

called pollutants on either inanimate materials or living plants and bodies.

Research—lots of research—is urgently needed. In what areas of science? Who is going to do it? Who is going to pay for it? I should like to explore these questions briefly, and I am taking the liberty of condensing the text of my statement which was submitted to you yesterday.

Let me interject that I speak from a background of industrial science and the management of industrial research and development. I certainly claim no great expertise on the social, economic, and political aspects of the problem you are investigating. For that matter, it is apparent that the technical aspects of the problem are so broad that no single person can begin to be knowledgeable in all of them. I shall be pleased to try to answer any questions which you may have with the help of Mr. Landon, but I trust you will consider an honest "I don't know" to be the best answer when there are major technical uncertainties or where I have insufficient firsthand knowledge.

So, based on research—particularly industrial research—with which I am familiar, I should like to list some of the areas where I think there are good potential opportunities for finding new knowledge that should be helpful.

DECIDING WHAT THE PROBLEM IS

The continuing interaction of biology, medicine, and other life sciences with chemistry, physics, mathematics, and other physical sciences should help us to define better the true problems of environmental pollution before we spend too much time and energy on the wrong solutions.

For example, I think the time is ripe for some "closed loop" experiments on a large scale. Some of my associates have suggested studies in which constant monitoring of pollutants and suspected pollutants is done over a large populated area. Information from such monitoring would be fed into a large computerized information system. Simultaneously, the computer would be given all possible information about the times and reasons for hospital admissions, reports from medical specialists about the number and severity of cases involving a specific list of diseases and disorders, statistics on absenteeism in school and industry, industrial productivity figures, death and accident rates. We all know the difficulties of establishing cause-and-effect relationships, but certainly if patterns and correlations could be established from such studies, we would have information vital for determining the direction of future research.

NEW MONITORING AND MEASURING TECHNIQUES

Although great progress has been made in building machines that will "sniff" the air and "taste" the water, there is still much to be done.

For example, we don't know enough about the extremely tiny particles that contaminate the air around us. I refer to particles in the general range of a few millionths of an inch in diameter, or less. The surprising fact is that although the particles in air larger than a tenth