2B—"The agent is possibly carcinogenic to humans" (*3*).

p-Dichlorobenzene is used primarily as a space deodorant and for moth control. The solid form is commonly used to mask odors in toilets. Domestic production of 73.5 million pounds was reported for 1984 (*4*). It has been estimated that more than 9000 workers were exposed to the chemical occupationally in 1980 (*5*). Significant numbers of consumers are also exposed from the use of products containing *p*-dichlorobenzene. The concentration of *p*-dichlorobenzene in personal air samples from individuals at sites in five states ranged from below 0.02 to 1550 micrograms per cubic meter in nighttime air and from below 0.02 to 2600 micrograms per cubic meter in daytime air (*6*).

As a result of the findings of the NTP carcinogenesis studies, the Consumer Product Safety Commission and the Office of Toxic Substances of the Environmental Protection Agency are conducting risk assessments of *p*-dichlorobenzene to aid them in making risk management decisions.

The findings from the NTP carcinogenesis studies reinforce the need for caution in making analyses as to cost-effectiveness of differing research approaches to the prevention of cancer.

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EDB: Persistence in Soil

Recent studies (*1*) have revealed a neglected aspect of the behavior of organic compounds in soil or sediment that we believe has important implications. Compounds added to soil can, with time, diffuse to remote sites in the soil matrix, where they are inaccessible to microbial degraders and from which they can slowly leach to water supplies over exceedingly long periods.

We have found that the soil fumigant 1,2-dibromoethane (EDB) persists in topsoil at nanogram-per-gram concentrations for at least 20 years despite its predicted lability in the environment (that is, high volatility, high water solubility, and low soil-water partition coefficient). In these soils, a spike of ^{14}C-labeled EDB was rapidly mineralized, whereas the "residual" EDB remained unchanged.

Experiments further showed that this "residual" EDB is strongly bound. It can only be extracted from soil with polar solvents at elevated temperatures. Surfactants show no enhanced extraction ability. Thermal desorption up to 200°C into a stream of N_2 resulted in more decomposition than desorption, while a fresh spike of ^{14}C-labeled EDB was recovered quantitatively. Diffusion of "residual" EDB from soil into water is very slow at 25°C and is highly temperature dependent. The rates yield an upper limit of the apparent diffusion coefficient within particles on the order of 1×10^{-16} square centimeters per second, or 11 orders of magnitude smaller than that expected in water. The diffusion rates correspond to half-equilibration times of two to three decades in a 1:2 soil to water suspension, qualitatively consistent with the observed persistence in the field.

Soils fumigated in our laboratory result in a mix of labile and "residual" EDB. "Residual" EDB is readily liberated by pulverization of the soil in a ball mill, leading us to conclude that it is entrapped in micropores in soil aggregates rather than sorbed by physical or chemical interactions alone.

Karickhoff (*2*) has shown that sediments continue to sorb hydrophobic compounds indefinitely from water at a slow rate after the initial rapid uptake. We believe these results have important implications for the fate of other organic compounds in soil. First, misleading results can be obtained when studies of microbial degradation, sorption, desorption, and analytical recovery are conducted with freshly spiked soils or sediments. Consequently, mathematical fate models that assume rapid and reversible sorption equilibrium may be invalid. Of greater importance, compounds thought to be labile that become physically entrapped in soil can leach gradually to water supplies over decades. We have observed this phenomenon in Connecticut where EDB is present throughout the soil column beneath a tobacco field last fumigated in 1967, including the saturated zone where ground water flow is rapid (*3*). Also, unexpected retardation of contaminant plumes in aquifers may occur, as observed in recent field experiments with an injection of organics of low molecular weight which showed increased retardation with time (*4*). Finally, present efforts to devise microbial or extractive techniques for remediation of contaminated soils may fail if the organic contaminants have become physically entrapped in soils.

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Data on Immigrants' Taxes

I would like to add a point of information to "The economic consequences of immigration," by George J. Borjas and Marta Tienda (6 Feb., p. 645). The article indicates that, in general, no data are available on taxes paid by immigrants. One notable exception is the data series on federal income taxes paid by the Southeast Asian refugees who arrived from 1975 through 1979. Updated yearly in the "Report to Congress" published by the refugee resettlement program of the Department of Health and Human Services, this series shows that in 1984 these former refugees reported more than $1.5 billion in income and paid $138.5 million in federal income taxes.

As Borjas and Tienda note, such economic contributions must be balanced against immigrants' impact on social expenditures. To ignore them would be like discussing immigration without recognizing the existence of return migration.

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Erratum: In Eliot Marshall's article "Academy rejects Huntington nomination" (News & Comment, 8 May, p. 661), the affiliation of Herbert Simon should have been given as Carnegie-Mellon University of Pittsburgh, not the University of Pittsburgh.