

MAURIE SEMEL, called as a witness in behalf of the defendants, being duly sworn, testified as follows: (874)

THE WITNESS: Maurie Semel * * *
Route Number 1, Box 39, Riverhead, New York

DIRECT EXAMINATION by MR. CORWIN:

Q. Dr. Semel, what is your occupation?

A. I am an entomologist associate professor employed by the College of Agriculture, Cornell University.

Q. And what are you presently doing in that capacity?

A. My occupation entails the development and trials in an attempt to find the best possible controls for insect pests of vegetables.

Q. How long have you been engaged in that work? (875)

A. In vegetable work for twelve years, and in fruit work prior to that for five years.

Q. Are you familiar with DDT?

A. As used in these particular applications, yes.

Q. Do you know anything about the extent of its use?

A. DDT as used, if I might bring it down close to home, since we are talking about the effects of DDT on the wildlife of Suffolk County, we are using it rather extensively, although not as extensively as we have used it in the past.

Q. When you say we, you are talking about the farmer or society in general?

A. I am talking about farm uses for shade-tree insect control, and other uses, such as this, where DDT is used.

Q. Now, Doctor, this matter of making your own decisions. Did you make a study to ascertain how much DDT was sold through agricultural sources in Riverhead this year, in the Riverhead area?

A. Well, actually, the figure can't be broken down too specifically for Riverhead area since much of the material that is sold through Riverhead outlets will also find its way into other sections. However, in Suffolk County there is a figure derived from contacts with the various distributors to the effect that in 1966 there was about 64,000 pounds of technical DDT sold, and most of this was for agricultural purposes. (876)

Q. Do you know how much there was sold in the Riverhead area?

A. Well, I would surmise possibly half of this.

Q. Now, do you know anything about the trend with respect to the use of DDT? I am talking about quantities in agricultural use.

A. From the agricultural standpoint, the trend is to a decrease in the quantities of DDT used. This is certainly in conformance with the findings of the New York State College of Agriculture, Cornell University, which feels that we should as soon as possible attempt to either eliminate or at least decrease the amount of DDT that is used in any of our control recommendations. (877)

Q. Will you tell us something exactly as to how these control recommendations work so far as your work is concerned and the effectiveness of these controls?

A. Well, generally what occurs is either a compound which we might ourselves develop or one which comes through the developmental process of some of the industrial corporations, the chemical manufacturers, will be started in preliminary trials. In our case, say at the research farm which is situated here in Riverhead, in greenhouses, and laboratory studies, and at which time we will make a preliminary estimate of whether these particular materials will have any valid use, any useful purpose in agriculture. This is done by testing it on a small scale on the potted plants in the greenhouse or testing on insects in the laboratory.

If we feel that these materials have potential useful value and coupled with the fact that these materials are not of too great concern as to the possibility of their being harmful to the individuals using them or to the individuals who will come in contact with the materials by virtue of the fact that they are consuming the products, then we will proceed further and test these materials out in the field. In our own case, we have research plots at the research farm. In other cases, we will work cooperatively with growers to assemble as much information as possible as to the effects of these insecticides or these potentially effective insecticides on the various insect problems confronting us here on the island. (878)

Q. Including the golden nematode?

A. I myself am not concerned with the golden nematode. That is within the realm of another department. The department of plant pathology. My particular interests are in insects.

Q. Well, what happens if as a result of your studies, you find that a situation of which you are suspicious because of potential danger to human life, for example, is involved? What would you do? What would be done?

A. Well, we do have a number of materials which might possibly, if misused and used in a form or in a way not generally acceptable to us--in other words, beyond what we recommend--some of these materials can be harmful. But with the amount of work that we put into these materials, coupled with what the manufacturers do with these materials--they are making toxicological studies--we feel that by the time the compound is recommended for use, that with the labelling and registration it has gone through, that it is perfectly safe if used as directed. (879)

Q. Well, you still haven't gotten off the farm, as far as I am concerned, and up to the college and back generally with the public. How does that aspect of the thing work?

A. Well, after the material is developed and we feel that it has use, and after these materials are also used in other areas of the country and other areas of the world, why then we at the research farm will indicate to the College of Agriculture that we feel that these materials will be useful against any particular organisms, the organisms with which we happen to be concerned. The College of Agriculture in turn will forward this information to the manufacturer, and the manufacturer will compile these data from our station and from the other stations in the country. (880)

Incidentally, in compiling this data, it is absolutely necessary before a compound gets anywhere, that these tests are conducted in various areas of the United States. In other words, so that they don't have the experiments run under one particular set of conditions such as rainfall or temperatures or soil types. So there is a large compilation of material as far as a particular material is concerned, as far as a particular insecticide is concerned.

Now, the company will then present this information to the United States Department of Agriculture, and this entails reams and reams of information. From these data, the Department of Agriculture will ascertain whether there is sufficient data to show the usefulness of the compound for a particular use.

At about the same time, if the company feels that there is a good chance the insecticide will pass its useful and necessary test, why then it will be passed on to the Food and Drug Administration, which is a department of the United States Department of Health, Education, and Welfare. They in turn by virtue of law will pass on the merits of the compound as far as the hazard of the compound to the user and to the consumer. (881)

THE COURT: Who will do that?

THE WITNESS: The department of Health, Education, and Welfare the Food and Drug Administration, and they will pass on this compound to determine whether it is going to be safe for the user and for the consumer. They

will place what is known as a tolerance on this particular compound after the United States Department of Agriculture determines that it is a useful compound.

Now, by law they have to put a tolerance on the compound. In other words, how many parts per million will be acceptable on any particular crop which will be consumed. This tolerance is in keeping with the toxicological studies.

In other words, they use two or more test animals--dogs, rats, guinea (882) pigs, or rabbits, or what have you, to determine just how safe these compounds are.

It is true that in a number of instances the information which they find from dogs and rabbits and rats that they cannot extrapolate with absolute certainty as to what will occur in the human being. But this is the only test, animal tests are the only type of test animals which they have. It is animals such as these that can be used. We cannot experiment with humans.

THE COURT: Assuming that they find they are dangerous?

THE WITNESS: If they find it dangerous, meaning--

THE COURT: Harmful.

THE WITNESS: Harmful, meaning that the residue that is found will be harmful to the consumer?

THE COURT: Or to anybody else in the surrounding area. (883)

THE WITNESS: By virtue of it being used?

THE COURT: That's right.

THE WITNESS: Well, they will not permit its registration.

THE COURT: Registration or sale?

THE WITNESS: Its registration. By virtue of the fact that it is not registered, it cannot be sold.

THE COURT: Now, you heard testimony here that DDT was extremely harmful.

THE WITNESS: DDT is a harmful material. However, it is harmful to this extent: That it is used in an unlawful manner.

In other words, Your Honor, they have a cut-off point so far as using it on food crops or they have a cut-off point beyond which they cannot use this material. They will have a point, a regulation as to how much can be applied or how many times during the season it may be applied. (884)

THE COURT: Now, you heard testimony here that this DDT remains in effect for long, long periods of time, and it is all over the place. So whether it is a few grams or a half-pound, it wouldn't make much difference, would it?

THE WITNESS: Well, to me it does make a great bit of difference. To me, if we might go back to this risk equation that we were talking about somewhat earlier, to me applying a small amount of this to a situation where it is required, where there is a registration for the use, I do not think it is harmful.

THE COURT: Let me ask you this question--and forgive me, counsel, but I want to clear up some things in my mind. Now, you heard me give the example of my own farm.

THE WITNESS: Yes.

THE COURT: I use it or I did use it. Now, assuming I used less, (885) and then the surface water takes it down to St. James Harbor. Wouldn't it also do harm?

THE WITNESS: We, meaning the College of Agriculture, we have no doubt whatsoever that DDT is harmful to crustacea, to fish, and things of that nature. We do not feel, however, that we should eliminate this material from use because of this particular reason.

Now, why we say this, Your Honor, is because DDT is perhaps one of the most extensively used materials which has ever been available to the farm group. I can speak with more certainty about farm groups than any other groups. However, this material has been most extensively tested.

We know what a lot of the effects are so far as human consumption is concerned. We know that in no instance has DDT been found to be detrimental to the human being. That is in the 20 years it has been tested, there is not one instance of a death being caused by DDT in humans if used properly.

THE COURT: Have you ever seen a package or box of DDT, for example, that is bought in Agway?

THE WITNESS: Yes.

THE COURT: And do you find a cut-off point on the package?

THE WITNESS: Yes, there will be.

THE COURT: I haven't seen it. I looked for it.

THE WITNESS: For DDT use on fruit crops, there is a cut-off point that is part of the registration.

THE COURT: All right. I just wanted to know. I might have missed it. Thank you for your information. * * *

A. Well, what I think now is most important is the introduction of these new governmental agencies to control the use of insecticides. I think that we can't overlook the importance of these agencies. They have been-- I think in the testimony that has preceded--rather belittled, and I am very surprised, especially that Mr. Woodwell in his testimony signified that he is a member of the Pesticide Control Board of New York State, and that these members--and these are upstanding members of the community of New York State, not just chemical manufacturers--do not have the interest of New York State residents at heart. I say this---

MR. YANNACONE: I'm going to object to the characterization. We are dealing with personalities now it looks like, and I don't think this is proper.

THE COURT: I just want to get the facts. The man means nothing to me, and I want to know the facts. (888)

MR. YANNACONE: All right.

A. What I say here is that the Pesticide Control Board is an important part of our legislative process in New York State currently. It would seem to me that as a member of the Pesticide Control Board, each one of these individuals--whether his capacity be a position where he has a vote or he is in a position where he recommends, in other words, without a vote--he has this capacity, and in the case of DDT used for mosquito control in Suffolk County, if a man feels that this is detrimental not only to the welfare of the residents of Suffolk County but to New York State residents and other residents of the country, he should state specifically, "I do not think that DDT should be used for mosquito control in Suffolk County." This is what the Pesticide Control Board wants to hear. Not, to make the generality----

MR. YANNACONE: I'm going to object to any further testimony with respect to what the Pesticide Control Board wants to hear. Dr. Dewey maybe can talk about the Pesticide Control Board, but Dr. Semel up there cannot. (889)

MR. CORWIN: Why can't he?

THE COURT: Your objection is overruled.

MR. YANNACONE: Because he is not involved in it.

THE COURT: Counsel, please. I said your objection is overruled. I don't care what he is involved in. I want to hear what he has to say. Now, you tell me. Go ahead.

THE WITNESS: Your Honor, I think Mr. Woodwell stated what the reason was for forming a pesticide control board. I am in complete agreement with the functions of this particular board. I believe that in its functions, in its duties, that it is within the prerogative of this particular organization to recommend to the New York State Legislature that DDT should be cut out completely for use against the mosquito in Suffolk County and in other parts of New York State. (890)

THE COURT: He did have that substance in his report, didn't he?

THE WITNESS: It was a general statement.

THE COURT: In other words, whether it is a question of a general statement or blowing a whistle and calling a cop, does it make any difference?

THE WITNESS: It has got to be a specific statement, yes.

THE COURT: All right. Go ahead.

THE WITNESS: Because general statements, Your Honor, I don't think are going to be accepted freely. The legislative body is not prepared to say, "Well, DDT is harmful in every area. Cut out DDT."

If they feel that it is from a board standpoint, they will cut it out there. But then we would also evolve into another situation.

The Suffolk County Mosquito Control Commission is responsible for adding DDT into the waters of Suffolk County and into the upland areas of Suffolk County. There is no doubt about that. Mr. Williamson stated that they have no intention of using DDT in 1967. (891)

Now, what Mr. Williamson would like to have is to have the DDT available in the event he has to use it. I believe that an occasion may arise whereby Mr. Williamson or agriculture will have to use DDT.

THE COURT: All right. Now, let me interrupt you. Let us assume you have 50 farmers, and all their farms are in this area; that they use some tons of DDT. Now, would that increase the danger to the safety point or the tolerance by this use? Assume that the county desists. What effect will this have when I have 100 farmers piling it on?

THE WITNESS: Undoubtedly, as it has been stated before, each increment removed from use will help in the situation. (892)

THE COURT: Answer this, if you will: If Suffolk County should quit today in their use of DDT, and the farmer piles on tons of it, why should I say that the county can't use it when I permit the farmer to use it?

THE WITNESS: Well, my contention is----

THE COURT: As I understand it from the testimony, the farmer buys more than the county does.

THE WITNESS: Yes, the farmer does purchase more, and there is no doubt about the fact that what the farmer uses eventually ends up or a great deal of it will end up in the Great South Bay.

THE COURT: And will do this damage that these people have testified to?

THE WITNESS: It will do that damage and possibly more.

