

impossibility of adequate cleansing of cabin air became evident.

"The coup de grace to smoking in airlines was the realization that diminished ventilation with outside air and increased recirculation of air, a characteristic of almost all new airliner models, will increase previous levels of toxic products of cigarette smoking in nonsmoking sections of the cabin."

In recommending the ban, the committee cites four aims: to lessen irritation and discomfort to passengers and crew, to reduce potential health hazards to cabin crew, to eliminate the possibility of fires caused by cigarettes, and to bring the cabin air quality into line with established standards for other closed environments.

Besides the smoking issue, the report, "The Airliner Cabin Environment," takes a comprehensive look at cabin air quality and safety issues including contamination and pollution from ozone, cosmic radiation, ground fumes, biologic aerosols, humidity, carbon dioxide, and dangers from onboard fires and depressurization.

Sponsor of the study was the Department of Transportation, parent agency of the Federal Aviation Administration, which regulates the airlines. Chalmers says the panel found the FAA system for dealing with air safety "phenomenal," but its concern for health issues less focused. Because of the scarcity of monitoring studies on air quality in airliner cabins, the panel decided to make comparisons of conditions in aircraft with other types of environments. Chalmers says that after looking at air-exchange rates in plane cabins, the panel concluded that conditions on airliners were inferior to those in other environments. For example, the panel says that measured values for environmental tobacco smoke in airline cabins were found to exceed a Japanese standard for indoor air quality. And ventilation standards set in the United States to avoid irritation by tobacco smoke in buildings are not met by prevailing aircraft practices.

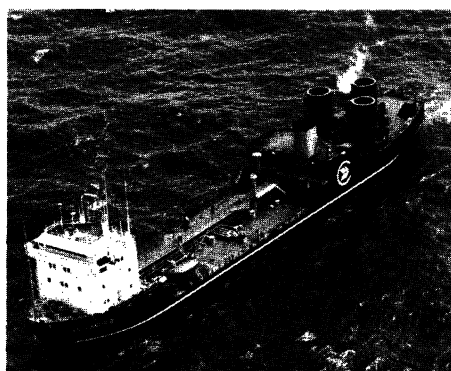
It is unusual although not unprecedented for an academy report not to cite decisive scientific evidence to support a major recommendation. In such cases, academy panels not infrequently wind up calling for more research. In this instance, the panel succeeded in convincing those manning the academy's formidable report review mechanism that the weight of evidence, incomplete as it is, justified the ban. Chalmers says that the process was a rigorous one, recalling that the review document ended up "bigger than our report." He acknowledges that "There was trepidation throughout the building. They wanted to be absolutely sure we could stand up to the criticism." ■

JOHN WALSH

## OTA Enters Inflamed Debate on Ocean Incineration

Of all the ways to get rid of hazardous waste, none has engendered as much controversy as burning toxic substances at sea. Now the Office of Technology Assessment (OTA) has entered the fray with a lengthy report that has already been used by proponents and opponents of the technology to bolster their own arguments.

The report, "Ocean Incineration: Its Role in Managing Hazardous Waste," released on 15 August, comes at an opportune time because the Environmental Protection Agency is struggling to develop regulations on ocean incineration. In May, EPA rejected



**Vulcanus II.** Plans to use the ship to burn wastes off New Jersey drew strong protests.

an application submitted by Chemical Waste Management, Inc., to conduct experiments on its ocean incineration ship, the Vulcanus II, off Cape May, New Jersey. The agency announced at the same time that it would not issue a permit until it had developed regulations to cover both research and commercial use of the technology. The company proposal generated enormous local opposition; nearly 3000 people attended public hearings held this spring on the proposal.

The OTA report says that burning hazardous waste at sea could be used as a stopgap measure to treat toxic liquids. It states that ocean incineration "could be a useful option, but is clearly not a panacea." Ultimately, better methods to reduce or recycle waste must be developed. Ocean incineration would only be suitable to treat 5 to 8% of all hazardous waste, but the chemicals that could be destroyed by the technology are among the most toxic. The report also notes that incineration at sea is one of the few methods available to detoxify hazardous waste that is highly chlorinated.

