

\$600 million to \$8 billion. Funding also is provided for a new space orbiter. The Department of Defense (DOD) is likely to shoulder the \$2.96-billion cost. NASA officials, however, worry about having to pay for \$265 million in costs for maintaining shuttle-related facilities and personnel. Potentially, programs like the Space Station, Advanced Communications Technology Satellite, the Trans Atmospheric Vehicle (space plane), and smaller science programs could be stalled or cut back.

The National Science Foundation's budget stands at \$1622.9 million, less than the \$1685.7 million proposed by the Administration. Of the total, \$1406.2 million is earmarked for research, an 8% increase over 1986. ■ **MARK CRAWFORD**

Education Secretary Uses Harvard Podium To Take Host to Task

A speech by Secretary of Education William J. Bennett to Harvard College undergraduates on 10 October kindled sharp controversy even before it was delivered. Bennett used the Harvard rostrum to subject Harvard and other universities to wide-ranging criticism on educational, political, and moral grounds.

Harvard president Derek Bok reacted to a look at an advanced copy of Bennett's text by issuing a tart statement in which he charged Bennett with engaging in "polemics." In an academic equivalent of equal time, Bok also followed Bennett on the Friday program, making a brief rejoinder to the Education Secretary.

Bennett's speech was part of a weeklong program of undergraduate activities planned to celebrate Harvard College's 350th anniversary. Bennett was invited by dean of undergraduates Archie Epps.

Bennett, who earned a Ph.D. in political philosophy from the University of Texas and a law degree from Harvard, has been a combative Secretary of Education, particularly in conducting a highly public campaign for his own agenda of education reform. In his Harvard speech, a major theme was that students "deserve a university's real and sustained attention to their intellectual and moral wellbeing," and American universities, including Harvard, by and large were not fulfilling that obligation. Most colleges and universities fail to provide a good general education, he said. "Under the justification of deferring to individual choices, much is left to chance." He made clear that Harvard's core curriculum fell short of meeting his standards.

Turning to moral issues, Bennett faulted universities for self-righteousness, charging that universities are quick to "proclaim their duty to address all sorts of things that are wrong in the world," but tend to shrug off problems closer to home such as that of drugs on campus.

Bennett hit hard at what he sees as university laxity in fostering essential traditions of the free exchange of ideas on campus, citing growing signs of intolerance, particularly against "right-leaning speakers." And he scored a pervasive liberal bias in academe, observing that "Most of the people in the humanities and social science departments in the universities stand to the left of center."

Bennett expressed impatience with the universities' obsession with money, noting that higher education "refuses to acknowledge the obvious fact that, in general, it is rich." Higher education lobbyists in Washington he described as "very good at getting their funds from a Congress seemingly enraptured by the pieties, pontifications, and poor mouthings of American higher education."



William J. Bennett: "Pieties, pontifications, and poor mouthing" from higher education.

In his original riposte Bok said:

"Secretary Bennett's speech raises important questions about the role of universities and the education they offer. Instead of pursuing these questions in an informed and sober manner, however, he has followed his penchant for delivering highly publicized polemics against educational practices which he has not studied in detail and policies with which he happens to disagree. In doing so, he sheds more heat than light and squanders an opportunity to make a lasting contribution to educational reform." ■

JOHN WALSH

Hanford Plant Closed Over Safety Violation

Concern for public safety prompted the Department of Energy to close the plutonium production center at Hanford, Washington, on 8 October. The PUREX and the plutonium finishing plants, which manufacture bomb material for the military, may be out of commission for as long as a month while they undergo a management review.

DOE ordered the plants to shut down after workers violated rules that are meant to prevent fission accidents, including, in the worst scenario, a nuclear explosion.

As DOE spokesman Thomas Bauman explained, the decision to close the plants is meant to be a reprimand to the contractor, Rockwell International, for its inattention to quality control. "I don't want to say that these things have been happening all the time," Bauman said, "but we have had several incidents like this."

The latest violation occurred as Rockwell employees were about to move plutonium nitrate from one process area to another through pipes. Safety standards require that every plumbing connection along the route be "blanked off" by a metal block. This insures that if valves are opened accidentally, the material will not flow to the wrong tank. This precaution is necessary because liquids with a high concentration of plutonium must be stored in special tanks that prevent the buildup of a critical mass of fissioning material.

On 29 September, Rockwell workers came close to sending the plutonium along the pipe before inserting the metal blocks. How close they came has not been revealed. In any case, DOE says, it is unlikely that a criticality accident would have occurred because five closed valves blocked the path to the area where a critical mass might have accumulated.

Earlier this year, according to an aide to Washington Governor Booth Gardner (D), the plant managers made a less alarming but more embarrassing mistake. Just before the governor went on a tour of the Hanford facility, workers removed signs warning of radioactive contamination from a spill. Later, the governor learned that the bus on which he rode passed through a contaminated zone and picked up a small amount of radioactivity.

More recently, the *Seattle Times* published an investigative series describing management problems at Hanford as revealed in confidential reports by Rockwell's lead auditor at the site, Casey Ruud. He found problems in plant design, quality control,

management discipline, and nuclear materials accounting. In May, Ruud specifically asked Rockwell officials to confirm in writing that they had improved the controls on plutonium within the plant. Otherwise, he said, they should close it down.

Several western politicians demanded last week that DOE take stronger action to resolve these management problems. Governor Gardner said on 8 October that he believed that "production is given a much higher priority than safety" at Hanford. "Maybe it's time for an independent review of all Rockwell operations, both to restore credibility and to assure safety," he said. Representatives Ron Wyden (D-OR) and Al Swift (D-WA) and Senator Daniel Evans (R-WA) have made similar proposals.