THE COURT: All right. Then why should I stop the county and not the farmer?

THE WITNESS: Well, I am a witness for the defendant, Your Honor, and I believe you should not. I believe you should not place a ban on the use of DDT for mosquito control work. (893)

THE COURT: Again, can I say that the DDT shall only be for mosquito control work? How about the farmer who gets it and uses it?

THE WITNESS: Would you like to place me in your chair?

THE COURT: No.

THE WITNESS: Well, that is what I believe. If it is necessary to ban the use of DDT, it is going to be necessary to ban the use of DDT in toto from all areas of New York State.

THE COURT: Otherwise all these people will be using it?

THE WITNESS: It is a matter, I believe, for New York State legislation or federal legislation.

THE COURT: I am inclined to agree with you. Unfortunately, they have got the case pending here. I can't chase them up to Albany tomorrow, Can I? Do you see my point?

THE WITNESS: Yes, I definitely know you have a problem. (894)

THE COURT: All right.

THE WITNESS: Well, that is what I think has been overlooked. Well, it may not have been overlooked, but it may not have been spoken about, because it wouldn't pay from the standpoint of the plaintiff. But I think that what is important is the fact that DDT has been tested over a long period of time.

We were talking about the use of materials such as abate, methoxychlor, and malathion as possible substitutes for DDT. Now, the thing that disturbs me is the fact that in the one instances this abate compound is a brand-new compound.

It perhaps has four or five years of data behind it. There's no knowledge whatsoever as to what some side effects of this material will be. (895)

In the case of malathion and methoxychlor, true, they are much safer compounds to use.

Q. By this testimony are you implying that we may be jumping out of the frying pan into the fire with these new chemicals?

A. Very true, yes.

THE COURT: All right. Go ahead.

A. Now, these compounds are safer from a stand-point of human toxicology. However, they are safer because they don't last as long. So it becomes necessary to use them more frequently, and the more frequently we use compounds, in my opinion, the less safe they become.

My responsibility at the research farm for the College of Agriculture is to see to it that the farm interest especially are served and to come up with the best compound and the safest compound for both the user and for the ultimate consumer of the product on which these compounds are used. (896)

But I am never neglecting the fact that these compounds will also find their way unintentionally into other areas, such as into crustacea, into fish, into predeceous animals. We understand that this is a matter of concern, and much of our interests are to find materials which are safest but which will still do a job and, hopefully, that these compounds will not become problems to wildlife.

It is within the province then of the ecologist, Your Honor, to determine whether they will become problems, and if they are, then it is within the scope of their particular study to recommend that they not be used in a particular situation.

THE COURT: All right. I have it. Go ahead.

Q. Sometime ago you were commenting upon the registration procedures, and you mentioned something about the united States Department of Agriculture. Isn't it a fact that if the Agriculture Department finds a danger in the use of these chemicals, that it is then referred to the Interior Department, the Fish and Wildlife Service, and to the Public Health Department for their consideration and approval too? (897)

A. Yes, Hereto there is another agency which has been established, a federal committee for pest control. It is within the province of this particular organization to pass on the worthiness and safety of compounds as used in federal programs. Within this committée there is a Department of Agriculture, Department of Health, Education, and Welfare, Department of Defense, and the Department of Interior. So this involves the entire gamut of the organizations within which pesticide materials might be recommended.

Q. Now, specifically with reference to a given insecticide, don't you make recommendations that a particular pesticide when used will be used a certain number of days before the harvest of a particular crop, and no later?

A. Yes, that is what the judge spoke about before. We do have the cut-off point for each one of the compounds which are recommended for use on food crops. (898)

Q. And the College of Agriculture is no longer recommending the use of DDT on potatoes in Suffolk County, isn't that correct?

A. Well, the only reason we don't recommend the use of DDT on potatoes is for one particular insect. Now, I think you may have misspoken here, Mr. Corwin. In fact, we do recommend DDT on potatoes for cutworms. We do not recommend it for use for say the Colorado potato beetle, because it is no longer effective.

Q. Well, do you use a chemical instead of natural and biological controls such as the use of viruses or bacteria or other insects?

A. Well, the entire situation, the insecticide situation is brought to the fore principally because these other methods of control have not worked "naturally". That is the only reason why the farmer finds it necessary to use insecticides, because natural controls have not worked.

Now, when we in this country, meaning the people, the consumers in this country are looking forward to high quality produce, produce free from blemishes of every kind. I mean, even the smallest spot. Well, the farmer is asked to provide these particular foods, and he then finds it necessary to go to insecticides to make control possible. (899)

If I might add, we too are interested in what is known as biological control, the use of natural-controlling substances. In two instances at the research farm, one in which we are using a virus material which is highly specific for the cabbage looper, which attacks cruciferous crops; and in another instance the use of bacillus thuringiensis, which is a bacteria for the control of the imported cabbage worm and possibly the corn ear worm on sweet corn and the imported cabbage worm on cruciferous crops.

Now, actually in 1956 it was my determination that this naturally occurring endemic virus on Long Island could possibly be used for the control of the cabbage looper. It is our contention that if we can find naturally occurring organisms, such as viruses or bacteria to control the organism, we much prefer doing it this way. So since 1956 we have been engaged in studying whether we can use this virus to control the cabbage looper, and we have been fairly successful with it, and with the ultimate hope that in the next few years this will be one of the materials which we will recommend for the control of the cabbage looper, in which case we will not have to use an insecticide, a commercially produced insecticide. (900)

But here too, even in this case, in using a virus to show you what controls are placed on these materials, they have to go through exactly the same procedure. In other words, through the United States Department of Agriculture for registration and the Food and Drug Administration to determine its safety on human beings and wildlife.

THE COURT: Well, isn't it a fact that you found as a result of these pesticides on cabbage and on potatoes, that you found innumerable deer and rabbits dead?

THE WITNESS: Well, I have never seen a deer killed dead on the Island. (901)

THE COURT: Well, come on up to my country, and I will show you a few. Go ahead.

THE WITNESS: I would be hard put myself, as a biologist, to determined what killed the deer though.

THE COURT: We buried two of them this year. We found them in the back of my place.

MR. CORWIN: Did you test them for DDT, Your Honor?

THE COURT: No, no. We just had them buried. But they were blown up, both of them. They had been down in the Nissequogue River. They had gotten as far as my corral, both of them.

THE WITNESS: Well, I couldn't say with any degree of scientific certainty.

THE COURT: All I know is we have these cabbage fields adjacent to my place, and they come up there. (902)

MR. CORWIN: The notion seems to be getting abroad as a result of the testimony adduced by the plaintiff's witnesses that almost anything that dies in Suffolk County is being caused by DDT.

THE COURT: Well, I can almost go along with that. I know the red fox kills 30 or 40 of my birds when he gets in there, and you have other things that kill too. I know this. However, you have many things that will poison and kill. But that is besides the point, and I am trying to get the education from you; not you from me. All right. Go on, please.

Q. Doctor, you are familiar with the gas chromatograph, aren't you?
A. Yes.

Q. You made studies of chlorinated hydrocarbons within the soil on the farm, haven't you?

A. Since the twelve years I have been at the ranch farm, I haven't used a gas chromatograph, no. (903)

Q. Do you collect samples of the soil where you are using these different materials which you are testing and have tests made?

A. This is a necessary part of our studies, yes.

Q. Analyzing the contents of the soil to determine what the residue of the particular material is, not only on the plant, but in the soil as well?

A. Yes.

Q. And you are familiar with the studies that have been made?

A. On soil?

Q. Yes.

A. On soil and crop residues, yes.

Q. Now, are you also familiar with the literature on the effect of these insecticides on wildlife and on fish?

A. This is a necessary adjunct to our studies, yes.

Q. So that the answer to the question is yes, you are familiar with the literature? (904)

A. Yes.

Q. And are you familiar with it by scanning it and reading it, as much as you can, and absorbing it within the time that you have for that purpose as a part of your continuing education, so to speak?

A. Correct.

Q. Now, do you have an opinion with respect to whether or not the DDT used by the Suffolk County Mosquito Control Commission is having a serious, permanent, substantial, and irreparable damaging effect upon the fish and wildlife of Suffolk County?

A. If you were just to delineate that and say the DDT used by the Suffolk County Mosquito Control Commission, I would say it would be impossible to determine which DDT was entering into these life streams, into these webs.

Q. All right. Now, you are familiar with the literature, and you are familiar with some of the LD₅₀'s, when it becomes toxic to a given animal so that the animal dies, are you not?

A. Yes.

Q. You are familiar with it? (905)

A. Yes.

Q. Did you hear the testimony of Mr. Williamson with respect to the amount of DDT that his commission has used? * * *

A. I forgot the exact figure.

Q. Well, he said that he used something on the order of a little over 3000 gallons of 25%.

MR. YANNAcone: 3500.

Q. Mr. Yannacone indicated that my figure is wrong; that his testimony was around 3500 pounds of 25% DDT. Taking those facts into consideration, and assuming that plus your own testimony and findings with respect to the agricultural use made in Suffolk County, can you express an opinion with

a reasonable degree of scientific certainty as to whether or not the DDT which was used by the Suffolk County Mosquito Control Commission was a serious, substantial, permanent, and irreparable damaging cause of wildlife? (906)

A I would say, comparing it with the total amount of DDT used in Suffolk County, that it was a small part. If it was causing damage, it would be causing it to a small degree.

Q Are you familiar with the plaintiff's exhibit 10?

A I looked it over before.

Q If a layman were to look at this exhibit, it would lead him, would it not, to the conclusion that although there was .001 parts per million DDT in the bay water, that the DDT residue of 0.281 pounds per acre contained in the bay bottom mud off Carmans River, that that was directly the cause of 93.40 parts per million found in the ringbill gull, and that would be the conclusion that a layman would arrive at from looking at this table, isn't that so?

A Well, I would say that since both items are on the chart, in other words, at the top of the chart you have bay bottom and bay bottom mud off Carmans River together with the quantities of DDT found per acre and then you have the listing here of all the animals; that it certainly would seem to me that not only from a layman's point of view, but even from a standpoint of a researcher and scientist that one would necessarily seem to be dependent upon the other. (907)

Q In other words, do you believe that there is any causal effects or causal relationship between the DDT in the Carmans River and any given ringbill gull or whatever it is he may have found?

MR. YANNACONE: I'm going to object, Your Honor, on the assumption that Dr. Woodwell testified the ringbill gull came from the same area as the DDT marsh study, and that all the animals were collected from the same environment.

MR. CORWIN: I agree.

Q The mere fact that the ringbill gull was collected, that doesn't indicate that he fed in that area all his life, does it?

A Well, I would say that the way this reads, that the author seems to imply that the reason why the ringbilled gull had 93.40 parts per million wet-weight was because there was .281 pounds per acre of DDT found in the bay bottom mud off Carmans River. That's the way I would take it. (908)

MR. YANNACONE: Your Honor, I submit not only did the author imply that, but he stated under oath that that was so, and that was his opinion. I don't think we need beat around the bush.

THE COURT: Well, he has a right to ask the question. Now, you don't know how he arrived at this, do you?

THE WITNESS: The way these collections were made, no, I don't.

Q The mere fact that he found an amount of DDT in the water, and that he found a ringbilled gull in the vicinity, that doesn't necessarily indicate any causal relationship, does it?

A I personally would say I think not. Certainly, the ringbilled gull is not living entirely in that Carmans River area. He may have come from another area. He might have picked the DDT up elsewhere. (909)

Q From some fish who had large quantities of it?

A Right.

MR. CORWIN: I have no further questions.

CROSS-EXAMINATION by MR. YANNACONE:

Q. Dr. Semel, you have answered one question, * * * in response to one of the judge's questions, that each increment of DDT removed from use will help. Is that your opinion?

A. Yes, certainly.

MR. YANNACONE: I have no further questions.

THE COURT: All right. You may step down.

* * *

(The trial was adjourned to December 6, 1966)

* * * * *

TUESDAY, December 6, 1966.

(910)

* * *

THOMAS F. BAST, called as a witness in behalf of the defendants, being previously duly sworn, testified as follows: * * *

DIRECT EXAMINATION by MR. CORWIN:

Q. Dr. Bast, will you state for the Court your qualifications and your education and job?

A. Well, from an educational standpoint, I have a bachelor of science degree in zoology and entomology from the Pennsylvania State University, a master's degree in entomology from Rutgers State University, and a doctor of philosophy in entomology from Rutgers State University. In my work experience I have been employed by the United States Department of Agriculture, United States Forest Service, and Rutgers University. * * * Presently I am the senior medical entomologist in the State of New York Health Department. * * * I resigned from Rutgers on July the 1st, and I have been with the New York State Health Department since July 5, 1966.

