

Nuclear winter status report

It "would be premature at this time" to change Defense Department policies or strategies to account for the possibility that a "nuclear winter" might be initiated by nuclear warfare, according to a March 27 report by the General Accounting Office (GAO), the congressional watchdog agency. Congress had asked GAO to review scientific research pertaining to nuclear winter — a controversial theory that suggests large-scale climate changes might be fostered by a strategic nuclear exchange (SN: 11/12/83, p. 314) — and to consider whether these research findings might justify changing defense policy.

Although the 55-page report finds nuclear winter to be "a plausible theory," it also points out that there remain "numerous uncertainties in critical areas" such as war scenarios, fire research and climate modeling. GAO suggests that only some of these uncertainties can be reduced by further research.

In its study, which involved not only a review of published research but also interviews with prominent researchers and policy analysts in the field, GAO identified major differences of opinion over whether the new \$5.5 million federal, interagency program for nuclear winter research, begun Oct. 1, is tackling priority problems in the most effective way. For example, at present few funds are earmarked for biological studies of a nuclear winter's possible effects. GAO says some scientists argue that, "given the range of likely consequences in nuclear war," such biological studies should be conducted along with the existing physical and chemical research. However, the study notes, others, including officials in the White House Office of Science and Technology Policy (OSTP), "think biological implications have secondary importance."

Analyses of the dynamics of large-scale fires generate similar disagreements. Some of those interviewed for the report suggest that the best use of limited funds is to concentrate now on the study of small-scale fires in laboratories. Others recommend focusing on controlled forest fires in Canada. Still others say forest fires "would not provide relevant data for modeling city fires and plume dynamics."

Before publishing the report, GAO sent around copies of a draft for comment by U.S. agencies involved in nuclear winter research. One of the primary criticisms it received came from the OSTP. According to GAO, OSTP argued that the report's "discussion of policy issues was giving more validity to the nuclear winter theory than was warranted"; OSTP therefore suggested that the tenor of the report be changed. GAO disagreed and left those discussions in its report.

Japanese basic-research windfall?

At the Economic Summit in Tokyo next month, Prime Minister Yasuhiro Nakasone intends proposing a 10-year, \$5 billion Japanese program to fund basic research in other Economic Summit countries, according to a senior official at the Japanese Embassy in Washington, D.C. The diplomat, who asked not to be named, told SCIENCE NEWS that although this program might be coordinated from a center in Japan, "the actual research would be carried out at appropriate institutions elsewhere" within the Economic Summit community, which includes the United States, Canada, United Kingdom, France, Italy, West Germany and additional European Economic Community member states.

The exact nature of the research has not been formally outlined, he says, other than to note that it would focus strongly on disciplines related to biotechnology. They might include not only physiology and biomedical studies, he adds, but also computer science — such as the use of "artificial intelligence to simulate the function of natural organisms."

"Very often Japan has been criticized as a science eater," he says, referring to his nation's reputation for using primarily

foreign science in developing its technology. "But here's a chance for Japan to take the initiative in a field that's still in its infancy." When asked why Japan chose not to spend its money domestically, he says, "Japan is not seeking a Japanese project; our intent is to establish an international project."

The official cautions that the proposal might not "make it to the table" at the upcoming summit because "this is, after all, an economic summit," and "Japan does not want to be looked upon as trying to divert attention from more pressing economic issues." But even if the proposal is aired, he says, it will probably take another year or so to develop a research agenda.

New U.S.-Soviet accord

On April 1 the U.S. National Academy of Sciences (NAS) and the Academy of the USSR signed a new two-year agreement calling for scientific cooperation, workshops and exchanges of scientists to participate in research activities in "nonsensitive" fields. Exchanges of individual scientists have been sponsored by the academies since 1959, though at reduced levels in recent years. According to Glenn Schweitzer, whose office at NAS will run the U.S. program, the new agreement differs from previous ones in several respects. For the first time, much of the agenda for meetings of academy officers will be spelled out in advance. Each side will now be able to request the participation of particular scientists from the other nation, and either side can now end programs it deems unproductive.

Crisis in undergraduate education

Over the past decade, U.S. undergraduate programs offering science, engineering and math education have developed "serious problems, especially problems of quality," according to a March 21 report by the National Science Board for the National Science Foundation (NSF). The deterioration, which was described as especially severe in engineering, represents "a grave long-term threat to the nation's scientific and technical capacity, its industrial and economic competitiveness and the strength of its national defense," the report says.

Laboratory instruction today, the board reports, is often "uninspired, tedious and dull" and conducted using instruments that are obsolete and inadequate. Moreover, the report says, essential lab courses are being dropped from many introductory courses in these fields. Adding to the problem, it notes, are faculty members who have not stayed abreast of changes in their field and courses that are not only out of date but also poorly organized and unimaginative.

These factors may account in part, the report says, for a growing decline in students pursuing careers in science, math and engineering; for the inability of many specialty disciplines to attract the number and quality of practitioners they need; and for the inadequate number of educators available to train the next generation of entrants in many fields. Finally, the study finds that financial support available for science, math and engineering education "is inadequately responsive to either its worsening condition or the national need for its revitalization and improvement."

The analysis concludes that although NSF cannot assume responsibility for the financial health of education in these areas, it can and should find ways to motivate state, local and private sources of aid. The report also recommends that NSF allocate an additional \$100 million for undergraduate education programs, including \$20 million toward improving laboratories and \$30 million for the support of programs aimed at providing schools with better instructional equipment. Admitting this \$100 million won't cure the schools' problems, the report says it should be enough "to cause truly significant, positive changes."