CHEMICALS IN FOOD PRODUCTS

HEARINGS

BEFORE THE

HOUSE SELECT COMMITTEE TO INVESTIGATE THE USE OF CHEMICALS IN FOOD PRODUCTS

HOUSE OF REPRESENTATIVES

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'Chemical Additives' On Food Found Harmless To Health

DDT, Parathion And Other Insecticides Reportedly Cause No Strange Maladies

By Science Service

WASHINGTON, Dec. 11—You need not worry about getting some dangerous or strange sickness from DDT, parathion or any other insecticide that might be in your food because the farmers used it to protect his crops.

And you can rest easy about chemicals used to retard mold on bread, improve the quality of evaporated milk and keep butter a summer-yellow color all year round.

The food protection committee of the National Research Council has just issued a statement to this effect. The committee has worked for a year on "chemical additives" and their effect on health.

"There is no evidence that consumption of foods resulting from the use of new chemicals in crop production or in the processing of foods has created mysterious diseases and epidemics or endangered the health of the people," the National Research Council declares.

This should kill the rumors about virus X disease epidemics coming from DDT and other similar rumors, all of which presumably started because people drew conclusions without sufficient information.

Parathion, for example, is an extremely poisonous substance if used as an acute poison. But it is extremely volatile in the form used to control moths on fruit trees. It, therefore, blows away very quickly. If the farmer follows directions not to use it later than one month before harvest, none will be left on the fruit that reaches the consumer.

MEDICINE

DDT Not Sickness Cause

No need to worry about getting dangerous disease from insecticide residue on food, National Research Council committee reports.

► YOU DO NOT need to worry about getting some dangerous or strange sickness from DDT, parathion or other insecticide that might be in your food because the farmer used it to protect his crops.

And you can rest easy about chemicals used to retard mold on bread, improve the quality of evaporated milk and keep butter a summer-yellow color all year round.

The Food Protection Committee of the National Research Council has just issued a statement to this effect. The committee has worked for a year on this subject of "chemical additives" and their effect on health.

"There is no evidence that consumption of foods resulting from the use of new chemicals in crop production or in the processing of foods has created mysterious diseases and epidemics or endangered the health of the people," the National Research Council declares.

This should kill the rumors about virus X disease epidemics coming from DDT and other, similar rumors, all of which presumably started because people drew conclusions without sufficient information. Such rumors have been widespread in recent years.

Parathion, for example, is an extremely poisonous substance. But it is extremely volatile in the form used to control coddling moth on fruit trees. It therefore blows away very quickly. If the farmer follows directions not to use it later than one month before harvest, none of the poisonous material will be left on the fruit that reaches the consumer.

As to the idea that we are eating poison with our bread because chemicals to keep it fresh are added, the Council says this:

"Contrary to some ideas that have been circulated, reliable food processors have not reduced the nutritional quality of our foods nor created inferior products through the use of chemical additives. Actually, the quality and sanitary characteristics of our foods have been improving."

Science News Letter, December 22, 1951

CHEMICALS IN FOOD PRODUCTS

TUESDAY, DECEMBER 12, 1950

HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE TO INVESTIGATE THE
USE OF CHEMICALS IN FOOD PRODUCTS,
Washington, D. C.

The select committee met, pursuant to adjournment, at 10 a. m., in room 429, Old House Office Building, Hon. James J. Delaney (chairman of the select committee) presiding.

Present: Representatives Delaney, Hedrick of West Virginia, and Miller of Nebraska.

Also present: Vincent A. Kleinfeld, chief counsel to the committee, and Frances K. Topping, staff director.

The CHAIRMAN. The committee will come to order.

Mr. Kleinfeld.

Mr. KLEINFELD. Mr. Cleary.

The CHAIRMAN. Will you state your name and address, please, Mr. Cleary?

Mr. CLEARY. Thomas F. Cleary, Geary Chemical Corp., Empire State Building, New York City.

The CHAIRMAN. Do you solemnly swear that the testimony you are about to give will be the truth, the whole truth, and nothing but the truth, so help you God?

Mr. CLEARY. I do.

TESTIMONY OF THOMAS F. CLEARY, VICE PRESIDENT, GEARY CHEMICAL CORP., NEW YORK, N. Y.

Mr. KLEINFELD. What is your occupation, Mr. Cleary?

Mr. CLEARY. I am a chemist.

Mr. KLEINFELD. And what position do you hold with the Geary Chemical Corp.?

Mr. CLEARY. I am the vice president and director of research for Geary Chemical Corp.