(911)

Q. Can you tell us what the purpose of your office is? What mission are you performing in that job?

A. Well, we have not just a mission, but we have several missions. We are principally concerned with protecting the health and welfare of the citizens of the State of New York, in particular, in regards to arthropod-borne diseases.

THE COURT: What is that?

(912)

THE WITNESS: Well, Your Honor, that would be something like Rocky Mountain spotted fever, encephalitis, et cetera. * * * The other thing that I am currently assaying or trying to develop is a state-wide vector control program.

Q. Have you been in any field work in entomology?

A. Quite a bit.

Q. Are you familiar with mosquito control and the use of DDT in that control?

A. Well, I have had approximately eight years in mosquito control and mosquito control work. So based on that, I would assume that I am somewhat familiar with them. (913)

Q. Are you familiar with what has been spoken of here as the literature?

A. Oh, yes.

Q. Of what societies are you a member, professional societies?

* * *

A. Well, the ones that are pertinent to this case would be the Entomological Society of America, the Ecological Society of America, American Institute of Biological Sciences, the AAA, which is the American Association for the Advancement of Sciences, the New York Academy of Sciences, America Mosquito Control Association, and there may be one or two which I didn't think of.

* * *

Q. Well, are you aware of the ecological consequences of the use of a very toxic pesticide? (914)

A. Oh, yes.

Q. Are you aware of the food chain and the reaction that takes place there?

A. Yes, certainly.

Q. And of damage to fish and wildlife?

A. Well, there is a question in my mind in many instances, and I don't think that I can answer that yes or no. I think I can answer it this way:

If certain of these materials are used excessively, continuously, and the control program is based around one element, such as a pesticide or an insecticide, I think over a period of years you will get into some difficulty with fish and wildlife.

Q. Well, both professionally and in connection with your position as an entomologist in the State Department of Health, you have a position and a policy with respect to the use of these chemicals, isn't that so?

A. That is correct. (915)

Q. Will you tell the Court what that policy is?

A. Our position on the use of pesticides, if I may direct my remarks to pesticides first and then come to this particular one, is that we have to realize that we have to rely to a certain degree on the continued use of pesticides.

Now, with regard to DDT, which is the insecticide before this Court, our policy is this: We are in favor of the restrictive use of this material.

* * * Our policy is, as I said, we are in favor of the restrictive use of this material, but we do have to rely upon it in certain instances. (916)

THE COURT: Can you give me an instance?

THE WITNESS: Well, let me put it to you this way, sir: I have from a professional standpoint, I have not recommended this material on a widespread basis, on a widespread usage. But this does not preclude me from recommending it in certain situations, and an example of this, if I may say, would be something like in an old junk yard, an automobile junk yard.

Now, the very fact that DDT persists, as you have heard, this is one of the advantages why you would want to use it in a situation like that of an old automobile junk yard, because this is where you have a certain species of mosquito breeding. After they have gone through four larval instars, after emergence from the pupae, they usually alight on the surface in very close proximity to their breeding grounds until their wings harden, and so on, and they begin to take off. Well, this is an ideal situation for the use of a material like DDT, because you have this residual effect. This means you can get them before they move into the surrounding areas. (917)

Another place where I wouldn't hesitate to recommend its use would be in barns or in private outhouses.

The point I am trying to make clear is that you would minimize the changes of it getting into what has been referred to in many instances as the ecosystem. We want to minimize that. But this does not preclude my recommending it, and I wouldn't hesitate to recommend it, in certain instances. But on a widespread use, I would be hesitant.

THE COURT: All right.

Q. What about in the event of an outbreak of an epidemic where the germ involved or whatever it was that was involved was thought to be transmitted by a mosquito, specifically encephalitis or something like that? Would you have any hesitancy in recommending the use of DDT on a widespread scale in a situation like that? * * *

A. Based upon my experience and records that we have established with the use of this material over the past twenty-odd years, 24 years at this time to be exact, and what I know about its effect on humans, I would not hesitate for a moment to recommend its use. (918)

THE COURT: You used the words "I would not hesitate to okay it for widespread use." Now, what is your definition of widespread use? Does widespread mean by numbers of people using it or the amount that is used?

THE WITNESS: This is the point, and I am sorry I didn't clarify this earlier, but I think we have heard testimony earlier--and I am not sure, but you can correct me or anyone can correct me if I am wrong--but I think the instance of what happened in Clear Lake, California, was brought to the attention of the Court where grebes were killed, which is a type of duck, and they were killed or the evidence was that they apparently died through the accumulation of DDD through the chains. (919)

THE COURT: I'm not quite clear on this.

THE WITNESS: But in this instance, Your Honor, it wasn't mosquitos they were after. They were after chironomid. It has a very similar habitat to that of the mosquito, Your Honor, but in this instance they treated the whole lake, the entire surface of the lake with this material. I think it was a helicopter that they used or a winged aircraft, and I'm not sure exactly as to which type it was, but the point I am making is this: In this instance, the entire lake was treated, and I think it was a widespread use in my opinion. Now, had this been mosquitos we were after, we never would have treated the entire lake. It wasn't necessary. It is only necessary to treat where the mosquitos are.

First of all, I doubt very much if you would find a mosquito in a lake per se, because of wave action. But the point I am trying to develop is what a widespread use means to me, and let me put it this way: You have heard of the term pounds per acre. (920)

THE COURT: Yes.

THE WITNESS: We might have 2000, 3000, 10,000 acres of spartina marshland. Well, out of that 2000 or 3000 acres, there may only be one or two acres that are producing the mosquitos. That is where you put the mosquito or the larvacide. You don't treat the entire acreage.

THE COURT: All right. Go ahead.

Q. Well, then your feeling is that damage can result from the improper use of this material?

A. There is no doubt about that.

Q. Now, you heard some talk, some philosophies, if you will, about bad is bad in connection with the use of DDT. Do you subscribe to that philosophy as it has been defined by some of the preceding witnesses? They were talking about just a little bit or relatively small amounts that the commission was using in controlling the world-wide use, and that sort of thing? (921)

A. If I felt this way, and if I had some reason or some basis of fact to feel this way, I wouldn't recommend DDT on a limited basis.

THE COURT: Not even under a limited basis?

THE WITNESS: No, sir. Your Honor, if I had some basis in fact for this, if I felt this way--that bad is bad--I would not recommend DDT on a limited basis.

Q. Then I take it you don't subscribe to that feeling, and that is not necessarily so?

A. Well, I guess an analogy----

MR. YANNACONE: I object, Your Honor. That is not what he said.

THE COURT: That is not what he said. He said that if he had the basis for such an assertion that bad is bad, and that it will do the damage as set forth in prior testimony, that under those conditions he would not hesitate to eliminate it under all conditions. Is that right? (922)

THE WITNESS: This is in essence what it is.

MR. CORWIN: I am trying to get a more responsive answer to my question about whether or not he subscribes generally to that theory.

THE WITNESS: Not in general, no, no.
THE COURT: All right.

Q. Now, when you were talking about the limited use of DDT to which you subscribed or which you approved, such as in the jungle, did I understand you to say that it was the persistence of the chemical, the lack of biodegradability--is that the expression you used--which makes it a beneficial pesticide in those cases?

A. Well, I will limit my remarks to vector control. I'm not qualified in other fields, and I don't know. But in vector control, this is one of the reasons that we have recommended and WHO, which is the World Health Organization, has used this material because of the fact that it persists. We are operating with a certain number of dollars. We are trying to get the best protection we can for these people. (923)

THE COURT: In other words, would you say that the prime purpose of your possible recommendation of DDT under those conditions would be the cost saving?

THE WITNESS: This could be one of them, Your Honor, plus the fact that it is persistent and in many instances you only have to treat one area or one habitat, or so on.

What I am thinking about in particular are the walls of mud huts and resting places inside of culverts and so on, which are found in Suffolk County. I think these are some areas which it definitely is advantageous to use this material.

THE COURT: How about this other material called malathion, or whatever it is?

THE WITNESS: Well, Your Honor, malathion to the best of my knowledge is not nearly as persistent as DDT.

THE COURT: Is this the reason why it is highly recommended by the other persons who testified? (924)

THE WITNESS: Oh, yes. I recommend it myself. I recommend it as a larvacide, but I am referring now to adults primarily.

If I may elucidate one step further, Your Honor? * * * You struck a responsive chord here, and one of the reasons why we recommend DDT in certain areas, and so on, why it has been recommended is this: To the best of my knowledge, malathion as a larvacide is completely ineffective in alkaline waters. DDT is effective in alkaline waters.

This is why, Your Honor, it is not all white and black or black and white. There are many complicating issues here and factors on which we make our decisions.

For instance, if there was an area that was breeding culix pipiens, and it happened to be in alkaline waters, there wouldn't be much sense in recommending malathion because it wouldn't work. It would hydrolyze. (925)

Q. Now, in connection with the vector program of the state, you are concerned with the secondary effects of these substances and products, aren't you, the pesticides?

A. I hope so.

Q. In that connection, you are constantly searching the literature, are you not, for evidence of the effects of these things upon man?

A. That's right.

Q. And are you familiar with the literature and with all branches of inquiry into that aspect of the problem?

A. Let me put it this way: To the best of my knowledge, I am. There may be some things that I am not aware of, but I think I am more or less.

Q. Have there been any deaths recorded, to the best of your knowledge, as a result of the normal use of this material, DDT?

A. It has been mentioned time and time again, and it has been alleged that there have been deaths due to DDT. However, to the best of my knowledge, that has never been documented, nor does it appear anyplace in the literature or anyplace that I have been able to find out from. (926)

Q.. When did you most recently check on that?

A. As of two o'clock Friday, this past Friday afternoon. I called Atlanta, Georgia, to see if they had any information on the amount of DDT in the placenta or cord as a result of some of these community pesticide studies that they are conducting. As I said, as of two o'clock Friday afternoon, there was no evidence that this material produces positive abnormalities or deaths or anything like that.

THE COURT: In what--man?

THE WITNESS: In new-born babies, particularly.
May I digress just a moment, Your Honor?

THE COURT: Yes. (927)

THE WITNESS: These are quarterly reports, and I think they are about twelve or fifteen states that are undertaking these community pesticide studies, to determine the effects of pesticides on the human population. There is one in New Jersey, Hawaii, Oregon, Washington, California, and California is particularly interesting. Now, if I may pursue this.

California is particularly interesting because they have selected a county, and they are doing this work in a county. This is to demonstrate if DDT is transformed across from the mother to the uterus and thus affecting the fetus. This is being carried out in Kern County, California, by the California State Department of Health.

Now, from what I know about Kern County, they have had a very, very active mosquito control group out there for some time, and they have really sprayed. I think if anything is going to show up, it would be here, because I know of the spraying they have done. What the figure is out there, I don't know, but I know they have been in business right along. (928)

However, Your Honor, to date there is no evidence one way or another, and I would like to bring to the Court's attention that the first bit of information that we get along these lines, we wouldn't hesitate to go along with it.

THE COURT: And to act?

THE WITNESS: To act. Not for a second would we hesitate.

THE COURT: I didn't think you or your department would or for that matter any department of the State of New York. That is why I state this is more or less of a friendly trial, so far as I am concerned. This is a matter that could affect the health and welfare of the people of this state, and not only this state, but every place else, and that is why all the information we can gather in this matter will be of considerable benefit to the Court in making its decision. I will be grateful to receive this information. (929)

THE WITNESS: Well, as I said earlier, I do not recommend it on a widespread usage, but there are certain places where it certainly is of value. But if I knew that this caused any abnormalities, deaths, or anything like that, I wouldn't hesitate to act immediately, and I am sure the commissioner in every other department would do the same thing.

Q. Doctor, do you know of any pesticide in the public health area that even comes close to the hypothetically perfect pesticide, such as Dr. Woodwell was describing yesterday?

A. You have to take many things into consideration, if I may address myself to Your Honor on this. You have to take mammalian toxicity into consideration. You have to take solubility into consideration. You have to take formulations into consideration. You have to take the relative cost, and there are many other factors. This is what you base your decision on.

Now, there has been a great deal of circumstantial evidence that this DDT in particular does build up in the food chain. I am the first one to admit that.

But this hypothetical perfect insecticide, if I knew of one that would approach that, I would be glad to use it or recommend its use. But in my opinion, the safest insecticide to use--and this is based on millions and millions of pounds that have been used, and so on--in my humble opinion, I still think that DDT is one of the safest insecticides you can use in relation to human health and welfare. That is my opinion. (930)

THE COURT: All right. You made it plain. Go ahead.

