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## Chemicals and Cancer

By accident or by design, humans are being exposed to an increasing number of chemicals. Each year thousands of new compounds are synthesized, and people subsequently are subjected to them in many ways, through agents that include air, water, food, drugs, and cosmetics. Acute toxicity of pure substances can be determined quite readily; synergistic effects are more difficult to evaluate. However, the major causes for concern are delayed effects such as cancer or genetic mutations. Because of the long times necessary for manifestation of damage, the hazards attending long-term exposure to most chemicals are not known.

The primitive level of our knowledge was demonstrated recently in events attending the banning of the use of cyclamate. This artificial sweetening agent has been in use for about two decades. Short-term and long-term toxicity of the chemical had been tested repeatedly, but only now have studies of 18-month exposures at high dosages been conducted; such exposure resulted in cancers of the bladder in rats. There is no evidence that cyclamates have caused cancer in man, but the full effects of the mass exposure cannot be known for 20 years or more.

Cyclamate is only one of hundreds of chemicals—some synthetic, others natural products—that have been ingested by man. Often, for what seem rather trivial benefits, risks of undetermined magnitude have been incurred by substantial fractions of the total population. Thus far we have escaped disaster. Indeed, insofar as they can be interpreted, the long-term trends in the incidence of cancer are to some extent reassuring. Although there has been an overall increase, the major factor in the increase has been lung cancer associated with smoking. On the other hand, incidence of cancer in the stomach and liver has decreased sharply.

The public rightly expects the government to take measures necessary to insure its safety from environmental hazards, and legal authority exists for doing part of the job. No new food additive can be introduced in interstate commerce unless the manufacturer produces evidence that it is safe. The applicable phraseology includes the following statement from the so-called Delaney Amendment: "no [food] additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal. . . ."

The effect of the law has been to subject new additives to close scrutiny while permitting continued use of substances that were being used prior to 1958, even if they had never been thoroughly tested. Moreover, many foods are known to contain natural components which, when given in massive doses, have been found to produce cancer. In addition, smoked foods usually contain highly carcinogenic compounds.

The government utilizes unevenly its power to protect the public. If the nation were truly concerned with cutting the incidence of cancer, it would mount a massive campaign against cigarette smoking and it would closely examine all substances that are ingested, including even those that have long been used.

Knowledge concerning the factors leading to cancer is fragmentary and hard to acquire. However, we have not been as vigorous as we might be in obtaining it. Long-term animal research has not enjoyed sufficient support. Epidemiological studies in man should be expanded. Around the world, widely differing incidences of cancer are noted. Careful analysis of this phenomenon should be made. In addition, more comprehensive studies should be initiated in the United States, including a follow-up on individuals exposed to large doses of cyclamate.

—PHILIP H. ABELSON