Mr. KLEINFELD. What is the Geary Chemical Corp?

Mr. CLEARY. The Geary Chemical Corp. is an organization that was formed in April 1949 for the manufacture and sale of certain insecticidal chemicals. We are licensed for the manufacture of certain insecticidal chemicals by Farbenfabriken Bayer, a German corporation.

Mr. KLEINFELD. And do you have a statement you wish to read?

Mr. CLEARY. Yes; I do.

Mr. KLEINFELD. Please proceed.

Mr. CLEARY. I would like to begin at more or less the middle of this statement as it appears here, because in amending the statement

as I did, I am presenting some information that I think is more general in nature, and perhaps a little more interesting to this committee than the original statement which is represented by the first two pages.

This statement is an attempt to describe to you the efforts that are required of a new insecticidal chemical manufacturer in an effort to assure itself that the products that it is handling are safe and valuable, and also in order to comply with the requirements of the law and the agencies administering the law.

The statement is titled "The Development of a Commercial Insecticide: Metacide."

The Geary Chemical Corp. was organized in April 1949 and incorporated in June 1949. This company undertook to test certain insecticide products developed by the German company, Farbenfabriken Bayer, with a view to their ultimate manufacture and sale in the United States and Canada.

We are not yet selling commercially any of these products. The entire activities of this company since its inception have been devoted to research into the toxicology, insecticidal activity, and spray-residue aspects of these chemicals. Our work has been concentrated on three insecticidal chemicals, all organic phosphates.

At this time, some 20 months following the start of our research, one of these products, metacide, has been brought to the stage of development where it has been submitted to the United States Department of Agriculture for their consideration for general registration. This required period of research is shorter than is the average, largely because of the extremely close chemical, insecticidal, and pharmacological resemblance between it and parathion, which is an already accepted and established product.

At the time we began to test it in this country, metacide already has a history of several years' use in Europe where it demonstrated no unusual hazards in application and where it was proven to be highly effective insecticidally.

The testing of this product in the United States began with the establishment of a comprehensive toxicological research program at Albany Medical College under the direction of Dr. William B. Deichmann, pharmacologist of that institution.

At the start, Dr. Arnold Lehman of the Food and Drug Administration and Dr. Justus Ward of the United States Department of Agriculture were provided with samples of this product for their examination. Subsequent informal meetings occurred at intervals between Dr. Deichmann and Dr. Lehman and his staff for the purpose of reviewing their respective toxicological findings and in order to maintain our research along lines indicated as desirable by the FDA and USDA. Other toxicological investigations of this product were carried out by the Wisconsin Alumni Research Foundation, the University of Chicago toxicity laboratory and the biological research laboratories of Dow Chemical Co.

Within a short time after our organization, we had instituted a research project at the Boyce Thompson Institute for the purpose of examining the plant-residue characteristics of this product. This project was directed by Dr. Albert Hartzell of that institution.

The study of plant-residue aspects of Metacide was supplemented by the establishment of our own experimental farm and analytical

laboratory where many hundreds of analyses have been performed on numerous varieties of plants which had been treated with this insecticide.

In carrying out such analyses, we have applied both chemical and biological methods. Both types of analysis for this purpose are capable of detecting in food plants 1 part of the toxic substance in 20,000,000 parts of plant or other food material. To put this in other terms, if a rabbit were to eat food containing the lowest detectable quantity of this insecticide, the animal would have to eat 1,000 pounds of this food in a single day in order to ingest a toxic dose of this insecticide. We have applied methods of analysis, therefore, which permit us to detect toxic substances in quantities infinitely more minute than any which could cause harm to a consumer of a food product.

Nothing in any of our toxicological and plant residue research indicated that Metacide constitutes a potential hazard to user or food consumer if the product is used according to directions.

Samples of Metacide were distributed to 72 State, Federal, and academic research organizations for their examination and evaluation as an insecticide. As a result of these investigations and those of our own entomologist, information establishing the insecticidal value of this product was obtained.

A summary of the results of all of our investigations on Metacide comprises almost 200 printed pages of pertinent data prepared by technically trained personnel. This document constitutes a label-registration application which was submitted to the United States Department of Agriculture for their study.

This company continues to be actively engaged in research on new insecticides with the objectives of developing better, more economical, and less toxic products. The development of insecticides lacking residue problems which might constitute a public-health hazard is one of our primary objectives. Such research is time consuming and expensive.

The encouragement of this kind of research by manufacturers of agricultural pesticides can survive only if Government regulation applied to this industry, while such regulation may be rigorous, remains realistic and clearly defined.

