

regard to problems is particularly useful in my field to enable us to point out what we need to know.

Mr. DADDARIO. Mr. Vivian?

Mr. VIVIAN. I'm tempted to begin with a defense of the concept of systems engineering. It is true that it is often called organized commonsense and it is meant to be, but it is marked in the modern world by the use of mathematical models which are the key.

Ecologists have been using this tool for a good many years. I remember that on the first occasion I had to use an electronic computer I discovered that the problem I was trying to solve had already been solved by an ecologist who was working on the population problem. Ecologists have, in a sense, been systems engineers for a long time.

Secondly, I notice that you are willing to use computers to solve problems and to propose possible solutions, so I feel that for one group to run down another is a little bit inappropriate. They are doing different things with the same tool.

I would like to ask a serious question now. Do we have a biodegradable DDT yet or don't we?

Dr. BUCKLEY. It is by some organisms and not by others and it is a matter of degree. You and I take in DDT and transform this into a variety of compounds gradually removing the chlorines from it. We store a certain amount of it in our fat without change. Some other parts, we eliminate primarily through the urine.

We just gradually break this down. In that sense, it is degradable. It is not like some of the materials which are totally nondegradable.

Biodegradability in relation to pesticides seems to me to offer some very real problems. First of all, some of these need a certain length of time in residence in order to accomplish a certain end. I don't know where you would draw the line on degradability.

Mr. VIVIAN. I think you will agree that the DDT we have been using remains active far beyond its intended valuable life.

Dr. BUCKLEY. I think there is no question about this, and if one wishes to pursue DDT sort of to the end point here I can't think of specific uses of DDT that ought to be prohibited and in the long run if we come to a bona fide need to reduce the amount of DDT or prevent further buildups of it, then I think we are faced with overall decisions on it, not piecemeal decisions.

Mr. VIVIAN. I understand that. The question I am trying to get to is whether we are working fast enough and ambitiously enough on types of insecticides which might replace DDT and which would have a much more controlled lifetime. Is there enough work on that subject?

Dr. BUCKLEY. I don't think there is ever enough work, but I think there has been a very great increase in work by industry as well as in agencies of Government and I think the regulatory patterns have stimulated this very greatly. When I make these remarks, I restrict them largely to application within the United States, not to the world as a whole, though.

Mr. VIVIAN. Why should an individual farmer be concerned with using something other than DDT, particularly something that might cost more?

Dr. BUCKLEY. Why should he?

Mr. VIVIAN. Yes.