Q. Doctor, you are familiar with the benefit-risk equation which has been discussed, aren't you?

A. I have heard a lot of them. I guess I am.

Q. Do you know that DDT has been one of the most beneficial pesticides that man has ever discovered and used?

THE COURT: "Has been" or "is"? (931)

MR. CORWIN: Well, "is".

A. Well, you have to weigh this again. I would have preferred had you asked me "has".

Q. All right, "has".

THE COURT: There is only one trouble. The Court would like to know "is".

THE WITNESS: Well, all right, Your Honor. I think there are others today. I am speaking just in the area of vector control practices and so on. I think there are others that are perhaps equally effective on a short-range basis, albeit that they are more costly.

However, I think in many instances and in many circumstances it is still one of the most effective insecticides that we have.

THE COURT: There is your answer, Mr. Corwin.

Q. It certainly proved beneficial in connection with food production when it was being used extensively a decade or so ago? (932)

A. I assume so. But there is no doubt in my mind that without this material being introduced twenty years ago, the world would have been in pretty bad shape. I mean not from a medical standpoint, but from a public health standpoint--malaria, et cetera.

Q. Do you find any evidence in everything that you know about DDT which leads you to the conclusion that the benefit-risk equation is being weighed down on the risk side by its continued use in that area?

A. I think if one were to answer that, I think you would have to admit that under certain circumstances--and what I mean by certain circumstances is this: If this material is abused, the risk and the damages are obviously going to overcome the benefits from that use.

Q. Now, having some twenty years experience with it, a body of knowledgeability about its effects is building up which leads you, I think, to be a little cautious and suspicious about its continued use to the extent that it has been in the past. Is that a fair statement?

A. Yes, it is.

Q. Now, Doctor, is it one of your responsibilities to familiarize yourself with the policies of all of the county health departments, such as Suffolk County, and are you familiar with the policy of the Suffolk County Health Department with respect to the use of DDT? (933)

A. Well, I have spoken with Dr. Leone several times about this, and he is in agreement with me. Our policy is more or less the same, which in essence means that we are gradually--and I am searching for a term now--we are gradually replacing this material with other materials. But we still would like to have it available if we need it.

THE COURT: Let me ask you this, Doctor. Would you have a practical problem if this was found to be dangerous and had the ill effects as has been described previously in this case, and this material were made unavailable for a municipality, could you keep it away from the farmer and other people?

THE WITNESS: I don't see how see how you could. It would have to be general use, if at all. Again, this is out of my field, but if you would like me to give you my opinion, I will be glad to do it. (934)

THE COURT: I want your opinion. That is what we are here for.

THE WITNESS: The way I see it, Your Honor, and from listening to the evidence pro and con, I think first of all it is against my philosophy. I don't accept complete license, and I don't accept the ban, because these are two extremes.

Now, from what I have heard and from what I know about the whole situation, it would be, and again, this is my opinion, but if you are going to do something like this, it has to be right across the board. No one gets it. I hope that will help you.

THE COURT: Yes, it does.

Q. In other words, you are tending to favor the imposition of some kind of control with respect to the use of DDT, is that correct? (935)

A. Certainly. That is what I have been trying to get across.

Q. Are you talking about that at an administrative or at a legislative level rather than an outright judicial ban, for example?

A. Well, I don't know if I am qualified to answer that, but I will give my opinion on it. As I told His Honor just a few moments ago, I think if it is going to be banned, it has to be taken care of by the Legislature.

Q. You think it is a political problem?

A. No, I think it is an educational problem.

Q. You are going to have to educate the Legislature?

THE COURT: Mr. Corwin, you must never ask a college professor about something that is political. If something is political, it is always educational.

MR. CORWIN: I was just engaging in semantics.

THE COURT: Am I right or wrong, professor? * * * (936)
He shakes his head yes, and that vindicates my position.

THE WITNESS: Your Honor, if I may interject something here. I don't know if this is out of order, but I think all professional entomologists and people who have worked with this material are all aware of these problems. But the point I would like to bring here is why don't the ecologists, and so on, work with us on this thing?

THE COURT: In other words, you are saying that while they will understand the situation that general problems evolve, ecologists do not work with the departments who could do something about this?

THE WITNESS: Yes, Your Honor, and I would like to say this also, for the benefit of the Court. This alleged fish kill that was supposed to have taken place down here, had I been here and someone would have contacted me about this, I would have come down and got the fish and the water samples. I would have had them analyzed. This is the kind of information we want. We don't have it. (937)

Q. As a matter of fact, Doctor, isn't there a section in the Agriculture and Markets Law that prohibits and makes it a crime for the use of pesticides or any other substance that results in a fish kill, if you know?

A. I don't think it is an agriculture and markets situation. You can correct me if I am wrong.

Q. Conservation law, maybe?

A. I think this is where it would come in. I'm not really that familiar.

THE COURT: Or the Food and Drug Act. ?

THE WITNESS: No, I think the one he is referring to now is the right one. I think it is in the Conservation Department. (938)

THE COURT: All right.

Q. Now, Doctor, you said that you were familiar, I think, with the literature generally, and are you particularly familiar and have you studied the literature that was in the plaintiffs' technical appendix in this case.

A. Yes, I am.

Q. Now, you had some observation with respect to, among other things, the adequacy of some of the samples that were used in those studies, isn't that true?

A. Yes, I did.

Q. Would you like to comment and give the Court the benefit of your opinion on those things?

A. Well, offhand there is only one that comes to mind. That was Dr. Ratcliffe's observation.

THE COURT: Dr. who?

THE WITNESS: Dr. Ratcliffe, and his paper was on the decline of the osprey or peregrine falcon in England. Well, you go through several pages of that, Your Honor, and then you come to the summary and the conclusion. You find that he found traces of four chlorinated hydrocarbons in one egg.

Now, Your Honor, I can't base a decision on one egg or one observation.

THE COURT: I can understand that.

Q. Do you think that the causal relationship of effect is pretty far fetching in some of the studies, that one particular? (939)

MR. YANNACONE: I am going to object to the characterization. Ask the witness what he thinks about them.

THE COURT: All right. He asked him that question. What do you think about the study and the literature and the results therefrom?

THE WITNESS: Well, as I said earlier, Your Honor, there is enough circumstantial evidence there that I am a little hesitant about recommending this thing for certain purposes or in certain areas.

I would like to point out, if I may, that I think Dr. Wurster's paper is probably one of the best in that whole technical appendix.

Q. Were you asked to review--and when I say you, I am talking about the State Health Department--the program of the Suffolk County Mosquito Control Commission? (940)

A. Yes, I have been asked to review the coming program for the Suffolk County Mosquito Control Commission, which I intend to start doing tomorrow, since I am down here.

Q. You are aware of the fact that they have presently discontinued the use of DDT, are you not?

A. This is my understanding.

Q. And you subscribe to that view, don't you?

A. Yes, I do. If I may point out one thing here. I've only been in the State of New York roughly say five months. I haven't had a chance really to familiarize myself with all the channels, and I am sure you appreciate my position. I really don't know all the different channels, and so on. I have been spending a great deal of time in the White Plains area.

Now I have been down in Suffolk County for a total of seven days, six of which I spent in this courtroom. On these questions on program, and so on, I couldn't very well say, because I don't know what the situation is. (941)

However, the last time I was down here, Mr. Williamson and I discussed this. He indicated that he was having some difficulty with DDT for killing mosquitos.

Well, I suggested that he try "Abate" or something like this, at which time he informed me that he had been working on it for two years, which I didn't know anything about, and that was on this problem. I may be wrong in this, but I think it was two years that they were working on this.

Q. Do you know anything about dieldrin? * * *

A. Yes, I do.

Q. Can you tell us something about its relative toxicity?

A. I can say it is quite more toxic than DDT.

Q. What about its persistency?

A. I think it is a lot more persistent. (942)

Q. Are you aware that its use is being increased?

MR. YANNACONE: Where?

MR. CORWIN: Generally.

A. When you say on general basis, including cotton, and so on, like in agriculture?

Q. Yes.

A. Let me say this: It doesn't surprise me.

Q. This is a relatively new pesticide, isn't it, as compared to DDT?

A. Dieldrin, let me see. DDT first became available on a commercial basis, I think, in 1942. Now, to the best of my knowledge, dieldrin followed either in the late '40's or early '50's. I think Dr. Dewey could answer that better. He is much more familiar with this and knows much more about this than I do, as to when it was introduced, and so on.

Q. In any event, you haven't had the experience with dieldrin that you have had with DDT?

A. Not I, no, sir.

Q. Nor has science in general?

A. No. I think that is a fair statement (943)

Q. And that is true of "Abate" is it not?

A. Yes, it has only been introduced about three years, I believe.

Q. Now, sometimes people yet a little panicky maybe about the fish kills and consequences like that which result from the use of pesticides, and they shift to another one, and sometimes they may be embarking upon a program of use which might result in something just as dangerous to the environment as DDT, isn't that so?

MR. YANNACONE: I am going to object, Your Honor. This is leading and polemicizing and everything else. You have an expert on the witness stand. Let him talk instead of counsel making conclusions.

THE COURT: All right. Withdraw the question, counsel, and ask it in proper form, without leading.

Q. Doctor, can you tell us something about the use of chemicals, pesticides, without studies as thorough as has been the experience with DDT? (944)

A. I certainly couldn't, and I don't know of anyone else who could.

Q. What are the consequences of use without the benefit of such studies or what complaint would you make about the fact that we are using it without such thorough studies?

A. Well, it could be something similar to a Pandora's box.

Q. In other words, we just don't know all the dangers that we are getting into when we use these substances, isn't that true?

A. Well, based upon the information that the USDA has, the label requirements, et cetera, you make your decision on these. You don't know the complete story, no.

Q. Well, of course, you have the same problem with respect to the use of drugs for human use, isn't that so?

MR. YANNACONE: Your Honor, I am going to object to this line of questioning. He is arguing with his own witness, and he is also suggesting the answer to his question. He has an expert witness on the stand, and I submit that he should ask the proper question. (945)

THE COURT: Well, he did answer it, counsel. He said, "I can't check everything that comes out on the market. If something comes out, I look at the label that is put there by the United States Government, and I more or less accept it. In addition to which, I might do some other work."

THE WITNESS: That is correct, Your Honor.

THE COURT: Is that about what it is?

THE WITNESS: That is correct, Your Honor.

MR. YANNACONE: We are now getting into the whole situation of morphine and aspirin.

MR. CORWIN: As a matter of fact, we are dropping the subject right now and going on to something else, Mr. Yannacone. * * *

Q. Doctor, there has been some testimony by the plaintiffs' witnesses with respect to the artificial disturbance of the ecological balance, the knocking out of one species, for example. Will you just comment generally on how you feel about that line of testimony? Tell us how you feel about that approach that was taken, and give us your views on ecological balance. (946)

A. Well, it is pretty tough.

Q. Yes, I know.

A. But briefly, let me put it this way: Every species has what is referred to as its own niche, which is determined by a certain number of grounds. You might measure it by food, temperature, and beyond which limits it can exist or won't survive in this environment.

In general, if you have an environment that has an unfilled niche, a species that has requirements very close or more approximate and which is available, that will fill this niche and utilize it.

THE COURT: Isn't that like a trout stream, where you take the trout out of that stream, and food accumulates in it; then before you know it there will be other trout right back in that stream eventually?

THE WITNESS: Yes. The point I am trying to make is that niches do not remain unfilled for any great length of time. (947)

THE COURT: Well, wasn't that typical about what I said about these trout streams?

THE WITNESS: Yes. It is the same thing. If you took the food away, you wouldn't have any trout. * * * I think this is well recognized by everyone. With an application of a certain--well, for instance, let us say DDT, which I know. We did some work at Rutgers several years ago, and you can put an application on, in this instance which happened to be fairly high. It was above

recommended dosage, because we wanted to determine what effect DDT would have on the copepod population. Now, I'm just trying to get the facts straight, and I think I have some information back there. But a day after we made this application, I think there was about a 75% reduction in the copepods, and I think the second day there was almost complete elimination of them. On the third day, 5% of what was equivalent to 5% of the control group started to appear. I think by the 18th or the 19th day, the plots that were treated with DDT had more copepods in them than our control pods. (948)

So what I am trying to point out is this: Granted, we may knock off, to use that expression, we may knock off certain species in the food chain, such as a copepod, but it is in the food chain and they have resiliency, they snap back.

THE COURT: How about if their sterility is affected? (949)

THE WITNESS: Your Honor, I haven't seen any information along sterility at all on anything. It is a question of reproductive capacity and fecundity, and so on. I haven't seen anything at all on this. This is a good point.

