ed by the Department of Education and Science to universities for research increased from $664 million in 1977–1978 to $1,338 billion in 1982–1983.

A substantial increase is also revealed for the Department of Industries' support of research carried out by private industry, particularly in areas such as microelectronics and what is referred to as "new products and processes," which grew from $110 million in 1977–1978 to $291 million in 1981–1982.

—DAVID DICKSON

Problems with EDB Not Over Yet

Last week the Environmental Protection Agency (EPA) banned nearly all uses of the pesticide ethylene dibromide (EDB), but problems related to the chemical are not over yet. Although EPA administrator William Ruckelshaus declared an immediate end to the fumigation of stored grain and milling machinery, he still faces the sticky problem of whether to allow continued use of the pesticide to treat citrus fruit. Moreover, there is concern that other chemicals replacing ethylene dibromide may pose health risks from long-term exposure.

EPA set levels that were designed to calm public fears and provide a minimum of disruption to the grain and food industry. The greatest economic impact will be absorbed by food processors, according to Richard Johnson, the agency's main EDB expert. The agency set a 30-parts-per-billion maximum for ready-to-eat foods such as cold cereal and this level could cost manufacturers at most about a half billion dollars over the next few years because of product recalls. EPA expects that supplies of stored grain contaminated with EDB will be depleted in 3 to 5 years, thereby eliminating future long-term exposure to the pesticide.

The problem of pesticide residues in grain, however, might continue. Farmers are replacing EDB, used to kill insects, with a carbon tetrachloride mixture. Animal studies show that carbon tetrachloride causes cancer, gene mutations, and damage to the liver and kidneys. The agency began a special review of the chemical in late 1980 to determine whether it poses an unacceptable risk.

Ruckelshaus said that, within the next few weeks, he will decide whether to ban the use of EDB as a fumigant for citrus fruit to control fruit flies. His decision will affect the export of domestic fruit to countries such as Japan and the importation of fruit from the Caribbean and Central America. Florida citrus growers are now substituting methyl bromide for EDB until the agency makes a ruling. But EPA is also conducting a special review of methyl bromide because animal studies have indicated it is mutagenic.

Finally, food companies may have to contend with a patchwork of state regulations because several states have set lower tolerance levels for EDB than those proposed by EPA.

—MARJORIE SUN

Nuclear Power Faces "Bleak" Future, OTA Says

What is likely to be an influential report on nuclear power came out of the Office of Technology Assessment (OTA) on 7 February forecasting a "bleak" future for the industry in the United States. The study, "Nuclear Power in an Age of Uncertainty," was undertaken for the House Committee on Science and Technology and has been more than a year in the making.

Industry spokesmen were not enthusiastic about the study during its preparation and will hardly be thrilled with its findings. The central conclusion—somewhat obscured in the maze of policy options, strategies, and scenarios—is that the U.S. nuclear enterprise is likely to be feeble if not moribund by 1990 unless it undergoes a radical self-transformation *and* receives help from the government.

The industry's economic troubles and sagging public image have been reported before and are well documented again in this report. What is new is a fairly extensive case for not looking to deregulation as a way out. In discussing the construction delays which are often blamed for the worst cost overruns, the report notes:

> OTA has concluded that the regulatory process per se was not the primary source of delay in nuclear plant construction. Rather, during the 1970's (when leadtimes escalated the most), utilities delayed some plants deliberately because of slow demand growth and financial problems. Plant size was being scaled up very rapidly and construction was begun with incomplete design information. The increasingly complex plant designs meant that more materials . . . were required, and constructors often experienced delays. . . . At the same time, worker productivity declined.

Thus, the study finds that through bad planning and weak supervision in the 1970's, the manufacturers helped bring on the slump of the 1980's. This, combined with the recession and the shock of Three Mile Island, dealt the industry a staggering blow.

There is hope for the future, the OTA thinks, but not without a painful effort at reorganization. In the meantime, the OTA says, foreign reactor builders (in France, Japan, and possibly Germany and Canada) may give some hard competition. In concluding, the report gives a short list of recommendations, none of which is considered adequate in itself to save the day. The government's options:

- Help finance an overhaul of light water reactor designs that would include the changes brought about by Three Mile Island and other "backfit" requirements, with a goal of improving both safety and efficiency.
- Fund programs that would improve the supervision of plants during both construction and operation.
- Require the Nuclear Regulatory Commission to take more care in ordering "backfits" and other changes on existing plants, in order to avoid unnecessary complexity.
- Establish a new program that would certify utilities and contractors as being technically competent to work in the nuclear field.
- Support R & D on standardized systems and entirely new concepts, such as the Swedish inherently safe reactor, the Canadian heavy water reactor, and the high-temperature gas-cooled reactor. (The latter is scheduled to receive $35 million in development funds in fiscal year 1985, according to the Reagan Administration's budget proposals.)
- Reduce controversy by involving critics of the industry "more directly" in the regulation and design of new reactors.
- Control the rate of plant construction to avoid future waste.

—ELIOT MARSHALL