LETTERS

Carter's Innovation Initiatives

Edward E. David's editorial "General Sarnoff and generic research" (15 Feb., p. 719), presents an inaccurate view of announced Carter Administration innovation initiatives, such as the generic technology centers and the Cooperative Automotive Research Program. David portrays the President's initiatives both as an overt attempt by the federal government to steer industrial technology and as massive proposals that do not recognize the requirements inherent in successful industrial research and innovation. In contrast to these assertions, the programs have been developed on the basis of careful review and deliberation involving industry and they are designed to complement, not supplant, industry's own important innovative activities.

The generic technology centers in the President's innovation initiatives are a balanced approach to research and advanced technology development in the area of generic technology. In practice, they will be directed toward problems such as automated assembly technologies, membrane technology, catalysis, and so on, that cut across industrial sectors. They are not product development or marketing enterprises. The government's involvement will initially be about $2 million a year for each center, but it will be reduced, over a number of years, to a phaseout. If the generic technology program is successful, the President may expand the effort in the direction of increasing the number of such centers. It would not expand toward intervention into what must be the domain of industry—the specific utilization of such generic work in pursuit of particular manufacturing or market objectives. The Administration's concept of generic technology is considerably narrower and is limited in level of effort. In this respect we are in agreement with David.

The Cooperative Automotive Research Program (CARP) is not directed toward the "reinvention of the automobile" (although it was portrayed this way at one time), nor is it directed toward fuel efficiency as a single, overarching goal, although the research sponsored through CARP will contribute to fuel efficiency, among other advances. It is a program of basic research, primarily in the physical sciences and engineering. It is "targeted" in that the research will be chosen in part for its relevance to automotive technology. It will not build a new series of research centers, but instead will largely build on existing capabilities of industry and university research facilities. CARP contains a number of features designed to obtain success; they happen to be the elements David thinks are absent. They include:

1) Enthusiastic industrial involvement. CARP has program agreement and financial commitment at the chief executive level by the five American automobile manufacturers.

2) University-industry linkages in basic research. Through joint research projects and personnel exchanges CARP will incorporate linkages in disciplinary and interdisciplinary science that can have useful value in both the academic and the industrial laboratory.

3) Long-term commitment. There is a presidential commitment, with a federal funding plan to extend over a decade. Industry commitment will be for 5 years and will presumably continue if CARP is successful.

4) Expectations commensurate with program scope. There are no demands by federal funding agencies or industry executives for quick payoff results.

5) Leadership and management. Many features of the industry-government agreement on CARP are designed to help ensure good management: for example, project review, annual oversight reviews, and so forth.

CARP has been worked out jointly between the five automakers and the government, represented by the Secretary of Transportation and the Director, Office of Science and Technology Policy. It is not an effort of Washingtonians laying a plan developed within federal agencies on industry. Moreover, CARP is a different concept from the goal-oriented automotive technology efforts that were developed in the Nixon Administration.

Both the generic research center activity and CARP are designed to be supportive of the development of industrial technology by the private sector through provision of related basic research, and as such are, we believe, quite consistent with many of the objectives of industrialists such as David.

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The presumably official view of the "Carter Administration innovation initiatives" in response to my 15 February editorial documents the fragility of an industrial innovation strategy based on direct government action. The editorial indeed catches the spirit and the fact of misdirected federal initiatives and the

absence of effective actions recommended by advisory groups during the Administration's policy review of innovation.

As indicated in the editorial, I have no objection to modest generic academic research programs seeded by the National Science Foundation (NSF). But the number of successful outcomes will be limited by, among other factors, the availability of creative academics oriented toward industrial purposes. As a general mechanism for federal support of industry or academic research, generic research is not viable for reasons stated at the end of the editorial.

CARP as a "basic research" program is reminiscent of the 1960's fashion for basic research as the inevitable producer of revolutionary technology. This idea has long been discredited. The list of CARP-related mechanisms and assurances listed in Smith's letter validates the unworkability of CARP. Such mechanisms, while undoubtedly the result of good intentions and desire on the part of the federal bureaucracy, are likely to impede rather than facilitate quality research. Assurances of long-term support cannot obviate inevitable political demands.