They are likely to have their wish fulfilled, according to U.S. congressional aides. The House energy subcommittee on oversight and investigations is one of several committees planning an inquiry. ■

ELIOT MARSHALL

Hoechst Tests Lead EPA To Ban Herbicide

A widely used herbicide, dinoseb, has been banned from use by the Environmental Protection Agency. The ban was instituted on 7 October in response to findings that the chemical could affect human reproduction and cause tumors.

EPA Administrator Lee M. Thomas issued the order on the basis of results of tests performed on animals by Hoechst AG, an international chemical and pharmaceutical manufacturer based in West Germany. Irreversible neurological and skeletal malformations occurred in the offspring of rabbits exposed to the chemical during pregnancy, the agency says.

Defects were found in 11 of 16 litters of Chinchilla rabbits that received doses of 1, 3, and 10 milligrams per kilogram of food ingested daily during days 6 to 18 of gestation. EPA concluded that dinoseb produced "biologically and statistically significant increases in malformations . . . at the highest dose tested when compared to the control group."

Other studies submitted to EPA show that the chemical affects fertility in male rats and mice. EPA says that limited studies also suggest that dinoseb has the potential to affect the human immune system and eyes. While dietary exposure to the chemical does not appear to present a significant risk, says Thomas, the chemical poses a threat to the unborn children of pregnant women and may produce sterility in men when it is

inhaled or absorbed by the skin. The agency began examining the hazards of dinoseb in 1984.

Thomas exercised rarely used emergency powers to ban the pesticide because of the potential hazard to 25,000 farm workers in the next several months. Usually, a hearing is held before use of a herbicide or pesticide is suspended or banned. Dinoseb is primarily applied as a contact herbicide to control broadleaf weeds. An estimated 7 million to 11 million pounds of herbicides containing dinoseb are applied annually in the United States, chiefly through field sprayers, aircraft, and hand-held equipment. EPA estimates that 25% of this use occurs in the fall and early winter.

The herbicide is used primarily in connection with soybeans, cotton, potatoes, peanuts, and alfalfa. First-year losses from the suspension of dinoseb use will run as high as \$90 million, the agency says. The three largest American producers are Uniroyal Chemical Company, Cedar Chemical Corporation, and Drexel Chemical Company, EPA says.

Hoechst does not market dinoseb in the United States. The company has registered the chemical with the EPA, chiefly as a certification procedure to meet requirements of other countries that permit the importation of products approved by the American agency. The company initiated toxicological studies last year in anticipation of the U.S. Congress passing amendments to the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). The legislation requires that pesticides that have been on the market for years be retested for compliance with current federal standards.

Hoechst first notified EPA of its findings in December 1985. Subsequent reports were provided to the agency in May of this year and on 16 September. On 10 September, in a letter to its subsidiary, American Hoechst Corporation, the company confirmed the findings of earlier tests. It further advised American Hoechst to drop EPA registration for the chemical. Trying to win EPA approval for continued use was judged too costly by the company.

On another front, EPA has placed restrictions on a second widely used herbicide, alachlor. Registered with the agency since 1969 and manufactured by Monsanto Chemical Company, it is the most widely used herbicide in the United States (*Science*, 12 September, p. 1143). The agency has initiated a review of the chemical in response to test results that show that alachlor produces tumors in mice and rats. A ban on the use of alachlor, the agency says, would mean farm losses up to \$760 million. ■

MARK CRAWFORD

Panel Questions Shuttle Flight Rate

The space shuttle fleet will be unable to sustain the flight rate planned by the National Aeronautics and Space Administration (NASA), according to a panel convened by the National Research Council.

After an initial buildup period following the resumption of shuttle flights, says the panel report,* NASA will be able to launch 8 to 10 flights per year with the current three-orbiter fleet, and 11 to 13 flights per year with a four-orbiter fleet. This estimate is as much as 25% lower than NASA's recently announced schedule, which calls for 12 flights per year with three orbiters, and 16 flights per year when the replacement orbiter enters the fleet in 1991 (*Science*, 17 October, p. 279).

The 11-member panel, which was chaired by former White House science adviser Edward E. David, Jr., says that a "surge" rate equivalent to 15 flights per year should be possible with four orbiters—but only for short periods of time, and only for simple payloads and flight plans. Sustaining even the lower rates will require improvements in spare parts availability, crew training facilities, shuttle processing facilities, and many other aspects of the program.

The shuttle flight rate is a sensitive point with NASA. Not only has the agency been criticized for unrealistic launch schedules in previous years, but the pressure on mid-level officials to meet those schedules was cited by the Challenger commission as a major factor contributing to the disaster on 28 January. In announcing the post-Challenger shuttle manifest on 3 October, NASA administrator James C. Fletcher accordingly emphasized that the 16-flights-per-year rate was simply a target and would be modified if any safety problems arose.

Where NASA and the panel appear to differ most strongly is in their assumptions about orbiter availability. The panel members concluded that one or another of the orbiters will always be out of service through a combination of routine maintenance, repairs, and upgrades. In effect, a three-orbiter fleet is really only a two-orbiter fleet, and so on.

The panel also points out that the shuttle fleet will have to serve at least until the year 2000. Since there is a significant probability of losing an orbiter to age or accident in that time, the panel suggests that NASA should always have one contingency orbiter in production. ■ M. MITCHELL WALDROP

* "Post-Challenger assessment of space shuttle flight rates and utilization," National Academy Press, Washington, DC, October 1986.