We are a new company experiencing our initial contact with the problems of developing a new pesticide product and with the laws and Government agencies which regulate our activities.

Having conformed with these laws and cooperated with these agencies to the best of our ability, we are confident that our product, Metacide, is a valuable addition to the pesticide field, that it is safe to use, and that it presents no public-health problem.

Now, the remainder of my statement is a little more restricted to a description of certain products.

Mr. KLEINFELD. Excuse me. For the sake of time, I think it might be well to have the remaining statement inserted in the record. It is of specific interest on certain specific chemicals.

Is that satisfactory with you, sir?

Mr. CLEARY. That is satisfactory with me; yes.

The CHAIRMAN. Very well.

(The statement referred to is as follows:)

PREPARED STATEMENT OF THOMAS F. CLEARY, VICE PRESIDENT, GEARY CHEMICAL CORP., NEW YORK, N. Y.

METACIDE AND POTASAN, NEW ORGANIC PHOSPHATE INSECTICIDES

The extremely valuable insecticidal properties of esters of phosphoric and thiophosphoric acids were recognized several years ago by Schrader, Kukenthal, and others in the laboratories of Farbenfabriken Bayer, in Leverkusen, Germany.

As a result of the investigations of American and British research teams which visited German industrial and research establishments at the end of World War II, these chemicals were introduced into the United States as commercial insecticides in 1947.

Since that time their use has expanded continuously until today these compounds occupy a position of major importance in the field of economic poisons. Parathion is the most important and most widely used insecticide of this class at the present time.

Parathion and certain related insecticides are characterized by high activity at low dosage levels against a very wide range of insect pests, and by relatively rapid and complete disappearance from treated plants. These features combine to produce extremely economical insect control, and safety for the consumer of treated food crops.

The Geary Chemical Corp. is engaged in the development and manufacture of insecticides of this type. For the past 20 months two such products, Metacide and Potasan, have been tested extensively by Geary Chemical Corp., with respect to their pharmacological, insecticidal, and plant-residue properties.

Metacide has recently been registered for general insecticidal use by the United States Department of Agriculture. It has the following composition:

	Percent
Parathion	6.7
Methyl parathion	26.7
Thiosolve emulsifier	66.6

In ordinary usage, from 4 to 12 ounces of this formulation is added to 100 gallons of water, forming a spray solution which contains 0.03 to 0.09 percent of the composition, or 0.01 to 0.03 percent of the toxic substance.

This product was specifically designed to overcome many of the disadvantages associated with the use of parathion in its commonly known wettable powder formulations. The desirability and need for the use of the product Metacide are indicated by the following of its advantages over parathion wettable powder formulations:

(1) Being a liquid, it presents no dust hazard to the user preparing spray solutions in the field. Exposure to dust is suspected of having been the principal cause of several fatal cases of parathion poisoning which occurred among field workers over the past 2 years. It contains an emusifier which suppresses the toxicity which may be exerted by dermal contact.

(2) When sprayed upon plants it has the property of penetrating into the plant rapidly, leaving the plant surface relatively nontoxic within a short time. Thus while remaining active against sucking and chewing insects which attack the plant, it does not create the problem of causing lingering toxic deposits upon the plant surface and thereby lessens the hazard to persons coming in contact with the plants after spraying. This has been demonstrated at Boyce Thompson Institute, where plants sprayed with Metacide were shown to become nontoxic to flies within a few hours after spraying.

(3) This characteristic of rapid plant penetration also brings about a more rapid disappearance of toxic residues in the plant, inasmuch as virtually all of the toxicant passes rapidly into the plant and is destroyed therein.

(4) While retaining all of the broad range of insecticidal activity of parathion, the active principle of Metacide, a mixture of 20 percent parathion and 80 percent methyl homologue of parathion, is considerably less toxic than parathion through oral, dermal, or inhalation exposure.

(5) Certain plants and certain insects are difficult to "wet" using parathion wettable powder formulations. Effective treatment of such plants and attack against such insects are facilitated by the use of Metacide.

Formulations corresponding to Metacide have been used on a wide scale throughout Europe for several years. In contrast to experience with parathion in

the United States, no cases of human poisoning have occurred with the use of Metacide in the field.

The insecticide Potasan is chemically related to parathion, being the diethoxy thiophosphoric acid ester of 7-hydroxy-4-methyl coumarin. The development of this compound as a practical insecticide resulted from a search for a pesticide which would be more highly effective against certain pests than is parathion, particularly against certain species of mites and coleoptera (beetles).

