it's his feeling that there are good signs, that the problem is working itself out, but that it's going to take more time.

Whether OTA's status report and the comments of Daddario and Teague resolve any questions raised by the House commission report in the collective mind of OTA's Congressional board remains to be seen. The board briefly examined the report at its July meeting, and no doubt will examine it in considerable detail at its September meeting. □

Teague: creditable performance record

Daddario: problem is working itself out

Congress moves rapidly on key bills as fall recess looms

With a final recess in October fast approaching, the 94th Congress is moving swiftly to clear its desks of many pieces of important legislation. It has completed action on most major fiscal 1977 appropriations bills, with only final funding levels for the Department of Defense still to be determined. The Senate has completed action on a major tax bill and passed for the first time legislation amending the 1970 Clean Air Act. And floor votes are pending in the House on its version of the Clean Air Act Amendments and on the toxic substances control act.

Chances for enactment of a toxic substances control bill dimmed last week when the Administration withdrew its support of the House version of the legislation, H.R. 14032. The Administration has quietly notified Republican members of the House Interstate & Foreign Commerce Committee, which acted on the legislation, that it now opposes passage of the bill. Among other things, the Administration feels that premarket notification of all chemicals as required under H.R. 14032 is just too cumbersome.

The Senate earlier this month passed, 78 to 13, its clean air bill and sent it to the House. Despite intense lobbying by the auto industry, the bill sets stricter limits on auto emissions for 1979 model year cars. Emissions of hydrocarbons will be limited to 0.41 gram per mile and carbon monoxide to 3.4 grams per mile. 90% of the 1979 model year cars must meet a nitrogen oxide standard of 2 grams per mile and 10% a standard of 1 gram per mile. Under the House bill, these same standards will apply to the 1980 model year.

In an unusual move Congress set final 1977 funding levels for the National Science Foundation before it completed work on the agency's fiscal 1977 authorization bill, which sets spending ceilings. Be that as it may, funding for NSF's research activities as set in the fiscal 1977 appropriations bill is $710 million. Funding for the agency's science education activities is set at $59 million. Funding for other federal R&D activities includes: $2.3 billion for the National Institutes of Health, with $815 million earmarked for the National Cancer Institute; $2.76 billion for the National Aeronautics & Space Administration; and $259.9 million for the Environmental Protection Agency. The Occupational Safety & Health Administration's $130.3 million budget includes $3.5 million for 178 additional compliance officers. However, none of OSHA's funds can be spent to issue citations for violations found by OSHA compliance officers during the first inspection of a workplace, unless the violations are willful or serious. Finally, the new White House Office of Science & Technology Policy gets $2.3 million for salaries and expenses.

After almost two solid months of debate and amendment the Senate on Aug. 5 managed to pass, 49 to 22, a massive tax bill that runs more than 2000 pages. The House passed a different version of H.R. 10612 last December. In the area of personal taxes both the Senate and the House just about do away with tax deductions for maintaining a home office, but do raise the minimum standard deduction, although to different levels. The House also voted to limit to two a year the number of overseas conventions that a taxpayer could claim as a business expense. The Senate rejected any such limit.

For businesses the Senate bill extends indefinitely the current 10% investment tax credit and makes permanent the current lower tax rate on the first $50,000 of corporate income. The House extended both only until 1980. Both versions of the bill also make some changes in the treatment of foreign-earned income of U.S. corporations. The Senate in a floor vote rejected a proposed tax credit for recyclers of used materials. But it did vote tax credits for weatherproofing of homes and businesses and for installation of solar and geothermal energy equipment. It also voted to encourage development of new energy processes, such as oil shale conversion and coal liquefaction and gasification, through a 12% investment tax credit.

Ling-yee Gibney, Janice R. Long, C&EN Washington

Bill and background
Antitrust. (S. 1284, H.R. 8532, 13489, 14580) Allow Justice Department to issue civil investigative demands prior to filing an antitrust suit; permit state attorneys general to bring treble damage antitrust suits; provide for premerger notification
(S. 2387, H.R. 4013) Prohibit any major producer, refiner, transporter, or marketer of petroleum from engaging in any of the three other activities
Authorizations. (S. 3202, H.R. 12566) Authorize fiscal 1977 funding levels for the National Science Foundation[a]
(S. 3105, H.R. 13350) Authorize fiscal 1977 funding levels for the Energy Research & Development Administration
Copyrights.[a] (S. 22, H.R. 2223) Provide for general reform of U.S. copyright law
Economy. (H.R. 10612) Changes, reforms U.S. tax laws
Energy. (S. 2532, 2869, H.R. 12112) Provide federal financial assistance, such as loan guarantees or price supports, for commercialization of new nonnuclear energy technologies
(S. 2035, H.R. 8401) Authorizes ERDA to enter into cooperative agreements with private companies for the development of privately financed uranium enrichment production facilities
Government operations. (S. 5, H.R. 11656) Permit members of the public to observe most federal agency meetings; House bill bars informal conversations between agency officials and interested outsiders to discuss pending agency business, exempts federal advisory committee meetings from the bill's provisions
(S. 2925, H.R. 11734) Require all federal programs and activities to be reauthorized at least every five years or be automatically terminated
Health. (S. 1737, H.R. 14319) Authorize the Secretary of Health, Education & Welfare to license clinical laboratories, promulgate regulations to assure quality, accuracy, precision of laboratory testing; authorize federal inspections of laboratories
Lobbying. (S. 2477, H.R. 15) Require full disclosure of all lobbying activities, tighten definition of individuals and organizations that must register as lobbyists
Ozone. (S. 3219, H.R. 10498) Provide for two-year study of the effects of aerosols containing chlorofluorocarbons on the atmosphere, ban or limit manufacture after two years if deemed dangerous; ease requirements of the Clean Air Act of 1970
Patents.[a] (S. 2255, H.R. 14632) Provide for changes to U.S. patent law
Research. (S. 3549, H.R. 11743) Establish 22-member National Agricultural Research Policy Advisory Board, authorize spending $150 million during 1977-79 for competitive grant research program, $90 million for mission-oriented grants to colleges, $5 million for nutrition research
Solid waste. (S. 2150, H.R. 14496) Provide for R&D and dissemination of information on promising recovery, disposal, and resource use techniques; regulate disposal of hazardous wastes
Toxic substances.[a] (S. 3149, H.R. 14032) Regulate hazardous chemicals, require premarket testing

a ACS position developed

TO Noel Sterrett
FROM SHEPHERD

1064

SCIENCE AND TECHNOLOGICAL ISSUES

Comments and Suggestions
by Dr. Michael Michaelis

The attached papers are written in light of the finding that:

- although a Gallup Poll* shows that American's sense of progress between 1974 and 1976 shows strongest upward shift (20 points on a low point scale) on the issue of assuring adequate energy supply; 18 points upward on dealing with inflation; 8 points up with improving economic and business conditions generally; and 7 points up on reducing problem of unemployment,

- the same poll shows that

  inflation ranks 2nd in priority,

  unemployment ranks 8th in priority,

  energy ranks 11th in priority,

  economic and business activities rank 18th in priority,

  among 31 items of public concern about major national issues. 12 years ago the 5 items of highest concern related to international and defense matters. Now the 10 leading items all relate to domestic problems.

