RESOURCES & ENVIRONMENT

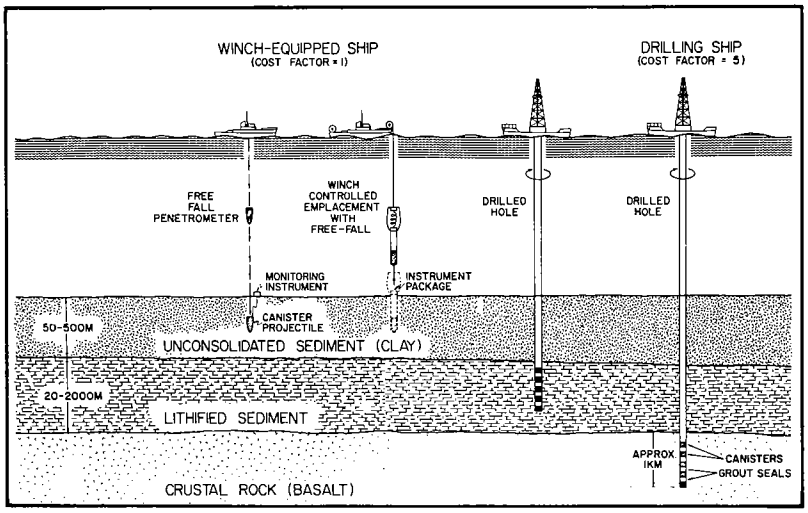
Deep-Sixing Atomic Wastes

"Can We Dispose of Radioactive Waste in the Deep-Sea Floor?" by G. Ross Heath, in *Maritimes* (Nov. 1976), University of Rhode Island, Wakefield, R.I. 02880.

Proposed solutions to the critical problem of radioactive waste disposal include: (1) burning dangerous waste elements in nuclear reactors, (2) launching waste containers by rocket deep into outer space, and (3) burial in stable formations of the earth's crust. The first option requires new technology; the second is extremely costly; but there appear to be no ecological or technological barriers to the third option when stable sediments of the deep-ocean floor are used, writes Heath, an oceanographer at the University of Rhode Island.

The deep seabed—four miles down—offers distinct advantages. It is the "least valuable real estate on earth," containing no potential petroleum or mineral resources, supporting no important fisheries, and lying too far from land for recreation or mariculture. The proposed disposal sites lie far removed from shifting and unstable mid-ocean ridges and deep-sea trenches; thus they do not suffer the earthquakes or large rock movements of tectonically active areas. Unlike land sites, they will be unaffected by future ice ages.

Present plans call for packaging radioactive waste material (em-



Adapted from diagram by A. J. Silva and C. D. Hollister.

The chart illustrates "sub-seabed emplacement concepts" for radioactive waste disposal with deep-drilled emplacement (at far right) costing 40 times as much but burying 100-200 times as many nuclear waste canisters as "free fall" emplacement (at far left).

bedded in silicate glass) in corrosion-resistant canisters. Even these will leak after 1,000 years, requiring surrounding sediments to impede the escape of radioactivity from slowly decaying elements for up to 1 million years. Tests show that the radioactive element thorium travels through North Pacific clay sediments, for example, at a rate of one meter every 10 billion years. What remains, Heath writes, is to determine the effects, if any, of both radioactive heat and the placement of disposal canisters on the barrier properties of deep-ocean sediments. Such research is now underway.

Better Mileage, Less Pollution

"More Miles Per Gallon," in *Scientific American* (Jan. 1977), 415 Madison Ave., New York, N.Y. 10017.

If 11 million 1977-model automobiles are sold in the United States as predicted, reports *Scientific American* (in "Science and the Citizen") they will burn 3 billion fewer gallons of fuel (or 2.6 percent of current U.S. consumption by motor vehicles) in their first year on the road than they would if they ran as inefficiently as cars built only three years ago. Savings to motorists: $2 billion.

Due largely to technological improvements by Detroit in response to federal legislation, the "sales-weighted fuel economy" of the new models has reached 18.6 miles per gallon compared to the historic 1974 low of 13.9. The 19 percent greater fuel economy was achieved even though federal exhaust emission standards were tightened for 1977 models. Still stricter standards in California, requiring special antipollution devices, cost owners of 1977 models there a 12 percent "fuel penalty." The auto industry has asked Congress to ease 1970 legislation mandating "ultimate" emission standards nationwide by 1978.

RELIGION & PHILOSOPHY

Hare Krishna and U.S. Youth

"Light from the East: A Report from Naropa" by Harvey Cox, in *Christianity and Crisis* (Jan. 24, 1977), 537 W. 121st St., New York, N.Y. 10027.

"For over 100 years, some Americans have been tempted to Go East . . . when they have become discontented with what was at hand." It began as early as 1858, when India's Swami Jogut Sangooly visited Ralph Waldo Emerson in Concord. Oriental religions also intrigued Walt Whitman, William James, and the theosophists. After summer teaching at the Buddhist Naropa Institute (1,000 American students)