Smith says that CARP "is not an effort of Washingtonians laying a plan developed within federal agencies on industry." The precursors to CARP are well known. These include Brock Adams' statements on television and his subsequent initiatives, a Cambridge, Massachusetts, conference on automotive technology, and several Washington meetings culminating in the presidential meeting with automotive executives referred to in the Office of Science and Technology Policy's description of 10 January 1980. From all this it is clear, I believe, that CARP did not originate spontaneously from industry.

Most important, all of these proposed direct interventions by the federal government are apparently to substitute for indirect financial incentives, particularly those pointed at innovative small businesses and at increasing spontaneous cooperative activities between academia and industrial laboratories. The absence of such programs seems to indicate that those people of a strict economic mind have predominated over those representing other values in the Administration. No amount of federally sponsored research will make up for this lack of willingness to encourage privately financed initiatives.

Let me not end on a negative note. The NSF Industry-University Cooperative Research Program has many positive aspects. As I understand it, selec-

tion and methodology of the research are left to the judgment of the researchers themselves, and proposals are subject to peer review. The government shares the cost of these efforts and so encourages the critical connection between scientific excellence and industrial purposes.

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Fossils in Asphalt

The Research News article "Work on U.S. oil sands heating up" (14 Mar., p. 1191) does not address a little known but very important environmental problem associated with surface deposits of asphalt. Many such sites, Rancho La Brea in Los Angeles being the best known, contain areas where prehistoric asphalt seeps have caught and preserved excellent samples of past biota. At Rancho La Brea the variety of remains include a wide range of well-preserved late Pleistocene specimens: pollen, diatoms, seeds, leaves, wood, mollusks, ostracods, a tremendous variety of insects, and vertebrates from stickleback fishes to mammoths. Anthropological-archeological specimens include a 9000-year-old human skeleton (*1*) and a variety of younger artifacts, those of bone and wood being especially important. This type of deposit yields an extremely complete biotic record unusually suited to detailed paleoecological studies.

Other fossiliferous asphalt deposits are found in California, Texas, Peru, Trinidad, the Caucasus region of the Soviet Union, and Iran [those in the Zagros Mountains of southern Iran range in age from the Late Miocene to Recent (*2*)]. Of these, three are or will soon be adversely affected by commercial exploitation as petroleum resources: McKittrick in California, the Trinidad "lakes," and Talara in Peru.

The hydrocarbon-saturated diatomite at McKittrick is partially overlain by late Pleistocene to Recent asphalt flows containing a rich assemblage of plants, invertebrates, and vertebrates. With the cooperation of the Getty Oil Company, an environmental impact report was prepared (*3*) which includes plans for the salvage and preservation of the portion of the deposit owned by Getty Oil. I do not know whether similar action will be taken in areas owned by other companies. Relatively few specimens are known from the Trinidad deposits, but their potential is enormous. The Royal Ontario Museum has collected thousands of specimens from Talara, which appear to be only a small fraction of what could be recovered. These deposits have been mined for many years to provide road-building materials (the fossils serving as gravel), a practice that reportedly continues to this day (*4*).

Many areas with surface deposits of asphalt have never been critically examined to determine if they might have associated fossil deposits. The excellent preservation of a wide variety of life characteristic of fossiliferous breas and their known geologic span of Late Miocene to Recent make them extremely important paleontological resources. All such areas marked for development should be carefully checked or we might well lose unique and irreplaceable records of the past.

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3. *Draft EIR, Proposed Getty Oil Company Diatomite Mining and Oil Extraction Project, McKittrick Oil Field, Kern County, California* (prepared by Dames and Moore, Santa Barbara, for the Kern County Planning Department, Bakersfield, Calif., 27 April 1979).
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Room Temperature

While recently conducting some commonly used assays for proteins and carbohydrates, the portion of the protocol requiring the samples to "sit at room temperature" for a designated time raised an interesting thought.

In light of President Carter's recent extension of the Emergency Building Temperature Restrictions Plan, I would like to suggest the following. "Room temperature" should no longer be assumed to be approximately 21°C, but to fall into three major categories: (i) spring-fall room temperature (March-May, September-November), 21°C: (ii) summer room temperature (June-August), 25.6°C; and (iii) winter room temperature (December-February), 18.3°C, except during unoccupied periods, when it would be understood to be 10°C.

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