Potasan has demonstrated its superiority in this respect, and it is, furthermore, considerably less toxic to warm-blooded animals than parathion.

Like Metacide, Potasan has the property of gradually disappearing in the plant, leaving negligible toxic residues in treated crops, within a reasonable period of time.

The statements given above with respect to Metacide and Potasan are supported by research reports which describe results of research programs carried out for and by Geary Chemical Corp. and by other investigators.

It is our belief that the products Metacide and Potasan represent valuable advances in the field of economic pest control and that their proper use is consistent with the best interests of public safety and economy.

(The research reports referred to above are on file with the committee.)

Mr. KLEINFELD. May I proceed, sir?

The CHAIRMAN. Yes; you may proceed.

Mr. KLEINFELD. Do you have something further to add, Mr. Cleary?

Mr. CLEARY. I have only to add, if this is the time to do it, that Dr. Deichmann, the pharmacologist who has conducted the work that I have been describing in general, is present and has some remarks of his own that he would like to present here if there is time for him to do so.

The CHAIRMAN. If we are able to fit him in, we will. So go right ahead.

Mr. CLEARY. In case you cannot, we can enter his statement as an exhibit here.

The CHAIRMAN. We will look that over, and, if it is pertinent to the issue, we will include it.

This is a rather unusual approach, because you are the first new outfit that has attempted to come in and give us testimony, and it shows what a man must do in order to secure approval by the Federal Food and Drug Administration and the Department of Agriculture and it is of interest in view of that fact.

Will you continue?

Mr. KLEINFELD. I gather, Mr. Cleary, from your statement that you believe that it is necessary, in view of the fact that these insecticides are poisonous, to make careful tests before they are used on growing crops; is that correct?

Mr. CLEARY. I do; yes.

Mr. KLEINFELD. I have a reprint of a report in the Journal of the American Medical Association of January 28, 1950, and I would like to read one paragraph to you and see what your views are on these statements:

It is the opinion of the Council on Foods and Nutrition that information on the following factors should be supplied before pesticides that may contaminate food or forage crops are released for general use:

1. Chronic as well as acute toxicity tests. These should be carried out in such a manner as to demonstrate satisfactorily the toxicologic effects of pesticides on warm-blooded animals and man.

2. Accurate methods of isolation and quantitative determination of pesticide residues in biologic material. These methods must be sufficiently rapid as to be of practical use in the examination of perishable foods.

Are you in accord with that statement of the Council on Foods and Nutrition of the American Medical Association?

Mr. CLEARY. Yes; I am.

Mr. KLEINFELD. Yesterday we had a gentleman testify before the committee who, in talking about various injuries that had occurred in the application of parathion, indicated that in his opinion these people who had been hurt had virtually committed suicide.

I would like to read to you from the Journal of the American Medical Association of September 1, 1950, a report for the Council on Pharmacy and Chemistry, and this says in part:

The organic phosphorous insecticides are among the most toxic materials commonly used for pest control, and are capable of producing severe systematic effects and death unless directions for handling and use are strictly observed.

Is that correct?

Mr. CLEARY. I believe it is. I would like to point out that it is a paradoxical fact that some of the most toxic chemicals that are used for insecticidal purposes today are some of the least harmful with respect to the consumer of foods which have been treated with it. In other words, it is their chemical nature that they disappear rather rapidly after they are applied to plants.

Mr. KLEINFELD. In other words, what you are saying, as I gather it, is that if used carefully, pursuant to the directions given on the labels, no harm should occur.

Mr. CLEARY. That is right. That label must contain a statement which describes to the user the period of time which must elapse between when he places an insecticide on the crop and when he is permitted to harvest it. That factor is the factor which controls the residue which may be left.

Mr. KLEINFELD. Now, let me read you another paragraph from the same report in the Journal of the American Medical Association of September 9, 1950:

Exposure to organic phosphorous chemicals and their production or use as insecticides has caused several deaths and from moderate to severe acute poisonings in a comparatively large number of persons during the short history of their use. These accidents have not been out of proportion to earlier experiences with more familiar and highly toxic agricultural chemicals such as nicotine and cyanide. However, they have occurred with sufficient frequency to warrant the utmost caution on the part of all persons who may be exposed to them.

Now, do you agree with that statement, sir?

Mr. CLEARY. I do.

Mr. KLEINFELD. In other words, you have to be very careful in the application of these poisons; is that not correct?

