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Municipal Waste

The 6000-mile odyssey of a U.S. barge seeking in vain to dispose of its 3100-ton cargo of trash has drawn national and international attention to an approaching crisis in municipal waste management in this country. The United States generates an average of more than 400,000 tons of municipal waste a day. The per capita contribution is about twice that of citizens in other developed countries. Before the 1960s, most trash was burned in open dumps or in poorly functioning incinerators. The practice was curtailed when clean air legislation was enacted. Disposal then shifted to so-called sanitary landfills. At present, more than 90 percent of municipal wastes are buried. But time is running out on burial. Many dumps have reached the limits of capacity, and by 1990 half of them are expected to be closed. Around the country there is strong opposition to locating new landfills in any particular neighborhood. In addition, there is growing recognition of contamination of ground water by leachate from the dumps. My guess is that the situation in many of them will be found to be more serious than that at some of the Superfund sites. The Fresh Kills landfill on Staten Island discharges 4 million gallons of toxic leachate per day.

What makes effective waste disposal a particularly difficult problem is the complexity of the trash. The composition also differs from place to place. On average, the major components are paper and paper products, yard wastes, food wastes, and moisture. But in addition, the trash contains glass and ceramics, metals, plastics, and anything that is not wanted, including paint cans, spray cans, solvents, and potentially flammable or explosive materials. Obviously, segregation of components at households and separate collection of them would make both recycling and residual disposal easier. This is a practice often employed in other countries, but rarely here. If anything, this country has retrogressed with respect to segregation and recycling since the 1970s.

The present usual alternative to landfill disposal is to incinerate the waste, thus reducing the volume by about 90 percent. If noncombustibles and moist garbage are separated first, temperatures in the furnace can be sufficiently high to destroy all organic matter. The heat produced can be used to generate electricity. However, critics have raised questions about burning unprocessed trash. When excessive moisture is present, temperatures in the furnace will be limited, and dioxins and other hazardous chemicals may be created. In Europe,* incinerators are closely monitored to ensure complete combustion of organics, and scrubbers are employed to eliminate acid gases such as hydrogen chloride. In the United States, neither the federal government nor the states have established a full range of performance monitoring and standards. Incineration plants known to be functioning poorly have not been shut down. The politics of the situation make it far easier for the Environmental Protection Agency to be tough on industry than to deal with municipalities.

An alternative to complete dependence on incineration is biodegradation of waste. This is particularly applicable when the trash consists mainly of moist food residues and paper. When the treatment is conducted anaerobically, the principal products are carbon dioxide and methane, a good fuel.

Because landfills are reaching capacity and few new ones are being authorized, the cost of disposing of wastes is increasing. Six years ago, tipping charges (cost of dumping trash) were as low as $5 a ton in some places. Now the average is $25 and going up. Philadelphia has paid $90 a ton to have some of its wastes deposited in Ohio. As more and more landfills are closed, tipping charges will increase. There will be an additional financial incentive to develop improved practices for separating components of the waste, either at the household or following collection.

With the imminent closing of landfills, many cities are building or planning to build incinerators. Before new air pollution problems are created, lessons should be learned from other developed countries that have in place standards, monitoring, and trained engineers to operate the plants.—PHILIP H. ABELSON

*See A. Hershkowitz, *Technol. Rev.*, in press.