The report says that there are many unresolved scientific questions concerning the technology's potential risks to health and the

environment. Many of these same concerns were raised last year by an EPA scientific advisory board. For example, the board recommended that EPA develop better ways to measure whether compounds have been destroyed by burning and that it should improve methods to identify what compounds are being emitted into the atmosphere after incineration.

Representative Roy Dyson (D-MD), a member of the House Committee on Merchant Marine and Fisheries, which has jurisdiction over ocean incineration, said in a statement that, based on the findings of the OTA report, "the need for ocean incineration has not been proven." But James Banks, director of environmental affairs at Waste Management, Inc., the parent company of Chemical Waste Management, repeated the report's statement that ocean incineration could be considered an interim method of treating hazardous waste. Banks said, "We're not saying that ocean incineration is the end-all and be-all. But let's go ahead and get the regulations moving. The technology is ready." ■ MARJORIE SUN

## Nuclear Waste Program Hits Senate Roadblock

The effort to find a suitable place to bury highly radioactive wastes from nuclear reactors has run into serious trouble in the U.S. Senate. On 13 August, the Senate Appropriations Committee voted unanimously to gut the Department of Energy's civilian nuclear waste budget, stripping some \$400 million from the \$780 million requested by the Administration.

The move, spearheaded by Senator Mark Hatfield (R-OR), is designed to block exploration of three candidate sites in the western United States for at least a year. The three sites, in Washington, Nevada, and Texas, were recently selected by DOE for intensive study with a view to choosing one of them as the nation's first nuclear waste repository.

The selection process was part of a carefully crafted national plan put together by Congress 4 years ago. It involved the selection of one site in the West, followed several years later by a second site in the East. However, the plan started to unravel on 28 May when DOE announced that it is suspending the search for an eastern site, claiming that one repository will be enough for the time being. The announcement angered people in the West, and the Senate Appropriations Committee action was a direct result (*Science*, 22 August, p. 835).

The committee is ostensibly calling for a 1-year delay in the program. However, political support may now be so badly frayed that it will be difficult to get the effort moving again.

The fate of the program is thus likely to be decided in September. The appropriations bill will reach the Senate floor after Congress returns from its recess on 8 September and, if the cuts are approved there, a House-Senate conference committee will take up the matter. The House has approved some \$620 million for the civilian waste program, enough to begin intensive work on the western sites. ■ COLIN NORMAN

## Nobelists Unite Against "Creation Science"

It is often difficult to get more than two Nobel prizewinners to agree on anything, but Murray Gell-Mann, the Caltech physicist, has managed to get 72 of them to endorse a legal brief filed in the Supreme Court on 18 August. The brief supports an effort to overturn a Louisiana law that requires "creation science" to be given equal time with evolution in the state's public schools.

The law, passed in 1981, has already been judged unconstitutional by a federal court on the grounds that it violates the First Amendment prohibition on state promotion of religious beliefs. The ruling was upheld by a three-member panel of the 5th Circuit Court of Appeals, whose ruling was in turn upheld by an 8 to 7 vote of the full appeals court. On 5 May, the Supreme Court agreed to take the case on.

The Nobelists' brief argues that "creation science" is religion dressed up as science and therefore should not be taught in the schools. Gell-Mann started gathering support for the "friend of the court" brief soon after the Supreme Court took on the case. At a press conference called in Washington to coincide with the filing, Stephen J. Gould of Harvard argued that "as a term, creation science is an oxymoron—a self-contradictory and meaningless phrase—a whitewash for a specific, particular, and minority religious view in America: Biblical literalism."

Francisco Ayala, of the University of California at Davis, added: "To claim that the statements of Genesis are scientific truths is to deny all the evidence. To teach such statements in the schools as if they were science would do untold harm."

