

be performed on a selection of the various gas-gas and gas-particulate combinations. At the end of the study the computer will help us perform the rather complex statistical analyses of the data that will reveal whether or not synergistic actions have occurred and, if so, their magnitude. When we consider that human populations are almost invariably exposed to mixed pollutants, the potential value of the results that will be forthcoming from the American Petroleum Institute study is evident.

Mr. DADDARIO. Dr. MacFarland, getting back to the preceding page, the last sentence of your statement on page 5: "Even allowing for these facts, it is difficult to see how such toxicologically low levels of sulfur dioxide and suspended particulate matter could elicit such a drastic response as death in 4,000 victims." You are talking about those who have a predisposition to such a situation. Can we assume that a higher concentration of such pollutants could affect great numbers of people who do not have such predispositions, since the death of so many allows you to come to this conclusion?

Dr. MACFARLAND. Yes; it is undoubtedly true that a normal subject would be adversely affected if the concentrations were high enough. The question that remains, then, is: How high is high enough? And some of the types of experiments we are doing, hopefully, will give some indications in this direction.

Mr. DADDARIO. Would you assume because people have died from such concentrations whom you would not expect to, even though they have a predisposition, that you could take the next logical step and say that healthy people subjected to high concentrations would also die? If that is so, then we are talking about a very dangerous situation because you are talking about the possibility of death of an untold number of people who somewhere in this scale will be affected as these 4,000 were?

Dr. MACFARLAND. I think this may be possible. The difficulty here is that we are talking about something where we simply do not know the answer at this point. We have not enough knowledge. Many people cannot even smell a concentration of sulfur dioxide of one and one-third parts per million. This particular visitation lasted about 5 days. Now, it is inconceivable on toxicological evidence that a person could not stand one and a third parts per million of sulfur dioxide for 5 days. Let me bring in something that may illuminate this a bit.

I sit on a committee which is concerned with the establishment of threshold limit values. These are numbers to be used in industries which produce airborne hazards and they purport to be a sort of maximum allowable concentration that a normal working man can be exposed to for 8 hours a day, 5 days a week, for a working lifetime of 40 to 50 years without adverse effect.

Now, what is the threshold limit value, this industrial standard, for sulfur dioxide? The value currently used is five parts per million. This standard has been in existence for many years and there simply is no evidence to indicate that it is too high. We do not anticipate that this number will be revised downward on the basis of any evidence presently available. So then if this number is a valid one, and it must be admitted that the reliability of these numbers in the threshold limit value list varies from number to number, depending on the evidence that lies behind them, but if we accept the five parts per mil-