Q. I think they were referring to the non-viable osprey eggs in which they found a lot of DDT, perhaps.

A. Well, I would ask you to question how many osprey eggs.

MR. YANNACONE: Your Honor, I am going to object to this back and forth argument here. Ask a question and get an answer.

THE COURT: Counsel, I am here trying to learn this subject. I hear words that I never heard before in my life. I told you I spent most of my life at school, but I don't know anything about this. I have to learn. Let them argue. The more you people argue with these doctors--and I don't know why you argue with them, because you can't keep up with them--however, I do learn something from it. Let me see how much material I can extract from these people. They are the only ones I can go to. I have to practically pick-pocket their minds and get as much information as I can get from them. I can't read it in places. All right. Go ahead. (950)

Q. Now, Doctor, let us turn from the sterility angle to the question of resistance or tolerance. Can you tell us about what you know about that with respect to the mosquito and DDT and then higher forms of life?

A. Well, at present, Dr. Sutherland of Rutgers University and I are completing a publication on resistance, the study of resistance on mosquitos of New Jersey. It covers a five-year period.

Now, in essence, what it comes out to is that it appears it takes a normal--well, I don't like the term "normal"--but over a period of five years, it appears you start to develop some resistance with your adult mosquito. (951)

THE COURT: With DDT?

THE WITNESS: Yes.

THE COURT: Let me ask you another question. I don't know, but I am curious about this: Was it a fact that they used to spray the prisoners of war with DDT?

THE WITNESS: Oh, yes. This is one of the reasons. This is one of the contributing factors that eliminated typhus.

THE COURT: That was in powder form?

THE WITNESS: This was wettable powder dust.

MR. CORWIN: I can testify to that, Judge.

THE COURT: I guess everyone in this courtroom could testify for that matter. I just wanted to know it for the record. That was all.

MR. CORWIN: I have no further questions, Your Honor.

CROSS-EXAMINATION by MR. YANNACONE:

Q. Dr. Bast, you are a medical entomologist, aren't you? (952)

A. Yes, sir.

Q. And you have done research in the field of entomology?

A. Yes, sir.

Q. If I remember correctly, you have done some significant research on the subject of insect niches, isn't that right?

A. Yes, sir.

Q. You just got your PhD a little while ago, is that correct?

A. That's correct.

Q. But you have been in this insect control business for a long time, haven't you?

A. Relatively long.

Q. And you are familiar with the common methods of mosquito control?

A. Yes, sir.

Q. Now, is your current publication at all concerned with the mosquito niche?

A. The one that is in preparation, Mr. Yannacone, and I have roughly, in fact, I have three publications that are in manuscript form now. One is on the niche.

Q. That is what I want to talk about at the moment. (953)

A. Yes.

Q. The mosquito niche, and you have done a lot of work on it, is that right? Do you know what elements in the environment it takes to support a mosquito or something evolutionary equivalent to a mosquito? You do know this, don't you?

A. Yes.

Q. Now, in your current capacity as medical entomologist for the State of New York Health Department, you are concerned with insect vectors, and that is what arthropods are, isn't that right?

A. No, sir, just insects. It is technical.

THE COURT: For the record, what is an insect vector?

THE WITNESS: Well, an insect vector, my definition of an insect vector, Your Honor, is an insect that can not only carry a disease, but it is one which the disease itself can multiply within the body of the insect. You have mechanical transmission, and you have active transmission. A fly could be considered a vector. But this is a mechanical vector. It lands on something, and contaminates. (954)

THE COURT: I am not that much interested in that detail. Let us go on.

Q. And your job is to see to it that arthropods don't spread communicable disease?

A. We try to prevent them, yes.

Q. And the most common ones from the mosquito point of view, I would assume, are encephalitis and malaria?

A. On a world-wide basis, there is no doubt that malaria is probably one of the most important ones.

Q. What about the State of New York?

A. I think, Mr. Yannacone, that when I have been here a little longer, I could answer that more accurately. I wouldn't want to venture one way or the other on this thing. I don't know the background here.

Q. Now you have seen the food web, is that right? (955)

A. No, I haven't. I am familiar with them, I think.

Q. Are you familiar with the food webs existing in the County of Suffolk?

A. Well, I think it is a fair statement to say that the County of Suffolk has the same type of ecological system as is found in South Jersey. It is the same coastal plain. So based on this, I would say yes.

Q. As a resident of the County of Suffolk, I am insulted, having worked in South Jersey on occasion. However, you have sat through this trial from the beginning, haven't you?

A. No, I came down, I appeared here last Monday, and I left early Wednesday. I came down again this Monday.

Q. You haven't missed that much. You have heard most of the testimony with respect to the Suffolk County ecosystem, haven't you?

A. I would assume so, yes.

Q. Do you have any objection to it?

MR. CORWIN: What is that--the testimony?

A. I think I would have to review it. I sat here and listened to it. I don't know what particular question you have in mind. (956)

Q. I am asking you whether or not you feel this testimony in any way was unfair or non-representative or not factual? I am doing something that I am not supposed to be doing on cross-examination. I am giving you an opportunity to venture an opinion at great length.

MR. CORWIN: I will object to counsel's remarks.

THE COURT: Yes, sustained, and strike it.

MR. YANNACONE: I withdraw it.

A. I can't remember.

MR. CORWIN: I should just like to submit, Your Honor, that this embraces all the testimony about the literature, in addition to a lot of indirection.

MR. YANNACONE: Your Honor, I seriously and honestly want to learn something from this particular witness. I have read some of his stuff, and I have a great deal of respect for his ability and knowledge. (957)

THE COURT: All right, counsel. Confine your questions so that we don't get them all over the world and on all kinds of pesticides. Let us stick to one, if you will, and try to stay in Suffolk County or its environs.

MR. YANNACONE: All right, Your Honor. I would like to state for the record I didn't object to counsel taking him on direct examination from malathion and abate all the way back to DDT and pesticide policies in general.

THE COURT: Counsel, I thank you for that. Now let us go on with the case and see if we can get moving with it.

Q. Now, you made a statement about the use of DDT; that its use is proper in auto junk yards, and this is based primarily on persistence, I think you said, and low cost.

A. That is correct.

Q. Now, you are assuming or are you assuming this is a proper use of DDT because confined to the general junk yard it can't generally enter the general ecosystem of the area, isn't that right? (958)

A. If it is put on correctly, I think that is a fair statement.

Q. Yes, assuming proper application. The reason it is permissible to use in the junk yard is because it won't enter the ecosystem?

A. Well, if you rule out--Yes, yes.

Q. Just to keep the record straight so that we build a nice record, if you don't want to answer the question with a yes or no, you may answer them at length. I have no objection. Now, I think you also mentioned it could be used in barns and cribs. I assume this is where animal food is stored?

THE COURT: He also said in outhouses. He whispered that to me.

Q. Again, these are basically areas where the materials, properly applied, are not expected to enter the general ecosystem, is that right?

A. Yes. (959)

Q. And this is one of the things that makes it safe, in your opinion, to use this in this context?

A. Based on the circumstantial evidence that has accumulated to date, this is one of the reasons why I wouldn't hesitate to recommend it in certain areas.

Q. Now, in all the work you do as a medical entomologist, with respect to America, the effects of pesticides has to do with their effects on disease vectors and their effects on humans, isn't that right?

A. Yes, we are attempting to find the most efficient one to control the vector and also protect the health and welfare of the general community.

Q. And your only measure of damage, I think we discussed, or your tendency to measure damage dealt with humans, is that right?

A. Mr. Yannacone, again let me emphasize this point. I haven't had time to really organize this program. I have only been here five months. But the only information I have and which I have to go on--and I am basing my conclusions and my philosophy upon what information I have at this very moment--to the best of my knowledge, this is not injurious to humans.

Q. Yes, all right. (960)

THE COURT: I didn't get that.

MR. YANNACONE: He said this is not injurious to humans.

THE COURT: Yes, he said that before.

Q. Have you heard anybody say on the plaintiffs' case that it is injurious to humans directly?

A. Well, what does irreparable damage mean to the people of Suffolk County?

Q. Don't ask me questions. If you want me to rephrase it, I will rephrase it.

A. Okay.

Q. Let me ask you this: Has anybody said on the plaintiffs' case that the continued use of DDT will cause direct physical injury to humans, to the best of your recollection?

A. To the best of my recollection, I don't believe so, no.

Q. Will you believe me when I say that that is not an element of the plaintiffs' case?

A. I have no reason to doubt you. (961)

Q. And what constitutes irreparable damage is a question of law and not a question of fact. We are talking about damage to the natural resources of the ecosystem. I am not talking about direct injury to humans.

Now, I think you described at great length the tests and the evidence that comes down on the fact that DDT doesn't hurt humans. Can you tell us approximately how long DDT and its residues can be expected to persist normally after application?

A. Well, this is a question of where and how and when it is put on. If you could be more specific, I can attempt to.

Q. All right. Let us take it this way: Suppose you would apply it to a salt marsh.

A. Well, the evidence apparently is that it is persistent for quite some time.

Q. Suppose it is applied to a forest?

A. Well, it depends. Forests usually have pretty considerable water sheds associated with them, so it depends on whether it stays in the forests (962)

Q. Do you want to give us an order of magnitude?

A. I think it would be safe to say five to ten years.

Q. And as a general average, would you say that the DDT that has already been made will be with us for five to ten years from the date of application?

A. Again, this depends, but if I may pursue this a little further. There is no doubt in my mind that DDT persists. This is one of the reasons why we use it. But I would like to point this out to you, Mr. Yannacone, and to the Court, if I may: That although DDT is found in mud, and so on, this does not mean it is biologically active. What I am trying to----

Q. Let us stop for a moment. What do you base that statement on?

A. Well, I think Dr. Woodwell introduced a pretty nice piece of information yesterday, and, if I may, I think it was your exhibit number 10. * * * (963)

Oh, yes. Bay bottom mud off Carmans River was .281 pounds per acre, and it ranged in the plankton from .04 parts per million to 93.40 parts per million in the ringbill gull. The lowest one was in plankton, and the maximum occurred in the ringbill gull.

Now, I won't dispute, Your Honor, that this is what was found. It was probably .281 pounds per acre found in the mud. But what I am trying to develop here is how much of this actually is in contact with these organisms.

Q. All right. Hold it a moment, Dr. Bast. With reference to that particular statement, you are familiar, of course, with the solubility of DDT in water?

A. Yes.

Q. And it is quite low?

A. I think it is on the maximum order of 1 in---

Q. Parts per billion?

A. Something like that magnitude.

Q. Now, this is a ridiculously small amount. This is almost unseeable.

MR. CORWIN: I concede that it is unseeable. (964)

Q. Doctor, you also heard testimony that the DDT that is present, even in this microscopic amount, becomes concentrated by collection in the lipid areas of certain organisms from algae on up that may proceed to live in the water. Do you contest that?

A. No, I think this is one of the best pieces of evidence that we have got, and I think it follows.

Q. All right. Now, the DDT's major virtue is its persistence.

THE COURT: And low cost.

Q. And low cost.

A. And, of course, it is effective. It is effective against the mosquito.

Q. Now, let us stop a moment. Is DDT still effective against the mosquitos in Suffolk County?

A. I couldn't tell you that.

Q. Is it effective around the world against the malaria vector mosquitos?

A. Well, it depends upon what part of the world you are talking about. Certain areas.

Q. All right. I will rephrase the question. From your knowledge of scientific literature, especially world health literature, isn't it a fact that it appears that DDT is having less effect in reducing or controlling malaria mosquitos generally throughout the world? (965)

A. As a general statement, I'd go along with that.

Q. And it appears that the reason for this is that the mosquitos are building up resistance?

A. Yes.

Q. Now, from your study and from your knowledge of the mechanism of resistance, isn't it the very persistence of DDT that permits the genetic development of resistance in fast breeding species, such as mosquitos?

A. I think, Mr. Yannacone, if you subject any organism to any stress, it will develop some sort of a resistance towards it.

Q. Right. And that is a fair general statement, isn't it?

A. I would say so, yes.

Q. But isn't it true also that the faster the organism breeds, the more likely it is to develop this resistance? Isn't that true generally?

A. Well, of course, the rate of mutation is quicker. (966)

Q. Isn't the selection-out process among insects considerably faster, say, than among robins?

A. Could I ask you, not to be facetious, but what insects are you talking about or do you have in mind?

Q. I am talking about mosquitos in general. I know there are millions of insects.

A. Well, some of them have considerable life histories. I think it is a fair statement, and Mr. Williamson would probably know this from practice, of course, down here in Suffolk County. So I will just answer that in a general way. Under ideal circumstances, which would approach laboratory conditions, you may get from egg to egg in approximately nine to ten days.