The Supreme Court is expected to hear oral arguments on the case this fall. ■

COLIN NORMAN

## Tax Reform Package Jars University, R&D Sectors

Tax reform legislation now pending before Congress may deal the university community a series of setbacks that could affect items ranging from donations received by universities to scholarships and fellowships. The sweeping overhaul of the tax rate structure, which was reported by the Joint Committee on Taxation on 16 August, still must be approved by both houses of Congress. The bill has strong White House support and is expected to pass Congress with few amendments.

Thomas G. Head, of the Association of American Universities (AAU), says it is unlikely that the university community will have an opportunity to get "deficiencies" in the legislation altered. Majority leaders in both the Senate and the House are expected to limit, if not prohibit, efforts to change the tax reform bill.

One change that could hurt private and public universities is the treatment of gifts of appreciated property. Under the legislation, large gifts that would lower a taxpayer's income to the 15% bracket could trigger an alternative minimum tax mechanism that would raise the tax level to 21%. AAU's Head says the university community is concerned that some potential donors of appreciated property will refrain from making gifts. This could occur, he contends, in instances where the prospective donor already falls within the 15% bracket.

Other items of concern to the university establishment include:

- A cap on the use of tax-exempt bonds by private universities. Under the law, an individual university could hold no more than \$150 million in such debt at any one time. AAU estimates that 22 private institutions—including Harvard, Yale, the University of Pennsylvania and Stanford—already exceed this ceiling.

- Nondiscrimination language included in the bill will force colleges and universities to make their pension plans more uniform. Typically faculty have more generous plans than nonteaching staff. The total cost of this reform is not clear, says Jerold Roschwalb, of the National Association of State Universities and Land-Grant Colleges. The cost will vary among institutions, he notes, but is likely to be significant. Some analysts suggest that mandate to equalize pension programs by January 1989 could force universities to radically change pension programs for faculty.

- Elective contributions made by faculty to retirement plans will be limited to \$9500

annually. Most likely to be affected by this cap are senior professors with large salaries who want to shelter income from taxation until retirement.

- Income from scholarships and fellowships will be taxable except for the portion used for tuition or to finance research. In the case of classic fellowships awarded to graduate students, universities could have to increase the size of fellowships in order to offset the tax bite.

- Charitable deductions claimed by individuals that do not submit itemized tax returns will be prohibited.

Research and development has not fared as well as expected under tax reform (*Science*, 23 May, p. 929). One positive provision is a new 20% flat credit for industry-sponsored research conducted at universities or tax-exempt nonprofit facilities. Stephanie Becker, of the Coalition for the Advancement of Industrial Technology, says this incentive will lead to expanded industry support for university-based R&D. The R&D tax credit also will be extended for 4 years, but at a rate of 20% instead of the current 25%. ■ MARK CRAWFORD

## Humane Society Fires Animal Rights Activist

The Humane Society of the United States may be attempting to modify an apparent drift toward the radical end of the animal welfare spectrum. In early August it dismissed John McArdle, a former research physiologist and an outspoken critic of much animal experimentation, as head of its Institute for the Study of Animal Problems.

The dismissal came shortly after an article was published in the August issue of the *Washingtonian* magazine which portrayed most animal welfare groups as being hostile or indifferent to research. Among the sentiments attributed to McArdle is that "most biomedical research has very little to do with human health," and the proposal that brain-dead humans be substituted for animals in surgical research. He is also quoted as saying "the HSUS is definitely shifting in the direction of animal rights faster than anyone would realize from our literature."

An humane society spokesperson says McArdle's views were misrepresented and that his dismissal has nothing to do with the article. The society's president John Hoyt has written the *Washingtonian* vehemently asserting that HSUS "is not an antivivisectionist organization," and that it recognizes animal use has benefited some research. ■

CONSTANCE HOLDEN