Mr. CLEARY. That is true. You have to follow directions. You have to take the label for meaning what it says.

Mr. KLEINFELD. And being hurt by their use is not quite synonymous with committing suicide; is that not correct?

Mr. CLEARY. In a way it is. I am inclined to attribute a great many of these accidents to sheer carelessness. I classify most, if not all, of them as industrial accidents and as an industrial-hygiene problem. Where accidents have occurred otherwise, it is a matter of educating the users that the label means what it says.

Mr. KLEINFELD. But these are highly toxic substances, are they not?

Mr. CLEARY. Acutely, yes; they are.

Mr. KLEINFELD. And to that extent is it not necessary that we have complete information before they are applied on a food product which will be consumed by the public?

Mr. CLEARY. Yes; it is.

Mr. KLEINFELD. And is it not of the utmost importance that there be available methods of quantitative determinations of the spray residue?

Mr. CLEARY. Yes; it is; and those determinations for the chemicals with which we are dealing exist.

I would like to go back to the first quotation you made from the Journal of the American Medical Association. It was mentioned that means must exist to isolate and analyze for such toxicity.

In carrying out an analysis for a toxic substance in a plant, it is not necessary to isolate it as a pure chemical. The material exists in the plants usually in such very small amounts that isolation would be impossible anyway. Actually, one uses distinctive chemical methods which respond to these chemicals which could give a color that could be recognized; or one uses biological methods by the use of an organism that is extremely sensitive to very minute amounts of these toxic substances to determine their presence.

There are practical tools that exist now which we use and which are practical as far as the processor of foods is concerned. They are brief enough so that they can be effectively and practically used to protect the food processor or canner.

Mr. KLEINFELD. Then it is important, from the viewpoint of the food processor or food canner, that with respect to the fruits and vegetables and any other products he may be selling to the public, there be available methods so that he can determine whether a poison is on the product and the quantity thereof?

Mr. CLEARY. That is correct.

Mr. KLEINFELD. Do you know whether such information is available with the insecticides now in general use?

Mr. CLEARY. I am sure that it is.

The CHAIRMAN. I have just this observation to make, that these toxic insecticides are distributed freely not only to people with scientific knowledge but to the average gardener, the amateur gardener. And I think that they use most of the advertised insecticides, and so forth. Do you not think there should be great protection for those people?

Mr. CLEARY. I do, Mr. Chairman. But I do not think that these exceedingly acutely toxic materials ordinarily come into the hands of householders, small gardeners, and so forth. They are certainly not intended for that purpose. They are intended for commercial use by commercial growers and in commercial greenhouses.

The CHAIRMAN. Do they put them up in small packages? Are they sold in small containers or packages, or in large lots?

Mr. CLEARY. It depends. The ultimate consumer is likely to buy a package that is relatively small. The smallness of the package is related to the effectiveness of the material. It does not take much of this material to treat a number of acres of a crop.

I believe that parathion, for example, can be purchased in containers containing 25 pounds or so of a 25-percent material. In other words, 25 percent of that 25 pounds is a toxic substance. A farmer might use that amount of that material to treat 25 acres.

The CHAIRMAN. We do not want to go into the acreage. Let us just take a small plot of a gardener, or of a person who has merely a 1-acre plot and a home on it, and he would buy these insecticides or pesticides. Now if he does not know how to use them, harm could occur.

Mr. CLEARY. That is right.

The CHAIRMAN. I think your testimony is valuable in this respect. It has often been said that we no longer have free enterprise insofar as the Food and Drug Act is concerned; that it is so difficult to get started that no small concern can ever come into the business.

Now, are you people ready to go?

Mr. CLEARY. Almost.

The CHAIRMAN. And you have had 2 years of preliminary work?

Mr. CLEARY. That is right, almost 2 years—20 months.

The CHAIRMAN. And you feel you will be going into it in a short period of time?

Mr. CLEARY. We hope to be selling this product, Metacide, in the spring of next year.

The CHAIRMAN. Dr. Hedrick?

Dr. HEDRICK. This Metacide, will that kill all types of insects?

Mr. CLEARY. Its insect-killing ability is rather close to that of parathion. Parathion will kill practically every type of insect, with some fairly important exceptions.

Dr. HEDRICK. How about the Japanese beetle?

Mr. CLEARY. I think it is pretty good on the Japanese beetle. Parathion probably has a greater range of insect-killing ability than any other commercial insecticide.

Dr. HEDRICK. Is this preparation a powder or liquid?

Mr. CLEARY. Our particular preparation is a liquid.