Q. So maybe in the field you have got fifteen days?

A. This could be.

Q. Maybe even twenty days?

A. Right.

Q. But certainly mosquitos breed faster generally than birds?

A. I would admit to that (967)

Q. With the exception of certain exceptional cases, most disease-vector insects breed considerably faster than birds?

A. Yes.

Q. Now, DDT has been in use for twenty years, and we have a large body of knowledge about it. I think you have indicated that circumstantial evidence in building up as to the biological effects of DDT, isn't that right?

A. Circumstantial, yes.

Q. What would you consider direct evidence of biological damage from DDT?

A. The next step in this.

Q. And what would it be? Describe the experiment. I mean in all sincerity, Doctor, not facetiously. If we can help, we will help.

A. Well, let us put a hypothetical, a few more steps in here. Let us put in addition to the ringbill gull--and this is all hypothetical now----

Q. What I want to know----

A. Let us put a higher carnivore in there and one in which man can feed on.

Q. All right. (968)

A. Is this okay? Let us assume that man eats a wolf. Well, we don't have any here in Suffolk County, actually.

Q. Well, would you take a game bird?

A. No.

THE COURT: How about a fox? We have got a fox or a racoon.

THE WITNESS: Your Honor, what I am trying to do is to get to the highest species in the food chain, which would be man. I am trying to develop this on up into man. Now from the other end, we have no evidence that it affects man.

Q. Dr. Bast---

MR. CORWIN: Let him answer.

Q. Dr. Bast, wait a minute. I'm not going to interrupt until I have a reason, but we can come back to that again, Dr. Bast, if you want to lead that chain up to a man, and if you want to put enough links in between to show---

A. No, not enough. If we could get--- (969)

Q. Or a link.

A. If we could get two or more carnivores which in turn we feed on or man feeds on, this would be sufficient.

Q. This would show you how the DDT entered man?

A. Yes, I think we would all admit that.

Q. Now, this is not the purpose of that experiment or I would say any of the experiments in the plaintiffs' appendix, and this is why I ask you specifically what you would consider with respect to objective evidence on humans. I agree that you are missing links that should be in there, but let us talk about objective evidence with respect to your food webs involved in the non-human chain in the County of Suffolk. Do you think there should be anything done to make that more objective?

A. This list more objective?

Q. This type of research more objective. Give us some guidelines which you could take back to the laboratory.

A. Well, one thing I would suggest would be--now I'm not an ornithologist, and please feel free to correct me--but I do know there are some great metabolic changes in migratory birds as they fly from one place to another, and I think on examining this that we have ten species of birds here, and I think seven of them are sedentary or, I am sorry, seven of them are migratory in nature. Now, please correct me on this, but I would certainly stay with the species that is found in Suffolk County.

THE COURT: Will you give me that again? (970)

THE WITNESS: I would certainly stay with a species that is sedentary within the county.

Q. Suppose we tell you that of those species of birds there are only three that are migratory or possibly migratory at the time of the collection.

THE COURT: He said he is no ornithologist.

MR. YANNACONE: I am telling him now, Your Honor.

Q. Would that help you evaluate the data a little more? (971)

A. Well, it wouldn't--

Q. For instance, the cormorant is a resident of the ecosystem where the sample was taken, and so are the herring gulls, and so are a number of other birds here.

A. May I ask a question? Is the cormorant a scavenger per se?

MR. YANNACONE: I don't think so. I think they eat live fish. * * * I think in some areas of the world they are used to hunt fish with a ring around their neck.

THE WITNESS: . . . Could I ask one other question? What is the feeding habits of the herring gull? Do they eat anything that comes along?

MR. YANNACONE: Anything they can find or that people will throw to them. They are scavengers. * * *

THE WITNESS: Yes, it is not indicated on here, but how many samples of plankton were taken? I don't believe Dr. Woodwell brought that out.

* * *

MR. CORWIN: Judge, I think we are in an area of inadequate samples, and this is getting a little afield to the kind of testimony that we should have. I'm going to object to the continuation of this line of testimony. Obviously, this witness is not familiar with the subject matter. (972)

THE COURT: Counsel, he is not familiar with it. He is going to spend more time asking you questions than you are asking him. * * *

MR. YANNACONE: As I said to the witness before, and I say to this Court, we are all here to learn. * * *

Q. Getting back down into the planktonic-chain area, you are familiar with this type of material? (973)

A. Yes.

Q. And assuming there is an adequate number of samples, and assuming that the sampling technique--By the way, Doctor, you don't challenge Dr. Wurster and Dr. Woodwell on their sampling techniques as regular scientific methods, do you?

THE COURT: He said this is one of the finest reports he has seen.

MR. YANNACONE: Well, not this one, Your Honor. He is referring to Dr. Wurster's report.

THE WITNESS: I say the same thing about this one too.

THE COURT: He said this one too, and he is referring to exhibit 10.

THE WITNESS: This is exhibit 10, Your Honor, yes.

THE COURT: That is what he said. That's twice already. All right.

THE WITNESS: I may add, if I could, that we need more information (974) along these lines.

MR. YANNACONE: Now, that information has been gathered for sometime prior to the commencement of this lawsuit; this wasn't just gone out and gotten for the purpose of this lawsuit.

Q. Let us get back to the constant research for damage to mankind from DDT. Conceding that DDT properly applied and according to labels and directions of the United States Department of Agriculture and the Food and Drug Administration hasn't killed any human beings yet. You referred to some research being conducted down in Atlanta.

A. May I correct you on that? The research is not being conducted at Atlanta.

Q. Compiled at Atlanta.

A. The data is being compiled at Atlanta.

Q. I will assume you are referring to the United States Department of Health, Communicable Disease Center down there? (975)

A. No, the Office of Pesticides, Bureau of State Services, Public Health Service, Washington, D. C. This is the final.

Q. Who did you talk to in Atlanta?

A. A gentlemen by the name of Dr. Rec.

Q. At the Communicable Disease Center of the United States Department of Public Health?

A. Yes. I may add that Dr. Kornis put this call in for me, so I assume this is where it was.

Q. Now, we have talked with people down there also, and I think the statement was that to the best of anybody's knowledge, there has been no fetal abnormalities in humans from DDT. Is that right?

A. This is what I understood, yes.

Q. All right, fine. Is there any statement made that DDT does not pass through the placenta to the embryo?

A. I think there is a study underway, but I am not sure. In fact, I do not know what the results of it is or any data that has been collected as to this. (976)

Q. You don't know whether there have been studies to show that the DDT passes through the placenta into the embryo?

A. They do?

C. Yes.

A. Well, now I do.

Q. Well, after this is over, I will give you a reference.

A. Well, this is very interesting, but do they have any effect on the fetus?

C. Now, in the opening statement of this trial a quote was made, and it was done off the record. I didn't have the document in front of me, so I am now going to requote it for you. It is from the affidavit of Dr. Robert Smolker, who was a professor at State University, and I think you know him. He says:

"... an informed guess would be that DDT interferes with normal development resulting in death of the bird embryo at an early stage and death followed by resorption or abortion of the mammalian fetus. The probabilities would favor an effect earlier in development than occurs in the parallel case, thalidomide."

A. I can't place that.

MR. CORWIN: Your Honor, I was wondering if I can get a couple of guesses in here too. They are talking about informed guesses. I think that is very unscientific. (977)

THE COURT: All right. Let us hear the guess too. So long as they come out of a book, I am willing to hear the guess.

Q. You know Dr. Smolker, don't you?

A. I do.

Q. Do you know that he is an embryologist?

A. Yes.

MR. YANNACONE: Your Honor, if necessary, we can produce Dr. Smolker on rebuttal and counsel can ask him questions about this, for one.

MR. CORWIN: I am not interested in having any guesses.

MR. YANNACONE: ° Well, you mentioned the word "fetus".

MR. CORWIN: I didn't mention fetus. (978)

Q. Is it a fair statement that DDT causes that effect; that it would cause the embryo to be resorbed or aborted at a time prior to the abnormal development because of the traumatic effect of a chemical such as thalidomide. Do you have any objection to that statement?

A. Mr. Yannacone, if I knew something about embryology, I could venture a guess on it. But I would rather not even venture a guess on this, and I don't know anything about embryology.

Q. Therefore, on direct examination those questions that you answered about whether it causes abnormal fetuses in everything, this isn't your field?

MR. CORWIN: There has been no such testimony. Is this cross-examination?

MR. YANNACONE: Do you want to start reading back the statement?

THE COURT: Gentlemen, the doctor says he knows nothing about embryology. He is not an embryologist. So there is no point in questioning him on this.

MR. YANNACONE: I don't want to question him on that. I am questioning him as to his entomological testimony. (979)

THE COURT: All right. Go ahead.

Q. Now, you were talking about the niche of a species being eliminated. This is a very common occurrence among insects, isn't it?

A. That's correct.

Q. And is it fair to say that our friends over here in the agricultural department no sooner wipe out an insect pest than another one moves right into the same niche and goes to work at the same time and place?

A. I think the agricultural specialists would be mighty happy if they could get rid of them.

Q. Are you aware of the general ecological principle that to get rid of a pest and fill the niche, it is not enough to get rid of the pest; you must also get rid of those elements of the niche that will lead to the reintroduction of a similar or worse pest? Isn't that true?

MR. CORWIN: Do you mean those elements of the ecology or those elements of the niche? (980)

MR. YANNACONE: I said elements of the niche, and I am talking to a man who has done some fundamental research on niches, and he knows what I am talking about.

MR. CORWIN: Thank you. I don't, and I am just trying to understand the question that you are asking.

Q. All right. Dr. Bast, before we go any further, will you please tell us technically what a niche is, and take it as long as you want to, but explain it to all of us?

A. This term, like many other terms, has its own meaning to whomever you speak to. But the definition of a niche that I like is what Dr. Hutchinson of Yale University or is it Harvard--I have forgotten--but Dr. Hutchinson---

THE COURT: You better not get those two mixed up.

THE WITNESS: I think I will go with Harvard. But he proposed a formal analysis of this concept. You see, Your Honor, this niche is a concept, and he proposed an analysis of this where you take a certain number of factors which could be temperature, food, et cetera, calcium, all sorts of factors and you plot the upper limit at which you have collected the species in question. You plot the lower limit of each one of these variables, and you connect them altogether. You more or less define an area and between the limits of these, this defines the niche of the species. I don't know if I made this clear. (981)

THE COURT: The Court understands exactly what the niche is. You did make me understand, but I did understand it before. We have been given a definition of a niche a half a dozen times by these prior gentlemen.

THE WITNESS: But I prefer the formal definition of it.

THE COURT: All right. You have given it to us. (982)

Q. Dr. Bast, a niche then, especially in your research, primarily concerns itself with the environmental parameters necessary to sustain the organism in the niche, is that right?

A. Yes, this is general.

THE COURT: Where the conditions are best to sustain them?

MR. YANNAZONE: Yes, Your Honor. * * *

Q. Now, in other words then, to remove the organisms that fills the niche, not only based on ordinary evolutionary environmental principles, but you also have to alter the niche a little bit too to be sure you don't get somebody back or somebody just as bad as the one you eliminated, is that correct?

A. On the surface, yes, it is.

Q. We are talking generalities now. We are not talking specifically to your thesis or any of the work you have done on it. Then ordinary chemical control of mosquitos without any environmental control isn't going to be too effective over the long run, is it? (983)

A. Well, Mr. Yannacone, any program based upon one, as I said earlier, based upon one element is not going to be very flexible. In this business you have got to be flexible.

Q. And the more tools with which you attack an organism that causes trouble, the more likely you are to control it?

A. The more likely you are to be successful in their control, yes.

Q. And from your research and studies on niches, isn't it fair to say that the most effective way of destroying a pest is to destroy its niche?

A. Yes, and I wish I knew how you could do that without pesticides.

Q. We are not taking the pesticide element of that at the moment. But the most effective method is to destroy the niche, and then you won't have the pest or anything remotely related with it, isn't that right?

THE COURT: Then you would have utopia.

MR. YANNAZONE: No, Your Honor. They have destroyed niches at various levels for various things.

THE COURT: All right. Go ahead. (984)

Q. And when we get to man or the higher forms, one of the best methods of destroying a niche, say for a bird, is to destroy its habitat either with bulldozers or dredges, is that right?

A. Again, I wish I knew more about birds, but I would say yes.

Q. Or any higher form, Dr. Bast, and you did a lot of field work for a long time, didn't you?

A. Right.

Q. One of the best ways to get rid of a species is to destroy its habitat, is that right?

A. Yes.

Q. Another way of getting rid of a species is to destroy its ability to reproduce, isn't it?

A. I would say so, yes.

Q. And extermination of insects has worked, to a certain extent, in the south, I think, with--what is that cattle insect?

