

we can add some chemical perspective to a discussion of lead. We would do this by putting in one place all of the relationships among the chemical phenomena involved: The effect of lead on the development of currently known catalytic converters to burn the hydrocarbons and carbon monoxide in exhaust gas; the effect of lead on currently known catalytic converters designed to eliminate oxides of nitrogen from exhaust gas; the chemical nature of gasoline and the consequences, both technical and economic, of removing the lead from gasoline; the effects on the prices of certain petrochemical based plastics at the consumer level if lead were removed from gasoline and the antiknock rating maintained by chemically altering the molecular structures in the fuel.

We can also raise and suggest answers to other pertinent questions: What are the real chances of cleaning up automobile exhaust without using catalysis? Is it thermodynamically possible to remove oxides of nitrogen from exhaust gas without using a catalytic approach? What is the mechanism by which lead poisons catalysts?

Once we understand the mechanism, will it be possible to design catalysts that function in the presence of lead?

What kind of research would be required to find out if lead actually does interfere with the operation of certain enzyme systems in the body, thus producing subclinical effects of an unknown nature?

In short, the technical question of lead is a controversial one and we hope that by using our committee approach we can set down an objective appraisal of the situation in specific chemical terms.

The Spilhaus report comments that "More technology is needed in the areas of low-cost source control devices, especially for sulfur dioxide."

To a discussion of that kind we would add specific descriptions of the major processes now available for removing sulfur from stack gases at the concentrations in which it is found there. We would point out the apparent costs of such processes. We would point out that no process of that kind is yet operating on the scale required at a modern powerplant, although two or three are in the process of being installed.

We would point out that, for some of the reactions involved in these processes, what actually happens, chemically, is not entirely clear, and we would ask whether knowing what actually happens would have any substantial effect on the efficiency and cost of operation of the process.

We would assess the technical likelihood of being able to remove sulfur from oil at substantially less than the present cost. We would point out that particulates created by burning low-sulfur coal are more difficult to collect in any electrostatic precipitator than are particulates from a coal that contains more sulfur.

In New York City this means that Consolidated Edison's precipitators go from 99 percent efficiency to 98 percent when the company switches from coal at 2 percent sulfur to coal at 1 percent sulfur. The 99 percent efficiency level will be required by law for all coal-burning equipment by next year, coal of not more than 1 percent sulfur content will be required by law by 1971.

Consolidated Edison can counteract the effect on its precipitators in several ways, although at somewhat greater cost. There are numerous instances of effects of this kind—effects that are based on the scientific facts of the case at hand—that rarely are spelled out in more