Dr. HEDRICK. You have "poison" marked on the container, do you?

Mr. CLEARY. Yes.

Dr. HEDRICK. Do you have an antidote in case of poisoning?

Mr. CLEARY. Yes.

Dr. HEDRICK. And does the container say what that is?

Mr. CLEARY. Yes.

Dr. HEDRICK. Would you mind putting that in the evidence?

Mr. CLEARY. The antidote?

Dr. HEDRICK. Yes.

Mr. CLEARY. The immediate antidote is atropine. A suggested antidote is carried in a statement to the physician which appears on the label.

Dr. HEDRICK. That is all, Mr. Chairman.

The CHAIRMAN. Dr. Miller?

Dr. MILLER. Mr. Cleary, I believe you said here in your statement that you could feed 1,000 pounds of it to a rabbit and it would not be toxic. Why is it necessary to put "poison" and an antidote on the label if it takes 1,000 pounds to kill a rabbit? How could anyone be poisoned by it?

Mr. CLEARY. I was speaking there of the amount that is likely to be on crops that are consumed by the public.

Dr. MILLER. I see; the ordinary application to crops?

Mr. CLEARY. That is right.

Dr. MILLER. I think your statement is very interesting.

Dr. HEDRICK. In other words, the rabbit would have to eat 1,000 pounds of clover before it would be in any danger, that is, clover that had been sprayed with this preparation?

Mr. CLEARY. That is right.

Dr. MILLER. It would have to eat 1,000 pounds of food in a single day in order to get a toxic dose of this insecticide.

I believe that is clear enough.

Mr. KLEINFELD. May I ask a couple of more questions?

The CHAIRMAN. Very well.

Mr. KLEINFELD. Mr. Cleary, have you registered any economic poisons with the Department of Agriculture?

Mr. CLEARY. This product is about to be registered.

Mr. KLEINFELD. In your statement, are you including information so that the food processor will know how to determine whether your product is on the food substance and the quantity thereof?

Mr. CLEARY. Do you mean on the label or in the application for label registration?

Mr. KLEINFELD. Label registration.

Mr. CLEARY. Yes, that information is there.

Mr. KLEINFELD. Do you know whether that is required in all statements?

Mr. CLEARY. It was required of us.

Mr. KLEINFELD. Who required it?

Mr. CLEARY. The United States Department of Agriculture, as represented particularly by Dr. Justus Ward and Mr. Billings.

Mr. KLEINFELD. So you are specifically setting forth methods of quantitative determination?

Mr. CLEARY. That is right.

Mr. KLEINFELD. Now, how do you know that such methods are available for all the many insecticides now in use?

Mr. CLEARY. Just from a general acquaintance with the literature and acquaintance with persons of technical training, chemists and biochemists, who are now practically making a career of developing methods for determining microquantities of toxic substances in foodstuffs.

Mr. KLEINFELD. Do you know how many economic poisons have been registered with the Department of Agriculture?

Mr. CLEARY. In terms of new active ingredients or in terms of new labels for compositions of old active ingredients?

Mr. KLEINFELD. Both.

Mr. CLEARY. My estimation of the number of new chemicals, new active ingredients, that have been registered with the Department of Agriculture in the last—how long did you say?

Mr. KLEINFELD. Well, since the act has been passed. Let us say the last 4 years or 5 years.

Mr. CLEARY. In the last 4 years——

Dr. MILLER. Mr. Chairman, I do not know why the witness should be in a position to answer that. He is not in the Food and Drug Administration. Counsel should know that. This man is in the business of producing a new product. Why interrogate him about what goes on in the Food and Drug Administration?

The CHAIRMAN. If he knows.

Mr. KLEINFELD. He has testified that he knows as a fact that this information is available, and I am trying to find out how he knows that. If he does not know, it is another matter. I want to know how he knows.

Mr. CLEARY. My answer would be purely a guess.

Mr. KLEINFELD. Then you do not know as a fact whether that information would be available on all insecticides.

The CHAIRMAN. He says it would be a guess.

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Mr. KLEINFELD. Is it a guess that such information would be available?

Mr. CLEARY. It is a guess that I would put a lot of confidence in.

Mr. KLEINFELD. Thank you.

The CHAIRMAN. That is all. Thank you very much.

Mr. KLEINFELD. Dr. Biskind.

The CHAIRMAN. Your name, doctor, and your adress?

Dr. BISKIND. Morton S. Biskind, Westport, Conn.