A. Screwworm fly.

THE COURT: And you also have another fly. (985)

THE WITNESS: The Mediterranean fruit fly.

THE COURT: Yes, the fruit fly. They are doing it to that.

THE WITNESS: They are working on it, yes.

Q. And this looks like a promising avenue?

A. Yes, it certainly does. But I would like to point out one thing: The reason that it has been so successful, and I think my colleagues could correct me on this if I am wrong, but the reason that it has been successful with the screwworm fly is that it mates only once, and I think there is a preponderance of males to females. Now, I don't know the exact numbers, but you will have to agree with me that it is quite a considerable ratio. So that if you can sterilize quite a large number of males and release them, of course, it will have this effect.

Now, it doesn't work with mosquitos, I am almost certain. The sterilization that they proposed does not work so readily.

Q. In other words, then, it is necessary to have a really broad attack directed at the pests' niche to effectively control, isn't that the summary of all good insect control methods? (986)

A. Well, again, Mr. Yannacone, I really don't know, but I assume it is.

Q. Well, assuming that Suffolk County is like South Jersey in the respect that there may be some similarity of a salt marsh, and assuming that the temperature is about the same, that tends to produce a niche that leads to similar moquitos, isn't that true?

MR. CORWIN: Judge, I object to that. I object to the form. Mr. Yannacone is now testifying upon a subject about which this witness has shown a reluctance to make an opinion, and upon which he states he probably isn't qualified.

THE COURT: What Mr. Yannacone is doing is to give this gentleman a similar situation, and then he is going to ask him for an opinion, I suppose. I'm going to let him go ahead with it. (987)

* * *

Q. Now, assuming Suffolk County is like South Jersey, with similar marshes and salt marshes. Water management is an important part of mosquito control process, isn't it?

A. Source reduction by water management, yes. This is very important. Reflecting on this now, what you brought to mind is that Mr. Williamson has done considerable amount of work in water management, I believe. I am not sure, but I think this is so.

Q. And prior to the advent of DDT, that was all he had to control mosquitos, and I want you to assume that according to the Museum of Science Service he had done a very good job?

MR. CORWIN: Your Honor, I am willing to concede that he knows nothing about Suffolk County or what happened to Williamson before DDT.

THE COURT: Mr. Williamson is here, I think. Isn't he? Oh, yes, there he is. If you want him to testify, put him on. This gentleman said he has been here for seven days, and six days have been spent in the courtroom. (988)

MR. YANNAZONE: But I still want the benefit of his entomological expertise.
THE COURT: All right. That can be done without bringing it down and directing it to Suffolk County.

MR. YANNAZONE: I'm not trying to confine him.

THE COURT: Counsel, I know you are not. I'm just trying to make clear that he has mentioned to me that he knew nothing about the county, and I am just passing the information on to you. Now, go ahead.

MR. CORWIN: Judge, I say I am interested in confining it to Suffolk County.

THE COURT: I know that.

* * *

Q. Dr. Bast, do you have any personal knowledge of any of the entomological problems of Suffolk County?

A. You mean as of now? (989)

Q. As of now.

A. The only thing I have, Mr. Yannacone, is that I have been asked to review the program, and that is the best I can say at the moment.

Q. Have you reviewed the program thus far?

A. No, I haven't.

Q. In other words, you are not qualified to render any opinion as to Suffolk County, is that right? (990)

A. In particular?

Q. All right, in particular. You can't say anything about Suffolk County?

A. If I knew something about the operations, I could.

MR. YANNAZONE: Your Honor, I would like to offer an objection to anything the witness has said if counsel wants to confine everything to Suffolk County. His own witness isn't qualified to talk about it.

THE COURT: Listen, gentlemen: I am not confining this witness or any other witness to anything. So long as it pertains to the element of our case, I intend to get as much testimony as I can get, because I need it. I need it badly.

MR. YANNAZONE: So do I, Your Honor, and I keep getting objections when I am just trying to get general information.

THE COURT: Don't mind him. He just does that out of habit. You should have a thicker skin than that, Mr. Yannacone, or else you will have to quit trying cases.

MR. YANNAZONE: I have a thick skin, Your Honor. * * * (991)

Q. Dr. Bast, let us get back to one of the statements you made on direct examination. In your capacity as representative of the New York State Health Department--and I assume you are such a representative--you said that if you knew DDT caused abnormality in human offspring, you would immediately move to ban it, is that right?

A. Yes--no, not move to ban it. I would take action, I said. I said I would take action.

Q. What action?

A. For one of the things, I would not recommend it--period.

Q. Well, according to the hypothetical on direct--and let us get a little hypothetical now. Suppose you had evidence, and this is all supposition and we are not contending, but suppose you had evidence that DDT produced effects similar to thalidomide. What would you do? (992)

A. Well, first of all, outside of what I read in the newspaper about thalidomide, I don't know what the effects are. But the first thing--

Q. All right. I will suggest an effect. Suppose you had evidence that DDT caused human fetuses to develop with reduced limb development, such that the child was born with an incomplete arm or legs, what would you do?

A. Well, the first thing I would do with a piece of information like that is to take it to people in our department or experts in this field and let them evaluate it for me.

Q. And assume that this actually happened, then what would you do?

A. Do you mean if they came back with the decision?

Q. And said that this is actually so; that DDT causes fetal abnormalities in children to be born; that they would be born with reduced limbs?

MR. CORWIN: Who is they? (993)

MR. YANNAcone: Anybody he recognizes as an authority. He said he would take it to other people in the department.

Q. What would you do?

A. Well, for one thing, I certainly wouldn't recommend its further use.

Q. You would stop recommending the use of DDT?

A. Yes. But, Mr. Yannacone, you have to bear in mind that in anything like this, I would consult with several people--endocrinologists, and so forth, and get their scientific opinion on this.

Q. Supposing the science was good, and assuming there was a direct causal connection, the same as thalidomide, you would no longer recommend the use of DDT?

A. I don't see how I could.

Q. Would you take any action to ban the use of DDT?

A. I think I wouldn't have to take any action. I think the commissioner would.

Q. Do you think the commissioner has that legal power?

A. Honestly, I couldn't answer that. * * * (994)

MR. YANNAcone: The New York State Commissioner of Health, Hollis S. Ingraham? * * *

MR. CORWIN: Just a minute. At this point I think it is a matter of common knowledge that the Federal Government and their controls are pre-emptive in this field.

MR. YANNAcone: That is not a proper statement at all.

THE COURT: They might have concurrent jurisdiction. I don't know at this time.

Q. Now, you were asked a number of philosophical questions with relation to DDT and to the effect that a proper place to handle DDT is in the Legislature. You gave us an opinion that the Legislature is the proper place. Now, you are a Ph.D in (995) entomology. You are familiar with the scientific method, with a capital S and with a capital M. Do you think that the Legislature of the State of New York is in a position to legislatively and scientifically evaluate your data?

A. Well, Mr. Yannacone, I don't mean to hedge or anything like this, but if I were here longer and knew the laws, and so on, I could answer that question. I can't honestly answer that question at this time.

Q. I can understand that. You have been in the State of New Jersey for a number of years, is that right?

A. Yes, sir.

Q. You went to school in Rutgers?

A. Yes.

Q. It is a fine school, and it has turned out some lovely entomologists, seriously. Rutgers is similar to Cornell in the State of New York, isn't it?

A. Dr. Pepper wouldn't like to hear you say that. He is the chairman.

Q. And I suppose Dr. Dewey wouldn't either.

THE COURT: Before this you had Harvard and Yale, and now it is Rutgers and Cornell. I'm afraid you are going to be a very much disliked young man.

MR. YANNAcone: Except Rutgers and Cornell don't play in the same football league. That is one saving feature.

Q. In any event, Dr. Bast, do you think the Legislature of the State of New York--of the State of New Jersey, based on your knowledge of it while you were in the State of New Jersey, is in a position to personally evaluate scientific data in your field of entomology? (996)

A. I have never gone into this, but I think they would have to rely on appointed experts, and so on.

Q. So the Legislature, you don't think, would really be competent to evaluate your type of research?

MR. CORWIN: He didn't say that. Your Honor, this man is now his own witness, and he is trying to impeach him. * * *

MR. YANNACONE: Let us not have counsel answer the question for him. (997)

THE COURT: Counsel, as I said before, this isn't a leg-off case that we have or an arm'off case that we have. We have an entirely different case here, where these things shouldn't be necessary. * * * Counsel asked you this question to determine, if you will, whether the determination of all the questions concerning DDT should go to a court or to the Legislature. Now, if you assume, for example, that a judge sitting has no knowledge concerning DDT, and you have a committee of ten men who have gone to Cornell, some to Rutgers, and some to every place else--that they have studied this subject; then don't you think they would be more qualified than the Judge to pass upon it?

THE WITNESS: I would have to say yes. (998)

THE COURT: Of course you would have to say yes. There are so many facets in this case, that I still don't know them. Counsel, I repeat, the question as to whether it belongs here or in the Legislature will be determined by the cases we have or such laws that we have. I don't know them yet. We haven't got them. However, if you try to draw a comparison between individuals or groups, then you must go further and determine how much the group or the individual knows about the subject.

MR. YANNACCNE: Your Honor, with deference to the Court, counsel for the defense has put on so far two witnesses, at least four or five pages, all about legislative action versus judicial action. I have let this go in without objection, and now I want to pursue it to its logical or--strike out logical--but I want to get the opinion of a Ph. D in science with reference to the laws and judges. (999)

MR. CORWIN: Can I sum up too, Judge?

THE COURT: Surely.

MR. CORWIN: For one, I am objecting to this on the ground that it is immaterial. What his opinion is is immaterial on this question of what the Legislature could or should do. That doesn't make any difference. Whether his answer is yes or no, it doesn't make any difference. Now, Your Honor, I would like to point out that he is qualifying people by the simple expedient of reading the literature. On the basis of that, I could become an expert here and testify.

THE COURT: What this gentleman thinks as to who is best qualified to make a decision here, that doesn't interest me one iota. I have become very fond of this witness, but I am afraid I can't take his opinion as to which one is best qualified. (1000)

MR. YANNACONE: That is all I want to hear.

THE COURT: That is his answer, I am sure.

THE WITNESS: I couldn't put it any better, Your Honor.

THE COURT: There you are. The witness said that is the answer. * * *

Q. Doctor, you have checked on the safety of DDT with respect to humans, haven't you?

A. Yes, to the best of my knowledge.

Q. And are you familiar with the FDA regulations and the USDA regulations with respect to handling?

A. Yes.

Q. Now, Dr. Bast, I assume that there has been a concession here with relation to DDT, malathion, parathion, or any one of a hundred insecticides, that all have been inspected before distribution and sale.

A. Mr. Yannacone, it is my understanding that under the Food and Drug Administration every--and I think this is Dr. Dewey's field, but I will just make comment on it--I think there are approximately 60, 000 formulations or in that neighborhood someplace, but before they are permitted to be sold, they must be registered by the USDA. I think this is true. (1001)

Q. And USDA and FDA are interested in toxicity in humans, isn't that right?

A. Oh, of course.

Q. And they have two standards: They have a standard for the user, the operator, his methods, because he disposes of large quantities of it, and they have a standard for the consumer, which is dealt with in terms of tolerance and residues on the products, isn't that right?

A. I think so, yes.

Q. And that is what Dr. Semel said yesterday, and I believe him.

A. Yes.

Q. Now, again, what we are interested in is directing damage to human knowledge, isn't that right?

A. Well, I think this is one of my primary concerns.

Q. Now, I said with respect to these standards, FDA and USDA, they are interested in damage to human health, isn't that right? (1002)

A. Yes, I think this is true.

Q. In fact, this is the way the statute is set up, and this is the way the laboratories are set up?

A. I assume so.

Q. Now, let us get a little more specific. With reference to the chemicals you have talked about, I think you have given an opinion or Dr. Semel did yesterday, that we don't know as much about malathion, parathion, abate, the carbamates, as we do about DDT, is that right?

A. Yes.

Q. I think you mentioned Pandora's box, and I think Dr. Semel mentioned Pandora's box. I know counsel has mentioned Pandora's box, and I would venture to bet that Dr. Dewey will mention Pandora's box--

MR. CORWIN: I object to the form of the question, Your Honor.

MR. YANNACONE: I haven't asked the question yet.

MR. CORWIN: I know you haven't

THE COURT: All right. The doctor does not bet.

MR. YANNACONE: All right. Excuse me, Your Honor. (1003)

Q. Now, the problem of knowledge relates to all potentially hazardous substances, doesn't it? We don't always know enough about the potential long-term effect of a substance before we authorize its use, isn't that so?