Dr. [illegible] Medical Center
[illegible]

Mr. Art [illegible]
202 676-6[illegible]
George Washington University
[illegible]

Mr. Aaron [illegible]
215 [illegible]
[illegible] Inc.
[illegible]

Dr. [illegible]
[illegible]
[illegible] University
[illegible]
[illegible]
[illegible] Cambridge, Massachusetts 02138

* "Policy Perspectives: America's Hopes and Fears--1976"; compiled by Potomac Associates, Washington, D. C. Published 12 September 1976.

1st CARTER-FORD DEBATE

Michael Michaelis
Deputy Coordinator
Science and Technology Policy Task Force

ISSUE I

- Promote economic growth and full employment
- Speed up modernization of industrial plant and equipment: increasing productivity

ANSWER

- Available technology is one of our most under-utilized resources. Under the Nixon-Ford Administration the growth of this store of technical knowledge has been slowed. U. S. Research and Development expenditures began a precipitous decline in 1968. A maximum of the fraction of the U. S. work force was then engaged in technical work. The percentage has steadily declined in the Nixon-Ford years. The consequences of this has been a decline in U. S. productivity, a loss of U. S. competitiveness, and postponed commitment to solving energy, environment and resource problems. Previous administrations have not acted to stimulate use of available technology. Yet our history shows that technology is a main-spring for fostering economic growth, creating new jobs, increasing productivity and promoting social well-being.

- My Administration will take deliberate action to create a business environment in which, once again, private entrepeneurship will find it profitable to take the inherent risks in delivering beneficial technology for the well-being of our people. Technological innovation will determine the options for our future. Technological innovation entails change. Such change need not be feared because, in the main, the changes brought about by beneficial technological innovation will be to improve the way we do things, e.g., generate electricity in order to maintain affordable availability of such an energy resource and thus enable us to improve our standard of life.

- In short, we will strive to manage change as brilliantly as we have already learned to manage the creation of knowledge. Science and Technology is an essential well spring of the opportunities for beneficial change.

STERRETT 3 of 4

SUBSIDIARY POINTS

- Learning to manage change -- technical innovation. We will aim for creative new institutional arrangements between government (at all levels) and the private sector (in all its constituent parts: industry, labor, finance, etc.). For too long, the public and private sectors have regarded each other with suspicion, if not animosity, based on mutual ignorance.

- My Administration will take the initiative to create new working relationships with the private sector for the special purpose of identifying in each component of the private sector those barriers which inhibit the changes needed to enable it to deliver beneficial new products and services to its customers.

- My Administration will then deliberately and imaginatively examine those policies and practices of each Federal department and agency (and encourage state and local government to do likewise) that bear on removing such barriers or on creating incentives to overcome them.

- We will test the efficacy of appropriate changes in these policies and practices in collaberation with the private sector, in order to satisfy our objective for government to be supportive of private enterprise.

- I believe that such governmental initiatives which my Administration would take will evoke full and cooperative responses from the private sector.

STERRETT 4

1st or 2nd CARTER-FORD DEBATE

Michael Michaelis
Deputy Coordinator
Science and Technology Policy Task Force

ISSUE II

Energy: (ranked 11th in priority of Degree of Public Concern about Major National Issues, though 1st -- tied with defense -- on issues of non-domestic nature, i.e., foreign oil dependency)

ANSWER

- In 3 years since the OPEC embargo, the U. S. import of foreign oil has grown from 30% to 42% of total U. S. energy demand. We are more dependent than ever: "Project Independence" has become a mockery.

  No credible and consistent national energy policy has been formulated, certainly not one to which industry can respond with vigor.

  Instead, major multi-billion scientific and technical research programs have begun. But no assessment has yet been done to assure that the results of this massive technical program can in fact be used by industry to generate and/or conserve energy through the use of this new technology.

- The Congressional Office of Technology Assessment has severely critized the Federal Energy Research and Development program on this count, but the responsiveness of the Executive Branch has been slow and inadequate.

- There is no question that we can have the technical means of assuring sufficiency of energy -- even from indigenous coal resources alone -- for the next hundred years at least, provided that definitive, unambiguous leadership is exercised by the Executive and Legislative Branches in concert. In my Administration such concerted action will be a first order of priority, coupled to a much closer collaberation with private sector interests -- now badly lacking.

- The solution to our energy crisis depends, in large measure, on aggresive and beneficial technical innovation, some near-term and much of it long-term. We must marshall the country's best resources -- and only the best will do -- to solve our energy crisis. Let's make no mistake about it, there still is a crisis, even if the memory of gas pump lines has dimmed.

---

*Potomac Associates, Washington, D. C.: "America's Hopes and Fears--1976", published 12 September 1976.

Mississippi Mail Street 1687

7 September 1976

MEMORANDUM

TO: Dr. Michaelis and Carl Shepherd

FROM: Dr. Leo Goldberg's assistant, Dr. Beverly Lynds

RE: Carter/Ford Debate Material

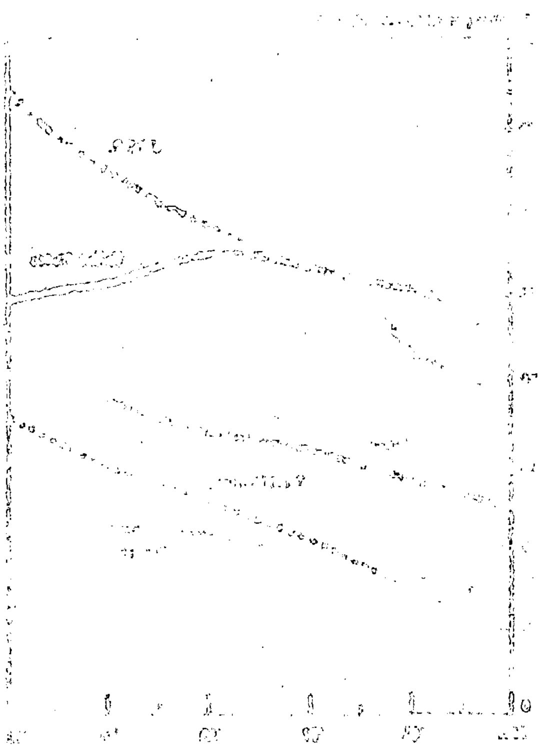
I regret that Dr. Goldberg will not be back in the country until 13 September, but I am attaching a copy of his 5 August letter in case you do not have it readily available. As supplementary documentation for the statement by Dr. Goldberg about the appalling decline in the fraction of GNP devoted to R&D expenditures, I am including copies of the diagrams from Science Indicators which clearly show this trend. I am also including a brief clipping from Parade magazine about the decline in the status of Great Britain as a result of poor support in the production of engineers. It appears that the US, which does better at producing scientists and engineers, is not able to formulate national policies aimed at full utilization of the talents of these "natural resources".

