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Greed to Cash In on Science Can Cause Cosmic Bellyache

THE DETERIORATION of the "environment" has not been one of my important scientific preoccupations until very recently. When journalistic criticisms like Rachel Carson's "Silent Spring" first appeared, I tended to shrug them off as hysterical exaggerations, perhaps even motivated in part by the notoriety they generated.

I had, however, not often looked very deeply into the scientific foundations of these damning recriminations. The task of preparing the present series of articles has become a major educational experience, for it obliges me to look more closely into, and make an informed, independent judgment on, a great many subjects for which I had formerly relied upon third- and fourth-hand accounts, where I tended to discount what seemed like alarmist exaggerations.

In fact, the more deeply I pursue my own inquiries, the more alarmed I become. There appears to be an almost endless list of foolish gambles with and intrusive exploitation of our common environment. They are not usually malevolent by intention, but this is no balm to our concerns.

They do mainly share a common fallacy—the mistaken view that the atmosphere and the rivers and oceans are infinite reservoirs that human activities cannot disturb. We have become too powerful now to take refuge in naive ignorance about what really does happen after we throw the switches.

THE IMMEDIATE irritant that provokes these remarks comes from a casual conversation with a staff colleague who had recently operated a filling station. He mentioned that one of the oil companies had proudly introduced a new gasoline additive that contained the metal nickel.

This was corroborated by an abstract in the Transactions of the Society of Automotive Engineers that cited many wonderful properties of "nickel isodecylorthophosphate": "a unique and effective multifunctional gasoline additive which . . . reduces abnormal deposit-induced ignition; prolongs exhaust valve life; functions as an effective carburetor deicer and rust inhibitor, and modifies combustion chamber deposits."

The abstract said nothing about the modification of people by nickel compounds, nor even about the chemical forms that nickel would probably take when it left the auto exhaust. But there is a substantial body of medical literature on nickel dust and on the particular compound, nickel carbonyl, which is readily formed by the reaction of nickel with carbon monoxide.

These compounds are insidious causes of cancer of the nose and lungs, as shown both by the occurrence of these cancers among nickel refinery workers and by experimental studies on laboratory mice. The nickel compounds are especially treacherous, for they often require over 20 years of chronic exposure before they reveal their cancer-inducing effect in man.

ACCORDING TO experimental studies, soluble nickel salts are relatively harmless (in contrast, say, to those of mercury of lead). The dangerous forms of nickel are insoluble dusts and the volatile nickel carbonyl which are readily taken into the lungs and remain there. In fact, Dr. F. W. Sunderman Jr. of the University of Connecticut School of Medicine has speculated, quite plausibly, that nickel is the culprit in cigarette smoke that causes lung cancer.

Dr. Mary R. Daniel of the Ontario Veterinary College has shown that different strains of rats vary in the production of tumors when inoculated with nickel sulphide. The possible hazards to man of nickel-containing gasoline additives will not be easy to determine. But who should bear the risks?

The President's Science Advisory Committee pointed out in its 1965 report on the environment that "widespread use of automobiles has made motor fuels the single most effective way to expose almost all our people to air pollution from combustion-resistant substances such as metals." It recommended that fuel additives be subject to compulsory registration.

In fact, we must go further, as we have begun to learn with pesticides, and require reasonable proof of safety before such products can be wantonly cast into our breathing space. Failing specific regulations under law, we must open the courts to private civil claims for collective damages for imprudent assaults on the common environment.

The larger issue was addressed by a committee of the American Association for the Advancement of Science in a 1965 report: We live in an era of large-scale "technological application before the related basic scientific knowledge was sufficiently developed to provide an adequate understanding of the effects of the new technology on nature."

Society is greedy for short-run payoffs—which are potentially enormous—on its investments in science. That greed, if it continues to foster a scientifically ignorant and imperceptive technology, responsive to narrow goals and blind to larger human needs, can have no end other than a terminal cosmic bellyache.