The CHAIRMAN. Do you solemnly swear that the testimony you are about to give will be the truth, the whole truth, and nothing but the truth, so help you God?

Dr. BISKIND. I do.

TESTIMONY OF MORTON S. BISKIND, M. D., WESTPORT, CONN.

Mr. KLEINFELD. Dr. Biskind, do you have a short biographical statement of your background and career?

Dr. BISKIND. I can give it to you.

Mr. KLEINFELD. Would you mind giving it to the committee first before you read your statement?

Dr. BISKIND. I am a graduate of Western Reserve University School of Medicine. I received my M. D. in 1930. Previously I received a master's degree in pharmacology in 1928.

I was a research fellow in the department of pharmacology at Western Reserve University from 1927 to 1928 and 1930 to 1932. Subsequently, I was a member of the headquarters staff of the council on pharmacy and chemistry in the American Medical Association, to 1938. Following that, I was in charge of the endocrine laboratory and the endocrine clinic at Beth Israel Hospital in New York. I am now associate endocrinologist at that hospital, although I am not active at the moment. I am also on the staff of the New York Hotel Trades Health Center.

Mr. KLEINFELD. How long have you been interested in the insecticide problem, particularly with respect to DDT?

Dr. BISKIND. About 2½ years.

Mr. KLEINFELD. And does your statement indicate the kind of work you have done with that product?

Dr. BISKIND. Mainly clinical work. We have also done some experimental work in association with the Laboratory of Industrial Hygiene in New York.

Mr. KLEINFELD. I see.

Would you please read your statement, sir?

Dr. BISKIND. The introduction for uncontrolled general use by the public of the insecticide DDT, or chlorophenothane, and the series of even more deadly substances that followed has no previous counterpart in history. Beyond question, no other substance known to man was ever before developed so rapidly and spread indiscriminately over so large a portion of the earth in so short a time. This is the more surprising as, at the time DDT was released for public use, a large amount of data was already available in the medical literature showing that this agent was extremely toxic for many different species of animals, that it was cumulatively stored in the body fat and that it appeared in the milk. At this time a few cases of DDT poisoning

in human beings had also been reported. These observations were almost completely ignored or misinterpreted.

In the subsequent mass use of DDT and related compounds a vast amount of additional information on the toxicity of these materials, both in animals and in man, has become available. Somehow a fantastic myth of human invulnerability has grown up with reference to the use of these substances. Because their effects are cumulative and may be insidious and because they resemble those of so many other conditions, physicians for the most part have been unaware of the danger. Elsewhere, the evidence has been treated with disbelief, ignored, misinterpreted, distorted, suppressed, or subjected to some of the fanciest double-talk ever perpetrated.

Early last year I published a series of observations on DDT poisoning in man. Since shortly after the last war a large number of cases had been observed by physicians all over the country in which a group of symptoms occurred, the most prominent feature of which was gastroenteritis, persistently recurrent nervous symptoms, and extreme muscular weakness. The condition was of unknown origin and, following an outbreak in Los Angeles in 1947, was thereafter widely attributed to a "virus X." As with all other physicians, a large number of my patients had this condition.

I, like others, found it extremely puzzling; it resembled no infectious process I was acquainted with, and it had features strongly suggesting some kind of intoxication. I had known that DDT was far more toxic than current mythology admitted, but it was only when I came across an item in the literature indicating the vast amount of DDT already in use in our agricultural economy that the possibility that this agent was involved occurred to me. I immediately consulted available textbooks and found that the signs and symptoms of known DDT poisoning were sufficiently similar to the cases I had seen to warrant further investigation. In fact, in 1945, two British authors had described with great accuracy part of the disorder following exposure to DDT in three human subjects.

The syndrome consists of a group of or all the following: Acute gastroenteritis occurs, with nausea, vomiting, abdominal pain, and diarrhea. A running nose, cough, and persistent sore throat are common, often followed by a persistent or recurrent feeling of constriction or a lump in the throat; occasionally the sensation of constriction extends into the chest and to the back and shoulders and may be associated with severe pain in either arm and may easily be confused with a heart or gall-bladder attack. Pain in the joints, generalized muscle weakness, and exhausting fatigue are usual; the latter are often so severe in the acute stage as to be described by some patients as paralysis. Sometimes the initial attack is ushered in by dizziness and fainting. Insomnia, intractable headache, and giddiness are not uncommon. Disturbed sensations of various kinds occurs in most of the cases; areas of skin become exquisitely hypersensitive and after a few days this disappears, only to recur elsewhere, or irregular numbness, tingling sensations, itching or crawling sensations, or a feeling of localized heat may occur. Erratic twitching of voluntary muscles is common. Usually there is diminution of ability to feel vibration in the extremities. Loss of weight is not uncommon.