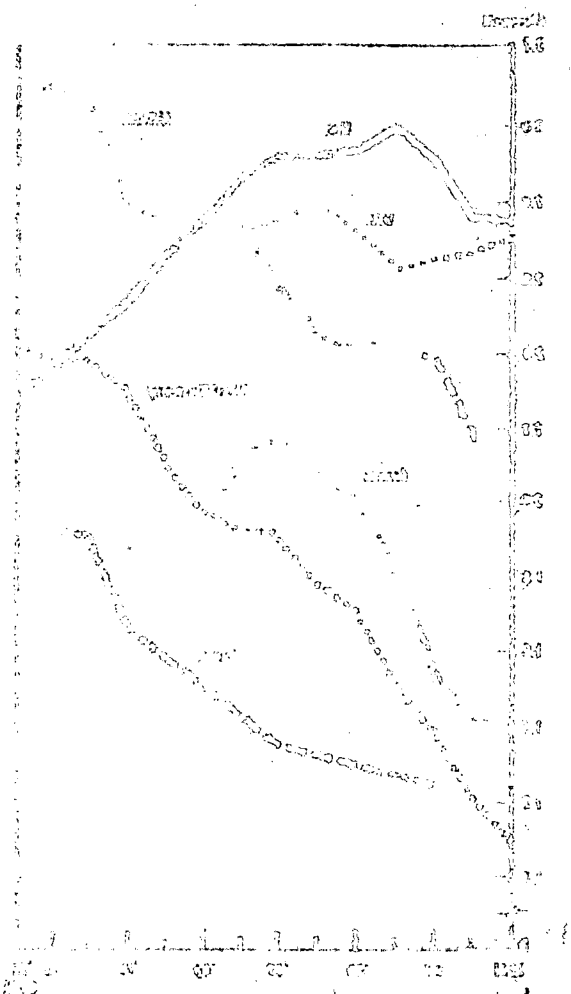
We have a technological superiority which, in foreign affairs, could be much better utilized and which, if not nurtured and supported, could readily be lost with disastrous consequences. We desperately need strong leadership in Washington to address these issues and to develope a strategy which will keep the nation technologically strong. No one agency has done this; all agencies involved in support of basic and applied research must be coordinated to ensure the success of effective use of our scientific enterprise.

Beverly Lynds

406-248-1688

SENT TO SPH
WITH SPH &
CH
TO
SEND CC





and

In reorganization it will be necessary to significantly tap the resources base of the public for both technical and non-technical expertise. While the public does not always have technical [illegible], it nevertheless is directly affected by technical decisions and [illegible] channels have the opportunity to provide input in the decision-making structure. On the other side of the coin, there is a lot of scientific and technical talent in the public sector that is being overlooked and should make use [illegible] to reorganization and other policymaking.

The [illegible] NATIONAL TECHNICAL PERSONNEL [illegible] would help un-[illegible] Washington [illegible] listen [illegible] in the next [illegible] technology-based decisions that directly [illegible] it, particularly when it comes to the [illegible] affect it.

FOR NOEL STERRETT FROM SHEPHERD

1 of 4

SCIENCE AND TECHNOLOGY INITIATIVES DIRECTED TOWARD
PRIORITY TOPIC AREAS: ADDITIONAL LISTINGS

AH PURCELL
7 September 1976

Administrative Branch Reorganization in Relation to Science and Technology

The Science and Technology Component of the federal structure is a strong one. As assessments commissioned by the US Office of Technology Assessment have shown, however, there are important technology-related deficiencies and overlap in a number of major federal programs, including those in energy and environment. Reorganization will have to be aimed at eliminating both deficienies and overlap, and will require sound and broad-based technical expertise and input. Title III of the National Science and Technology Policy, Organization, and Priorities Act of 1976, which directs the President's Committee on Science and Technology to study reorganization along s/t lines, will have to be vigorously pursued in order to optimize the role of science and technology in the government structure.

In reorganization it will be necessary to significantly tap the resource base of the public for both technical and non-technical expertise. While the public does not always have technical competence, it nevertheless is directly affected by technical decisions, and through formal channels must have the opportunity to provide input in the decision-making structure. On the other side of the coin, there is a lot of scientific and technical talent in the public sector that is being overlooked and which could make useful contributions to reorganization and other policymaking. The establishment of a volunteer NATIONAL TECHNICAL PERSONNEL BANK would help uncover this talent.

The public must know that, in the next Administration, Washington is listening to it, particularly when it comes to the vital technology-based decisions that directly affect it.

Noel Storrett
3/4

In a number of technically-based areas, there are needless parallel r/d efforts in the defense and non-defense sectors of the government. While some coordination exists (e. g. in environmental research), a much greater effort can and must be made if substantive increase in efficiency and "payoff" is to be achieved in defense and non-defense research and development efforts applicable to societal needs.

Augmenting Metrification Efforts

It is genrally agreed that the sooner we go metric, the easier it will be for this country to compete in world trade, particularly of technological commodities. While metrification is proceeding with some progress, we need to accelerate our efforts. More stringent legislation and increased public education are two ways of achieving this-

****

WASH DC ISSUES → ATLANTA ISSUES

FOR NOEL STERRETT
FROM CARL SHEPHERD

29 PAGES ALTOGETHER

SCIENCE AND TECHNOLOGY RELATED QUESTIONS AND ANSWERS BY LEWIS M. BRANSCOMB
(SCIENCE/TECHNOLOGY TASK COORDINATOR FOR THE CARTER/FORD DEBATES

September 2, 1976

I assume a moderately "hostile" questioner - a la Spivak...