A. If I want to get absolute information, we would never be able to use anything.

Q. And one of the classic examples of latent long-term effects . . . that has been deleterious has been ionizing radiation, hasn't it?

A. I would say so.

Q. And another one has been exposure to the effects of radiation over a long period of time---

THE COURT: Counsel, there are many things that you can tabulate under there. You have given a classic example. Now go on from there. (1004)

Q. Now, with respect to the long-term effect of pesticides on humans, these effects have been determined to be safe legislatively and administratively so far as they meet the registration requirements of FDA and USDA, haven't they?

A. To the best of my knowledge, yes.

Q. In other words, if a pesticide is marked with USDA or FDA approval, it is the opinion of these agencies it is safe for humans, is that right?

* * *

A. Yes, if used as directed.

Q. There is no mention made about its effect or potential effects on the ecosystems other than as they cause direct damage to humans, is that right?

MR. CORWIN: No mention made where--on the labels? (1005)

MR. YANNAZONE: No, in the procedures. These testing procedures that lead to this approval.

MR. CORWIN: If the witness knows.

MR. YANNAZONE: If the witness knows, yes.

A. Now, this I am really not clear in. This Dr. Dewey could possibly answer better than I inasmuch as he knows more about this than I do. But I think recently U. S. Fish and Wildlife Service has been participating in assessing this. In other words, Mr. Yannacone, it is not just the USDA and the FDA. It is Department of Interior and the USDA or--I'm sorry, the Department of Interior and the Fish and Wildlife people who are also making contributions along these lines. This is the best I can say.

Q. They are making research contributions?

A. Yes.

Q. Now, will you tell us, if you know, what the difference is between the class of compounds represented by DDT and other long-persistent, broad-spectrum biocidal compounds such as malathion, parathion, the organic phosphates, and say the newer carbamates? What is the major difference between them or among them?

A. Well, from a chemical standpoint, your chlorinated hydrocarbons (1006) are exactly what they say they are--chlorinated hydrocarbons, with the exception of the cyclopentadienes, which are dieldrin, endrin, and aldrin.

Q. Now, in your organic phosphates, I believe most of the nucleus is a phosphoric acid nucleus, and the carbamates--well, I forget the linkage there. However, let me give it to you a little more classical. The organic phosphates and the carbamates are generally considered as classes of compounds that are biodegradeable, isn't that right?

A. To the best of my knowledge, I think this is a fair statement to make.

Q. And the chlorinated hydrocarbons, with the possible exception of methoxychlor, are not generally considered biodegradeable? * * *

THE COURT: What is that?

THE WITNESS: Broken down.

MR. YANNAZONE: I mean by that, Your Honor, readily broken down (1007) by organisms and higher animals so as to be non-harmful.

A. Now, by way of answering your question, there is some evidence that just came out in the November 18th issue of Science that illustrated that some of the actinomycetins have been able to break down DDT.

Q. What is an actinomycetin?

A. That is fungus.

Q. So that would bring it down to this order?

A. I would assume it would.

Q. To one of the residue products of DDT?

A. Well, also DDE.

Q. Which is the end metabolite?

A. Yes, I would say so.

Q. To the best of your knowledge, the warm-blooded animals don't generally break down DDT into DDE, do they? (1008)

A. To the best of my knowledge, I am not sure. That is the best answer I can give you. It is such a broad spectrum that I can't answer it.

Q. Let us be specific. To the best of your knowledge, do the higher animals convert DDT quickly into a harmless derivative, relatively harmless derivative such as DDE.

A. Quickly? Again, I wouldn't want to venture it.

Q. Does the word "quickly" bother you?

A. Yes, it does.

MR. CORWIN: It bothers me too.

MR. YANNACONE: All right. I will rephrase the question.

MR. CORWIN: Your Honor, I would like to submit that this is completely irrelevant. He is talking about this resistance factor, and the way the enzymes are built up in the mosquito which has a life expectancy somewhat less than man's. We have got to know what he means by quickly, and it makes a difference.

MR. YANNACONE: I will get rid of the word "quickly". (1009)

Q. Within a period of say one breeding cycle?

A. Of a higher animal?

Q. Yes.

A. Well, based upon the evidence--not the evidence, but the literature, and so on--and again, I would like to emphasize that most of it is circumstantial, but I would say no.

* * *

Q. Now, there is very little persistence in the organic phosphates and the carbamates, isn't that so, compared to DDT? (1010)

A. All right. Compared to DDT, under certain equal conditions, yes.

Q. We are assuming a normal Ph, and that this does automatically break down.

MR. CORWIN: Can we have a definition of what he means by persistence in this case?

MR. YANNACONE: All right. For the purpose of the discussion with Dr. Bast, I will consider persistence to be lasting longer than generally one or two breeding seasons of the species we are talking about.

THE WITNESS: We will have to concede that.

Q. Now, I think that is a fair working definition which we are going on. The less-persistent substances--malathion, abate, parathion, the carbamates--these are less persistent in the sense that they break down in the bodies or in the products, and they no longer are biologically active, isn't that it? (1011)

A. Well, I'm not so certain about that. For instance, Mr. Yannacone, parathion, as you mentioned, it breaks down into paraoxon, which is even a lot more toxic than parathion, I believe, and a lot more persistent.

Q. Then what happens to it?

A. Well, then eventually it is broken down.

Q. And then its persistency is in no way similar to that of DDT?

A. I would say no.

Q. Is it possible in higher animals, other than insects, to build up sublethal cumulative levels of these pesticides, other than DDT? So that we may narrow the field, for the purposes of this lawsuit we are talking about malathion and abate.

A. I would sort of doubt it.

Q. In other words then, all these cumulative sublethal--call them what you will--effects that are mentioned in the literature with reference to DDT are not the subject matter of the research involving these other substances, such as malathion and abate, isn't that so?

* * *

MR. CORWIN: He has made this witness his own witness for the purpose of getting into something entirely new. I submit, Your Honor, that this is immaterial, and I object to it on that ground. (1012)

MR. YANNAcone: I have no more questions then, Your Honor, if he wants to raise the objection. * * *

THE COURT: I still didn't get the definition of the last term. (1013)

* * *

Q. Is it possible to measure, based on common methods of environmental research, sublethal accumulations of malathion and abate in higher organisms?

A. Well, Mr. Yannacone, this presupposes that I know what a sublethal dose is. I honestly don't.

Q. A sublethal dose by definition?

A. I mean in terms of actual grams per body kilograms or milligrams per body weight.

Q. I think you answered me just two questions ago that you didn't think it was possible to get sublethal accumulations of malathion. That is your opinion, isn't it?

A. Yes.

Q. Therefore, the sublethal effects of these substances are not in issue here, is that so?

A. I think with malathion, they are more or less rapidly degraded.

Q. But DDT isn't?

A. I don't know. Not in higher animals, I don't suppose. (1014)

Q. In other words, you don't have any knowledge, do you, as to the effect of DDT in higher animals?

A. Not outside of what I have been listening to and what I have read.

* * *

Q. All right. Do you challenge the testimony of Dr. Woodwell, Dr. Wurster, or Dr. Whittaker in any particular respect that you care to challenge it? Here is your opportunity. Counsel didn't give it to you on direct; I am giving it to you now.

A. Well, the only thing, I would have to go back to keep these facts and figures in my mind. The only thing that disturbs me about Dr. Wurster's paper was the fact that he got 61 robins from one town, and I don't know what it was from another.

Incidentally, I would submit to you and to this Court, that I had asked Mr. Corwin to ask Dr. Wurster if he had analyzed the soil samples, and I believe his answer was no. (1015)

Now, the point that I am trying to develop here--and I don't know too much about the experiment or the environment up there, and so on--but I would submit that if these trees were treated year in and year out, which is what I will assume they were, you would probably run into massive amounts of DDT in that soil, which, of course, I would expect that you would probably get some mortality in robins. But the point I am making is that this is an abnormality. We don't go around recommending dosage rates at 50 pounds per acre.

Do you see what I mean?

Q. Don't you believe that the continued application of small quantities of DDT will tend to build it up in the soil?

A. I assume so, but the point is in decimals. (1016)

Q. Don't you think it is possible to get 32 pounds per acre if you spray a salt marsh for twenty years with a half-pound per acre?

A. Let us see. A half-pound per acre for twenty years?

Q. Yes.

A. You could. I am just saying you could.

Q. In concentration?

A. You could get 10 pounds per acre.

Q. That is still more than half a pound per acre, isn't it?

A. If my mathematics serves me correctly.

Q. It is still potentially a not recommended amount, isn't it? In other words, if someone was going to dump that 10 pounds per acre today, you would say "Don't do it."?

A. Of course, I would.

Q. But if he dumps a half-pound today, a half-pound next year, a half-pound the year after, and it accumulates, and you have already testified it can stay as long as ten years--isn't it going to have the same effect? (1017)

A. Yes, but, Mr. Yannacone, we don't recommend this practice.

Q. You don't recommend this practice, but apparently the Suffolk County Mosquito Control Commission did it up until last year.

A. I can't say anything about that.

* * *

Q. You made the statement that this is not a political problem; that it is an educational problem.

A. That is as I see it.

Q. Now, we have taken one tack, and we are endeavoring to educate the judge. Who do you think should be educated?

MR. CORWIN: I object to this as immaterial (1018)

MR. YANNAZONE: Your Honor, this is from his direct examination, and I want to know who he wants educated.

THE COURT: Everybody, I guess.

A. I was going to say everyone that uses the material, the public. * * *

MR. YANNAZONE: I have no further questions at this time, Your Honor.

MR. CORWIN: Nor do I have any further questions.

* * *

(The Court then recessed for lunch.)

AFTERNOON SESSION

* * *

AFTERNOON SESSION

* * *

MR. CORWIN: Dr. Dewey, please take the stand. (1019)

JAMES E. DEWEY, called as a witness in behalf of the defendants, being previously duly sworn, testified as follows: * * *

DIRECT EXAMINATION by MR. CORWIN:

Q. Dr. Dewey, can you state your qualifications a little more elaborately, please, other than what was exacted from you when you were a witness, for the purpose of enabling the Court to better evaluate your opinion testimony?

A. I was born and reared on a farm in Central New York. I attended (1020) Cornell University, College of Agriculture, as an undergraduate. I received a degree in entomology. I attended the University of Tennessee and obtained a master's degree in entomology and zoology. I returned to Cornell and received a Ph.D in entomology, with a major in insect toxicology.

My experience is varied. I worked at the experimental station in biological control as a under-graduate in college, and I then had my first introduction to insecticide work for my master's degree. I decided to major in toxicology primarily because of the lack of jobs in the field of biological control, and, being a practical individual and interested in eating, I decided to work on the insecticide controls.

Now, before completing my degree for a doctor, I was made a member of the staff. I was a specialist in fruit-insect control in the Extension Division of the University, and I received my assistant professorship upon completion of my degree. Three years later I was made an associate professor in the field of insect toxicology and a resident, which was in teaching and toxicology research. (1021)

I became a full professor in 1954, and I remained in this position until 1964, when I was made program leader of the chemical pesticide program for the College of Agriculture, with the responsibility of coordinating the pesticide chemical program as it related to the College of Agriculture, the Veterinary College, the College of Home Economics, and to a degree with the College of Forestry at Syracuse University. I was also charged with the responsibility of being the representative of the university with state and federal agencies in relation to chemicals and pesticides.

Now, as part of this responsibility, I am charged with the safe and proper use of pesticides and the use of substituted measures where such measures are adequate and available. In doing this, I am faced with the problem of perhaps writing in that a large state, such as New York, with sizable staffs of professionals working in the area, I am riding the rail, so to speak. They tend to be interested in very specialized areas to which they are trained, and thus it becomes continuously necessary to almost educate professional people to the broader im- (1022) plications of the pesticide program and to the problems of control.

Believe me, we have them on both sides, that is, we have people who bring pressure of an interest, such as this court has been hearing, and we also have people on the other side who will acknowledge perhaps that pesticides can do no wrong. Somewhere in between we have to come up with a workable solution that is in the best interests of the public.

Now, in relation to the public, we should say that the College of Agriculture is charged by state law with the responsibility of making recommendations for the use or the control of insects and diseases and other agricultural problems of agricultural significance.

However, in a state of the size of New York State, which presently runs about 18,000,000 people and to which probably 500,000 are directly associated with agriculture or agricultural business, we cannot help but be responsive to the other 98% of the population. We consider these are people as much within our province of responsibility as are those who deal with agriculture. (1023)

Q. Is it a fair statement that it is part of your job to make a judgment about the elm trees as well as the robins?

A. That is correct.