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SCIENCE is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Second-class postage (publication No. 444460) paid at Washington, D.C., and at an additional entry. New combined with The Scientific Monthly: Copyright © 1985 by the American Association for the Advancement of Science. Domestic individual membership and subscription (51 issues): $60. Domestic institutional subscription (51 issues): $98. Foreign postage extra: Canada $34; other (surface mail) $27, air-surface via Amsterdam $65. First class, airmail, school-year, and student rates on request. Single copies $2.50 ($3 by mail); back issues $3 ($3.50 by mail); biotechnology issue, $5 ($5.50 by mail); classroom rates on request. Change of address: allow 6 weeks, giving old and new addresses and seven-digit account number. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and their users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of $1 per copy plus $0.10 per page is paid directly to CCC, 21 Congress Street, Salem, Massachusetts 01970. The identification code for Science is 0036-8075/85 $1.00. Postmaster: Send Form 3579 to Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Science is indexed in the Reader's Guide to Periodical Literature and in several specialized indexes.
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Call for Symposium Proposals

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Size and Scaling in Primate Biology, reviewed by H. M. McHenry; The Quantum Theory of Unimolecular Reactions, D. G. Truhlar; Theory of Molecular Fluids, D. Chandler; Theoretical Concepts in Physics, C. M. Sommerfield; Books Received

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Technical Comments: Detection of Number or Numerousness by Human Infants: H. Davis, M. Albert, R. W. Barron; P. Starkey, R. Gelman, E. S. Spelke

COVER
(Left) The leaves of the Madagascar periwinkle (Catharanthus roseus) yield the anticancer drugs vincristine and vinblastine. [T. E. Hemmerly, Middle Tennessee State University, Murfreesboro; reproduced with the permission of Carolina Biological Supply Company, Burlington, North Carolina] (Center) Pyrethrum (Chrysanthemum cinerariaefolium) flower heads yield commercially important pyrethrin insecticides. [W. H. Bollinger, NPI, Salt Lake City, Utah] (Right) The berries of the chinaberry tree (Melia azedarach) yield insectidal limonoid compounds such as azadirachtin. [J. R. Martineau, NPI, Salt Lake City, Utah] See page 1154.
Waste Management

Our society generates an enormous amount of solid waste. Most of it is municipal in origin; a substantial part is industrial. For decades little thought was given to possible toxicity. Today, the public is increasingly concerned about danger to health, especially from contaminated drinking water.

In 1976, Congress passed a Resource Conservation and Recovery Act to regulate existing industrial waste dumps. This was followed by a Comprehensive Environmental Response, Compensation, and Liability Act in 1980 to provide for cleanup of abandoned dumps. Included was a tax on feedstocks that was designed to produce $1.6 billion (Superfund) to be spent in the following 5 years and administered by the Environmental Protection Agency (EPA). In preparation for renewal of the Superfund Act, the House Energy and Commerce Committee and the House Science and Technology Committee requested that the Office of Technology Assessment (OTA) prepare a report on Superfund.

The report takes the position that the magnitude of the cleanup that will be required is much greater than had been thought. Earlier EPA estimated that 2000 sites would ultimately be placed on a National Priorities List (NPL). The OTA asserts that at least 10,000 sites will eventually be on the NPL, but it includes in its total some sites that are not now under Superfund responsibility. Experience during the last 5 years indicates that the costs of cleanup will be enormous. The OTA estimates that it may be necessary to spend several hundred billion dollars in an effort requiring as long as 50 years.

The report criticizes the way that the EPA has operated. For the most part, toxic waste has merely been moved from one place to another. Landfills are known to be subject to leaching, and the EPA is said to have been slow to establish monitoring procedures. Little has been done to achieve permanent solutions to the toxic waste problems, and the EPA has only begun to foster innovative approaches.

The OTA has made a number of recommendations to Congress. One suggests a substantial research, development, and demonstration fund. Another is to create a well-funded, high-priority interagency program whose purpose would be to deal expeditiously with the problem of obtaining more complete information on the health effects of toxic wastes. The report also recommends a waste-end tax to provide funding to complement other sources. The tax would also be designed to slow the creation of still more uncontrolled waste sites.

One of the major chapters of the report is devoted to clean-up technologies. The present conventional techniques include capping the wastes with an impermeable layer and installing drains to monitor and recycle leachate. Some of the widely used processes for treating wastewater include carbon adsorption, flocculation, sedimentation, filtration, ion exchange, and reverse osmosis. More interesting are the innovative technologies designed to destroy wastes.

The major environmental toxic wastes are halogenated organic chemicals. These can be destroyed completely by incineration at high temperatures. The off-gas acids can be trapped. An interesting alternative is pyrolysis to form an insoluble char and harmless gases that can be burned. Another method, which seems quite attractive, is oxidation in supercritical water. Still another method, already in wide use in industry, is biological treatment followed if necessary by carbon adsorption. Altogether, 26 methods are described. Given encouragement and financial inducements, methods superior to landfill could be demonstrated. Their first cost might be higher than those of present methods, but they would not give rise to continuing costs and ineffective disposal or be a burden to future generations.—Philip M. Abelson