Q1: Scientist and academics have been loud in their denunciation of Nixon for firing Dr. E.E. David, the President's Science Advisor and abolishing the Office of Science and Technology (OST). But, President Ford sent up a bill to re-establish this Office, even sending the Vice President to testify for the bill in the House. He has appointed Dr. Stever science advisor, and he enjoys widespread scientific support. What more can you do to make this Office effective than President Ford has already done???

A1: What has President Ford already done??? It took the administration two years to rectify Nixon's mistake, finally responding to extensive hearings and legislative work by the science committees of the Democratic Congress. Dr. Stever has been in office barely a month. Our universities research capability is still encumbered in bureaucratic "red tape" and has not been effectively mobilized to handle the environmental, energy, health and economic problems that beset our nation. America is drifting..... We must put our great technological capability to work. My scientific and engineering experiences convince me that the problem is not a lack of American talent or a lack of public investment...it is a lack of leadership, focussing this talent on the problems and opportunities which lie ahead.

Q2: Nixon killed the OSTP because he was annoyed at receiving from his science advisory committee advice he did *not* want on the SST and the ABM. Will you welcome scientific advice from the OSTP which is counter to your administration's position? Will you be willing to let such studies be made public?

A2: I am committed to an administration which is open-minded, objective and future-oriented. The OSTP will seek the best technical advice available from outside, as well as inside the government. The results of such studies will be made public, except when national security considerations are over-riding... Nixon's closed and secretive approach to government stands is in stark contrast to the approach I will take...

Q3: Scientists and engineers complain that the United States has been falling behind other nations in its commitment to scientific and engineering leadership and excellence. Do you agree? If so, what would you do about it?

A3: IT IS TIME...U.S. research and development expenditures, public and private, began a precipitous decline in 1968 (from 2.9% of GNP in '68 to 2.3% in '74), while the Japanese, West Germans and Russian investiments have continued a steady rise. Similarly, 1969 saw a maximum in the fraction of the U.S. work force engaged in R & D. This percentage has declined steadily throughout the Nixon-Ford years; while it continues to rise in the USSR, Japan and Germany. These trends reflect a pattern of neglect of an important body of talent for solving a problem in America. The consequences of this neglect are seen in a decline in U.S. productivity, a loss of U.S. competitiveness and postponed commitment to solving energy, environment and resource problems.

MORNING [illegible] Abel STERRET 3
484

A3: (Cont.) I would act on several fronts to change this trend:

1. Enhance the *(irtabitz?) and innovative power of American industry, * innate ability and its dependence on research and development a cornerstone of economic policy.

2. Give America's demoralized scientists and engineers the opportunity to work with government to rebalance priorities in federally sponsored research, strengthening basic research in the universities and assisting them to rebalance training of scientists and engineers to meet future needs.

3. Direct the OSTP to assist me to improve the management of the 15 billion dollar federal R & D enterprise to simplify the chaotic organization, eliminate paperwork which is choking our universities, increase reliance on private sector research - especially when economic objectives are foremost.

Q4: You have advocated "zero based budgeting" for government programs. Will you apply this principle to federally sponsored R & D programs bringing a halt to those lacking in justification over the objectives of those doing the work?

A4: Yes, I will...The basic core of America's basic research is funded today on the basis of project grants which must compete for support on their merits. Even deserving projects should be brought to conclusion when other better opportunities are found. The "peer review" system for chosing the best projects must be made a fair process, but this competitive approach is still better than one dependent on government bureaucrats to run continuing programs without external evaluations and review.

Q5: For 20 years the rate of increase in United States productivity has lagged that of many other industrial countries. During the last 3 years U.S. productivity has actually decreased. A negative balance of payments in the early Nixon years was temporarily reversed by devaluation of the dollar, but is now in the "red" again. What will you do to better apply U.S. technology to improving U.S. competitiveness through higher productivity?

A5: During this period other governments have been vigorously protecting and stimulating key growth industries in competition with the U.S. Our government should act in 6 areas:

1. Shift federal R & D investments to emphasize the basic technologies generally applicable to manufacturing industry.
2. Establish a process for accelerating the diffusion of non-proprietary industrial technology, especially to smaller firms.
3. Direct and stimulate private investments in undersized plants and equipment.
4. Refocus the government programs in engineering research and education to maximize new industry growth, creating both jobs and capital for re-investment
5. Negotiate with other nations to get agreements on international standards in health, safety and environment.
6. Implement an energy strategy that developes new technological options under new management techniques that encourages the commercial development of new processes.

5

Q6: Governor Carter, you are trained in nuclear engineering, you managed development and installation of nuclear reactors in submarines. Yet in public statements you question dependence on nuclear power, you say you will cut back the breeder reactor program, and you put much reliance on solar energy. Did your experience lead you to believe that nuclear technology is too dangerous for America to rely on, or is your position just a political posture to keep voters from identifying you with nuclear advocacy? Will you switch your position after the election?

A6: My position is fully consistent with my experiences and the facts. The fact is that 3 years after the OPEC embargo we still have "no energy policy" and the government's effort is a chaos of contradictions. I am not opposed to proper use of nuclear energy. I am opposed to concealing and postponing safety and waste disposal problems. I am opposed to investing hundreds of millions of tax dollars on exceedingly complex energy technologies at the expense of more flexible, more innovative and more widely applicable technologies for increasing efficiency of energy use, for using the fossil fund reserves we have, and for broadening the base of private sector investment in new energy sources and technologies for conservation.

Q7: Under the policy of detente with the USSR of the Nixon-Ford administration many dozens of joint projects have been established under Joint Commissions on science and technology and other technical areas. In addition, the Nixon-Ford administration encouraged the Russians (Article IV, May 1972 US/USSR agreement) to press U.S. companies to sign agreements on science and technology cooperation

Q7: (Cont.)

with Soviet enterprises. Who is getting the best deal? Would you continue them ?

A7: I favor commercial relations with the Soviet Union as an appropriate outlet for American exports, but I do not see any reason or necessity for the U.S. government to press American companies to exchange any technology with the Soviets. Most U.S. companies are unwilling to sell them proprietary "know how" in any case. There is no evidence that the provision for technology exchange in the (bilateral?) agreement with the Soviets was necessary - either to give U.S. firms access to Russian markets or to bring the Russians to the SALT bargaining table.

Regarding the government projects under Joint Commissions, I would reduce the numbers of such projects, concentrating on those that serve directly the interests of the people on both sides - health, environment, urban studies would be examples.

Q8: Governor Carter, the American people are disillusioned - confused - even frightened over conflicting statements by scientific "experts" on highly technical questions such as - whether some food additives cause cancer - whether nuclear power plants are safe enough, whether aerosol sprays - or SST's - or urea fertilizer affect ozon in the stratosphere and might cause cancer - whether predictions of earthquakes in California should be taken seriously...They often disagree on the facts. What could you do, as President, to get at the truth on such matters, when ever the "experts" disagree???

A8: There are many problems requiring forthright leadership..,First, "experts" disagree out of simple ignorance because the research to get the answers simply wasn't done. The scientific community has been clamoring for opportunity to look into vital questions of health, chemical effects, climate effects on agriculture, earthquake prediction and protection; etc. New institutions organized on an interdisciplinary basis to focus problem solving research on such problems are needed.

Second, the processes for getting at the facts must be opened up to full participation by those who have relevant facts and information. Federal agencies too often lack the courage and the competence to bring the facts out for public discussion at an early state.

Third, government officials must face up to their responsibilities to take actions appropriate to the severity of the concerns and the certainty of the facts. We will never have all the information we need for decisions. But in almost every situation there are step-by-step actions which will both provide public protection and a steadily improving factual basis for further action.

Q9: You have declared your intent to reorganize the executive branch, substantially reducing the number of Federal agencies. There are over 80 of these "independent" agencies, each reporting directly to the President. Among them are major research and development agencies - NASA, ERDA, NSF - which spend billions of dollars on science and technology.

What will you do to rationalize these R & D agencies? Do you favor a department of science and technology?

A9: The Congress has quite properly focussed attention on the need for the President to re-examine the way the executive branch manages (or fails to manage) its R & D. Over initial objections of the White House, the new Statute re-creating the OSTP has a specific title calling for a special two-year study of priorities and better management for Federal R & D programs. I would ask my science advisor to give this effort a high priority and work closely with the (appropriate)? Congressional Committees to find the best solution.

I do not believe that we would want to bring all R & D activities into one department, because applied R & D should be kept closely tied to the end user to insure its effectiveness. But these clearly are opportunities for efficiency and coordination by putting similar programs together and re-directing them to high priority ends.

UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON 98195

School of Medicine
Department of Microbiology, SC-15

August 30, 1976

Dr. Lewis Branscomb
Coordinator, Science Policy Panel
5 Hidden Oak Lane
Armonk, New York, 10504

Dear Dr. Branscomb:

Mr. Carl Shepherd of the Carter-Mondale Campaign staff informed me by phone that Governor Carter or his staff would like a quick list of 10 broad issues related to science and technology for possible use in campaigning. The enclosed list does not have any new or unusual problems. The problems and familiar and basic. Many of them will be with us for many years and the solutions, if any, will be complex.

Unfortunately, the public "consumes" issues very rapidly. It gets tired of hearing about the needs of the environment, about population pressure and the difficulties regarding energy needs. Nevertheless, these are the main problems and I see no reason to try to promote other less important issues for the sake of novelty.

Your list of 10 issues in Science Policy has my complete agreement. I will try to write a few pages on funding in the next week or so. In preparation for this, I have solicited opinions from the Public Affairs Committees of the American Society for Microbiology, FASEB and AIBS. My efforts, therefore, will reflect my personal views and also those of 3 large biological societies.

Sincerely yours,

H. R. Whiteley

H. R. Whiteley
Professor

cc: Mr. Harry K. Schwartz

Ten important problems in the area of Science and Technology

The first five problems listed below (population, food supplies, energy needs, dwindling resources and the environment) are well-known and have received a considerable amount of attention in the past 15 years. The problems are all inter-related and concern not merely the US but the entire world. Total solution of these problems will require international cooperation but the US should not wait until such cooperation is possible. It should continue with its own programs and expand them in order to do whatever possible to improve the present situation and to plan for the future. The needs of the present population have created difficult problems--these will become even more complex as the population increases and technology advances.

The most important single step that a Presidential candidate can make with regard to these problems is to spell them out clearly for the American public. These are problems that will face the US and the world for the forseeable future.

1. Population

The world population will double by the beginning of the next century. The impact on resources and space for living will be immense and may be catastrophic. The problem will be slightly less acute for the developed nations than for the under-developed ones but even the US will feel a severe drain on its resources.

Despite all the religious, moral and emotional issues involved, the long-range view must prevail. There is only one possible position for any candidate for the Presidency in 1976: the US should encourage limiting population growth in this country and in the world.

Specifically, 1) the consequences of the population explosion should be discussed in public debate to make the people of the US realize that they are part of the world and its many inter-locking problems and 2) dissemination of information on family planning should be supported. Eventually tax inducements may be required to limit family size (as suggested by Packwood of Oregon several years ago).

2. Food Supplies

One of the major problems arising from the increase in world population will be the supply of food. US agriculture is now producing excess food but this may be insufficient to keep up with the demands of future US populations.

We must maintain the present agricultural capability of the US and plan for future expansion. We should continue our efforts to help under-developed countries increase their agricultural productivity and we should continue to search for new food sources.

3. Energy needs

A serious problem arising from the technological advances in the developed and developing nations is the increased need for energy sources at a time when cheap resources are being depleted. The US is the major consumer of energy and, hence, is especially vulnerable to energy crises such as those instigated by OPEC.

12

I believe that Americans would welcome an investigation of these problems of operational safety and waste disposal by a really top-notch scientific panel. The present Senate hearings on this issue have only added to the confusion. Following thorough review and public discussion, perhaps a decision could be made whether nuclear energy programs should be expanded or left until proper solutions can be advanced. The government has not vigorously supported an impartial evaluation of this complex problem, probably because of its sponsorship of the AEC and many military applications of nuclear power. The main point is that the issues should be discussed openly, by experts who are not directly employed by the utility companies or by the AEC, that the public be represented on the panel and that a decision be reached.

A separate worry is the possibility that the nuclear reactors and nuclear fuels that we sell to foreign nations can be used to produce atomic bombs which could start another world war. This is a complex political-economic question and is only marginally related to the use of nuclear power plants in the US.

7. Health Care Delivery

Americans are justly concerned about the costs of health care. Because of this, there is growing support for federal health insurance even though it is widely recognized that there will be abuses both by the public and by the health industry. In fact, unjustified over-use by the public and fraudulent practices by the health industry may, in the end, cost the public more than private health care.

This is obviously a complex issue which cannot be reviewed in a brief outline of issue. Two points can be *made*. First, a complete review and consolidation of the existing Medicare-Medicaid programs should be instituted before adding more programs. Also, strict enforcement of regulations and laws against fraud is essential so that neither the private citizen nor the medical practitioner can continue to rob the US treasury. And, of course, the present Senate and House health insurance bills need thorough study and cost-accounting --once a plan is put into effect, it will be virtually impossible to retract it.

Secondly, one of the many reasons contributing to the increasing costs of health care is that there are relatively few doctors and dentists and that they value their professional efforts so highly. The AMA and ADA claim that there are sufficient numbers of health professionals already and that the only problem is one of distribution, specifically to rural areas and urban ghettos. It might be less costly and better for the nation as a whole if there were many more doctors and dentists, each earning far less than at present. Doctors and dentists frequently cite the high costs of medical education as one of the chief reasons for their high fees. Paying the complete costs of education for these professionals and producing many more would at least remove this widely-cited explanation for their fees. If the federally trained personnel were then required to serve 2-4 years in hospitals at fixed salaries, this would again decrease medical costs. Needless to say, this approach would not gain the support of the AMA but it would appeal to the public.

STERRETT

STEPACT 13

8. Support of research in basic and applied sciences

The American public expects medical miracles and never-ending technological advances. Congress seems to believe that if money is provided, not only will man walk on the moon, but there will be a quick cure for cancer and that all of the technological problems of the world will be solved.

In actuality, whatever advances we now enjoy in medicine, physics and engineering have all developed from discoveries that usually were made many years ago and often in the course of investigations which were unrelated to the present use of such discoveries. Continued research now on the basic aspects of biology, medicine, chemistry, physics and engineering will provide the information we will need in the future for solving technical and applied problems. Conversely, it will not be possible to solve the many pressing problems of the future without continued provision for basic research today. Every effort should be made to inform the public that basic research is essential for the nation's future well being.

The US must resolve to devote a constant percentage of its research and development funds to the support of basic research. Basic research should be separated from applied research and funded, after peer review, both as an investment in the future and as a contribution to knowledge. The other major need is to encourage more rapid incorporation of new discoveries into practical use. Specific areas of applied research are mentioned in the issues listed above. It is urged, however, that whenever possible, contract research in the areas of biology and medicine be avoided: it is inefficient, costly and frequently of poor quality (I am not familiar with contract research in physical sciences).

9. Training of scientific personnel

The need for scientific personnel will not diminish in the future--the problems listed above will diminish only if there is a major drop either in the world population or in the demand for the products of technology. Thus, the education and training of scientific personnel becomes a national concern. Medical and engineering personnel cannot be produced instantly to cope with crises and the present stop-and-go support of training programs is wasteful and inefficient.

10. Organization of science in government

The federal investment in science is enormous and scattered throughout all government departments. Amalgamation of manyof these efforts in a single Department of Science would undoubtedly reduce bureaucratic waste and inefficiency. It that is not feasible, then creation of a Department of Health separate from HEW, would also lead to more efficient administration. If any organizational changes in administration of science are made in the future, federal regulations governing the many aspects of science should be reviewed, reduced and simplified.

H. R. Whiteley
Aug. 30, 1976

STERRETT 14

International Planning Management Corporation

7910 WOODMONT AVENUE, SUITE 1103

BETHESDA, MARYLAND 20014

(301) 986-1120

GEORGE C. SPONSLER, PhD.
PRESIDENT

CABLE: INPLAMAN
WASHINGTON, D.C.

August 31, 1976

Mr. Carl Shepherd
Carter/Mondale Campaign
National Task Force Staff
Suite 613
1625 Massachusetts Avenue, N. W.
Washington, D. C. 20036

Dear Carl:

The following paragraphs contain my suggestions, which you requested last Friday, regarding Science Policy issues Governor Carter might wish to introduce in the forthcoming TV debates with President Ford.

Although at first glance, Science Policy might not seem to play a major role in either the campaign or the TV debates, closer inspection reveals, to the contrary that Science and Technology play implicit, indeed central parts, in most of the commonly accepted major issues. In my view, the three most important issues are: unemployment and the National Economy more generally; National Defense; and Energy.

In spite of persistent Republican attempts to persuade the electorate that the economy is on the mend, it is, in fact, operating at a severely reduced efficiency. And there are disturbing signs for the future, including: reduced retail sales, lower home construction rates, and a renewal of the negative balance of payments which characterized the national economy during most of the Nixon-Ford Administration.

Part of the reason for the economy's malaise during the Nixon-Ford Administration has been that, as a result of the Nixon-Ford Policy, the U. S. has effectively given up its traditional role of technical innovator and inventor. The Nixon-Ford Administration de-emphasized science and technology by reducing government R&D budgets and by removing science advice from the White House. Belatedly, Ford has this year recommended a ten percent raise in the government's R&D budget. Because of the time lag between research and development and production, the immediate effect on the economy will be negligible. It will require years to undo the ill-effects of the ill-considered R&D de-emphasis by the Nixon-Ford Administration.

STEGER 15

Recognizing that science and technology is the fuel, so to speak, which drives the locomotive of American industry and the U. S. Economy, Governor Carter should centralize R&D planning and administration by organizing a new Department of Science and Technology which would combine, under one roof, the presently disparate and uncoordinated civilian R&D agencies of the Federal Government. The newly organized Office of Science and Technology Policy should be disbanded and replaced by the proposed department. The new department should be given the responsibility of reawakening american science and technology and reestablishing the United States as the preeminent high-technology industrial power in the world. Using R&D funds, the new department would stimulate research and development throughout the nation, and would encourage the transfer of government research and development into production by private industry.

Turning to unemployment, a good case can be made that the West Coast, particularly California, unemployment can be directly traced to the decline in the high-technology aerospace industry which resulted from ill-considered Nixon-Ford administration policy decisions. Unemployment to my mind is the single most important issue facing the country today. Following in Hoover's footsteps during the Great Depression, the Nixon-Ford Administration knowingly chose unemployment in preference to inflation, whereas in fact they got both together.

I have read somewhere that for every scientist or engineer out of work, some five or six other workers also lose their jobs. This unemployment multiplier effect spreads throughout the economy and throughout the country.

Consider also the plight of small businesses, particularly technology-based ones. Most economists agree that small businesses are the nation's principal technical innovators. Today in the United States, some 10 million small businesses account for one-half the nation's total industrial production and employ 58% of all U. S. workers. Former President Roosevelt, in his program to help the country recover from the Great Depression, organized the Small Business Administration to help the nation's small businessmen recover from that period of economic disaster. In contrast, the Nixon-Ford Administration has looked primarily to big business to help the country recover from the economic woes. In its efforts to reestablish the economy, the Nixon-Ford Administration has left small business to look after itself as best it can.

For example, rather than offering small businesses direct government loans, the SBA in the Nixon-Ford Administration has emphasized a loan-guarantee program which most private banks will not adopt, preferring to make less risky loans to big business. As a consequence, technically oriented small business, and correspondingly the nation's innovative capacity and related employment, have languished.

STEPPER 16

Governor Carter could sponsor a new SBA program, offering venture capital to help new small businesses in their most difficult phase--their initial organization. He could also offer tax credits to small businesses to help pay for new employees, thereby encouraging industrial expansion and reducing national unemployment even further through the multiplier effect previously described.

An expanded Military R&D program could also help small business and further increase employment, while supporting national security objectives at the same time.

The Nixon-Ford Administration is particularly vunerable in defense issues. They have allowed the U.S.S.R. to become superior in nuclear strategic weapons, and have permitted the once proud U. S. Navy to become handicapped with old, second-class ships. In their typically unimaginative "Last-War" type of thinking, the Nixon-Ford Administration has chosen to support highly vunerable big carriers and big strategic submarines, rather than choosing to build a larger number of smaller, less vunerable vessels. It has supported an exorbitantly expensive bomber (the B-1) of dubious utility. It has adopted questionable policies of detent, and blinked at Soviet violations thereof. It now appears to be on the verge of confirming Soviet strategic superiority through an ill-advised and hurried SALT II agreement being rushed through in time for the election.

Governor Carter should demand equitable detent policies, matching U. S. concessions with corresponding ones by the Soviet Union. He should replace large carrier and large missile submarines with smaller ones. He should encourage development of the highly accurate, but inexpensive ($500,000) cruise missile. He should stop production of the B-1 bomber, replacing it with a new R&D program designed to develop a lower-cost, stand-off bomber armed with the cruise missile. He should study the possible removal of all land-based ICBM's from the U. S. Mainland, thereby freeing the U. S. citizens from the fear of the massive nuclear fall-out which would accompany a Soviet attack upon our land-based missile silos. Further, he should consider replacing the land-based missiles with mobile sea and air-based weapons. He should place greater emphasis on automated weapons to reduce manpower requirements and corresponding costs. Rather than the tanks (for example, the Main Battle tank), the development of which has proved such a fiasco under the "Last-War" thinking of the Nixon-Ford Administration, Governor Carter should encourage the production of the new smart bombs and guided missiles, which would negate the Soviet predominance in tanks. In short, the entire U. S. defense posture needs rethinking and restructuring.

Matching its failure in defense, the Nixon-Ford Administration has failed to create a National Energy Policy. Its dismal record has been one of drift, vacillation and improvization. The Nixon-Ford Administration permitted the OPEC nations to

dictate petroleum prices to the West, a major contribution to the disastrous inflation the U. S. and the Western nations experienced during the Nixon-Ford Administration. Today, the United States imports 40% of its petroleum, compared with 30% at the time of the Arab Oil Embargo in 1973--which itself went unchallenged by the Nixon-Ford Administration. If this import trend continues, the U. S. will find itself at the mercy of the Near-Eastern oil producers; an unenviable position at best, and disastrous to national security at worst.

The U. S. possesses the largest of the world's coal reserves, and yet those reserves have been unexploited by the Nixon-Ford Administration. That default has arisen partly because of environmental problems, but more because of the Nixon-Ford Administration's hesitancy to make the needed capital investment. The necessary technology for coal gasification and liquifaction is at hand. Only decisiveness is wanting.

The situation with regard to nuclear power as it has developed under the Nixon-Ford Administration today is one of chaos. The Nuclear Regulatory Commisaion has directed that no further charters be issued for the construction of nuclear power plants until certain problems are resolved, which may take years in resolution. The nuclear breeder reactor program, so strongly emphasized by the Nixon-Ford Administration, has doubled in cost and its completion date recedes far into the future. Nuclear waste disposal has become a nightmare, and the proliferation of nuclear explosive material is a problem for the entire world. The Nixon-Ford Administration has demonstrated it is incapable of managing nuclear energy. A new administration is demanded to clean up the mess.

In the long term, solar energy has great promise, but once again, the indecisiveness of the Nixon-Ford Administration has left the country grasping fruitlessly for a policy.

The Carter Administration should develop a four-point energy program as follows:

1. Institution of measures of conservation designed to reduce energy, and especially petroleum, consumption in the United States.

2. Initiation of an extensive synthetic fuel production program, patterned on the World War II synthetic rubber precedent under which the U. S. Government funded private industry to develop the needed plants.

STERRETT 16

3. Initiation of a long-range R&D program to exploit solar energy to the fullest possible extent to augment petroleum, coal, and nuclear energy sources.

4. Encouragement via Federal incentives for exploration of new, and secondary and tertiary extraction of old, oil wells in the United States.

Through such a program, the United States could become substantially independent of foreign oil producers by the year 1990, if pursued with vigor and resolution.

I have tried to show how Science and Technology can be employed to reduce unemployment and otherwise help the economy, to strengthen national defense, and to relieve the energy crisis. It can contribute in many other ways to other issues. Science and Technology represent America's genius; it has been and remains the key to improved standards of living and to the good life more generally. The prime missing ingredient is a central government office which would develop and administer a truly national science policy. That responsibility dictates the establishment of the recommended new cabinet-level Department of Science and Technology.

Science and Technology can make significant contributions to all the issues to be considered in the forthcoming TV debates. I suspect President Ford will not have considered Science and Technology in this light, and therefore, a correspondingly opportunity for unexpected initiatives presents itself to Governor Carter.

As we discussed on the telephone yesterday, I would appreciate your forwarding a copy of this letter to Mr. Neil Sader in Atlanta, as he has asked to be kept informed of my policy suggestions.

Best Regards,

George C. Sponsler

- Creation of a science and technology advisory committee comprised of ERDA, FEA, NASA, other agency personnel, and representatives of academia.

This committee would review the agency's progress and make recommendations on their proposed courses of action to the President.

The U.S. needs to export its science and technology to assist in further stimulating our economy. This is presently being accomplished to a small degree with the exporting of some of our weapons systems. However, we need legislation to encourage national exportation of our science and technology. The Japanese have masterfully recovered from their economic recession by skillfully exporting their goods to the tune of a positive balance of trade of $16 billion this year. The U.S. needs a national commitment similar to that of the Japanese where the Japanese are willing to skillfully manipulate the value of their yen on the foreign money market to help with their exports.

A national dedication to basic science and research is compulsory if we are to continue as the leader in world technology. The Nixon fiasco of destroying the White House OST and de-emphasizing this country's science and technology programs did not help our world leadership position. We need a national policy with specific goals, inducements and models to stimulate our efforts into the basic science and research fields. Inducements for minorities and other disadvantaged members of our society would help in increasing the total level of our national education. These minorities would then be redirected to use and acquire knowledge for application to increasing the social well-being of the masses -- the poor, the uneducated, et al. Our country's survival is directly dependent on our continued world leadership in basic science and research.

In concluding, the nation's space applications program should not be forgotten. NASA is one of the few agencies which has carried out its charter and our national commitments within the designated time frame, and with unparallel success, the agency has brought prestige and international acclaim to the U.S. Yet, its budget is constantly reduced each year. Spin-offs from space in communications, medicine, weather and crop forecasting, etc., have contributed to the overall well-being of mankind. NASA needs to be challenged and funded to continue providing the excellent contributions they have made to this country. In this manner aerospace, education, basic science and research, social well-being, and national technology will be greatly assisted.

OAO Corporation

Cecile D. Barker
President

/bls

DICTATED BUT NOT READ.

SEVERAL THOUGHTS ON SCIENCE, TECHNOLOGY AND THE UNITED STATES ECONOMY

1. In the United States we clearly must translate promising technological possibilities into marketable innovations more speedily than is presently the case. This pertains especially to those technological possibilities developed with public funds. Mechanisms must be developed to have these technological possibilities exploited in order to improve productivity, increase employment opportunities, and to solve particularly vexing problems such as those which often plague the elderly, the handicapped, and the disadvantaged.

We require new initiative to stimulate innovation based upon our massive national inventory of technological possibilities. Such initiatives are long overdue; the present Administration has failed utterly to recognize the problem, much less undertake any such initiative. The Carter Administration will quickly devise and implement programs to enable science and technology once more to contribute to the nation's economic and social well-being to their full potential.

It is well to keep in mind that to assure long-term economic growth and welfare, fully one-third of United States jobs at any time should be in industries created during the preceding 25 years through the successful exploitation of technological possibilities. This was the case in the United States through the 1960's but, largely because of anti-science policies and out of apparent ignorance of the critical role of technological innovation in the nation's development, the Nixon-Ford Administration has presided over

exploitation of technological possibilities which are fewer than ever, significantly because of our failure to support basic science intelligently. This situation, too, will be redressed in the new Administration.

* * * * * * *

3. The effects of economic regulation on technological innovation are often most profound even while being the most difficult to observe. It is surprising that until recently there was very little question but that the economic regulation of industry in the United States was neutral as to technology. Certainly the Nixon-Ford Administration had never even considered such a relationship notwithstanding its crucial nature, especially in such pivotal areas as transport, energy, communications, and health care. The Carter Administration will not fail to identify and address such issues and will discharge its responsibility to the public to assure that exploitation of science, technology, and the process of innovation will be interfered with in the course of regulation only where it is clear that such interference is, on balance, in the public interest.

With respect to government regulation, the new Administration will establish a mechanism requiring that the effects of such regulation on technological innovation be assessed explicitly as part of the regulatory process itself. A "technology impact statement" will be sought of those charged with establishing regulatory policy and with issuing regulations of various kinds. The science and

technology community will in this way have the opportunity to support or challenge such statements, which is in sharp contrast with past practice where science and technology considerations have literally been ignored in virtually all matters of economic regulation.

The new approach should itself be a substantial catalyst to the development of science and technology as it holds great promise of removing perceived and real barriers to investing in science and technology that have gone up especially since the present Administration took office in 1969.

* * * * * * *

In doing so, it can pave the way for greater productivity and employment. Conservation can create jobs, and with proper initiatives, the federal government can help demonstrate this. In addition, another "energy crisis," as well as the threat of a "materials crisis," feared by many technology forecasters, will be reduced.

It is highly unfortunate that the Administration and the Congress have not been able to agree on measures to replace the long-expired legislation which set up the first coordinated federal machinery to deal with the problem of our nation's wastes. The lack of agreement in this area has meant that programs which can lead to significant reduction and recycling of our massive wastes have yet to get off the ground. A high priority of the next Administration must be to establish substantive resource use and waste recovery policies, and ensure that legislation is passed to put "teeth" into such policies. The recommendations of the federally-mandated National Commission on Materials Policy, which spell out means for more efficient use of our resources, have gone largely unheeded. It is time that we utilize the findings of this commission to help reduce resource waste and create jobs.

"Small technology," or "community technology" development is an important factor in reordering federal research/development priorities. We are learning more and more that big is not always best and most efficient when it comes to technology. Many promising community-based efforts, which encompass labor-intensive programs, have been demonstrating that small technology, in which individuals or groups contribute directly to local technical needs, is very efficient. These include the Washington-based Institute for Local Self Reliance, Oregon's ORE Plan, and the national Solar Alliance. Groups of this type could greatly expand their effectiveness if they had a share of federal research and development resources.

* * * *

SIERRETT 28

UNIVERSITY OF CALIFORNIA, SAN DIEGO

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO — SANTA BARBARA • SANTA CRUZ

INSTITUTE OF GEOPHYSICS AND
PLANETARY PHYSICS, A-025
LA JOLLA LABORATORIES

~~POST OFFICE BOX 1529~~
LA JOLLA, CALIFORNIA ~~92037~~ 92093

1 September 1976

Carter-Mondale Presidential Campaign
1625 Mass. Ave., N.W.
Washington, D.C. 20036

ATTN: Dr. Michaelis and Carl Shepherd

These notes are written in response to your letter of August 30 in a hurry inasmuch as I will be going to sea tomorrow.

I think the energy issue is the most critical topic. The only immediate improvement can be obtained by discouraging waste.

From a short range viewpoint, nuclear power still seems as the most attractive. The disposal problem can, in fact, be solved if properly handled. Setting up plants on coastal islands or submerged offers some attraction.

There are, of course, many aspects of this issue to be pursued. Some of the topics have been discussed over and over again. I think the time is right for a small number ($\sim$10) of active prototype investigations, each of the order of 10^8 dollars. At the same time the little company and the little University department should not be overlooked; this is where some of the best ideas will come from.

I do not think a rational energy problem has to be at odds with environmental considerations.

Sincerely,

Walter H. Munk

/dw

STERRETT 29

Suggestions from Ivan Bennet, Jr., on Science Technology Debate Matters

September 2, 1976

Some main areas of concentration should be:

Stimulating Economic Growth

International Affairs (Defense)

Urban Policy

Ford's urban policy has been abysmal and businessmen, Bennet has talked to, agree. New York was handled poorly and not within the context of any defined urban policy. Ford's policy appears to be to handle crises as they come, rather than working to prevent crises. However, considering Carter's background many critics of Ford's policy, are uncertain of the formers potential urban policy and suggest he should come out clearly on it - thus scoring a lot of points...

Bennet believes Health issues should be avoided if possible, particularly National Health Insurance - as it's a potential can of worms and anyway Ford would probably initiate some sort of insurance program himself.