Disturbances of equilibrium may occur. There may be attacks of rapid pulse and palpitation associated with contraction of blood ves-

sels in the skin, sweating of the palms and a sense of impending loss of consciousness, followed by slow pulse, flushing of the skin, relaxation and cessation of palmar perspiration.

The subjective reactions tend to recur in "waves," as numerous patients have described it. Some have actually been able to clock the reaction with considerable precision from day to day. The reactions appear most likely to occur during periods of low blood sugar. Additionally, consumption of alcoholic beverages or acute emotional stress may provoke a severe exacerbation.

Often, patients with this disorder complain of a "hollow feeling" in the epigastrium which bears no constant chronologic relation to the ingestion of food, and in fact may occur immediately after a full meal. Attempts to eat further may provoke sharp repugnance for food and occasionally may lead to an attack of hiccups or nausea. In other patients, actual overeating indistinguishable from the compulsive types seen in certain psychogenic disturbances may result.

Hardly a single sensory nerve appears to be immune to involvement in this disorder: disorders of vision, smell, taste, and hearing may occur. Pain of varying intensity and duration may involve any area of the skin, may localize in a joint or even a tooth. Severe peripheral neuritis involving intense, protracted pain in one or more of the extremities is frequent. Pain in the groin, usually bilateral, is a frequent complaint. In the acute stages, mild convulsions involving mainly the legs, may occur.

After subsidence of the acute attack, irregular spasm throughout the gastrointestinal tract often persists for weeks or months, associated with increased fatigability, which only gradually regresses. Fever occurs occasionally during the initial stages but is not the rule. Except for a tendency to anemia, and in some cases a relative increase in certain white blood cells, no constant changes are observable in the blood. Many of the patients have an acute bout of apprehension associated with the foregoing symptom complex and rarely is this relieved by reassurance as to the absence of physical findings sufficient to account for the severity of the disturbance.

Most striking about the syndrome is the persistence of some of the symptoms, the tendency to repeated recurrence of others over a period of many months—some patients fail to show complete recovery even after a year—and the lack of detectable lesions sufficient to account for the severity of the subjective reaction.

The high incidence, the usual absence of a febrile reaction, the persistence and erratic recurrence of the symptoms, the lack of observable inflammatory lesions, and the resistance even to palliative therapy, as I have already indicated, suggested an intoxication rather than an infection. The epidemic first appeared at about the time DDT came into widespread use by the civilian population. The signs and symptoms described in the pharmacologic and toxicologic literature as characteristic of DDT poisoning turned out to be identical with those appearing in patients with the affliction described.

By far the most disturbing of all the manifestations are the subjective reactions and the extreme muscular weakness. In the severe, acute cases, patient after patient has used identical words, "I felt like I was going to die."

The sensation can perhaps best be described as one of unbearable emotional turbulence. There are at various times excitement, hyper-

irritability, anxiety, confusion, inability to concentrate, inattentiveness, forgetfulness, depression, and especially extreme apprehensiveness. These episodes can easily be confused with anxiety attacks having a psychiatric basis. The combination of apprehensiveness, confusion, and depression has led to suicidal impulses in a number of my patients. Several insisted after a week or two of a more or less continuous disturbance that they did not want to live if the reaction persisted. This reaction was the more difficult to bear because its sources was unknown and, when the cause became apparent, explanation as to the etiology was usually of great help in tiding the patient over this difficult period. One such patient who had been heavily exposed to DDT was treated psychiatrically for his suicidal depression for months without success. This depression vanished within a few weeks when exposure to DDT was reduced to a minimum by removing it from the immediate environment and restricting the foods most heavily contaminated. Parenthetically, one cannot help but wonder how often exposure to the DDT group of compounds has been implicated in otherwise inexplicable suicides. Certainly in a person already mentally disturbed the additional stress of DDT poisoning could be disastrous. In addition, the mental effects of DDT may easily lead to accidents.

A characteristic history is that of a person—and in a number of cases, an entire family simultaneously involved—who, previously well and able to make a satisfactory emotional adjustment to his environment, suddenly is affected with the syndrome described and remains partially disabled for many months. Usually, the condition remains undiagnosed and frequently these patients make the rounds of doctor after doctor and institution after institution seeking at least a diagnosis, if not relief. The extent to which this can go is illustrated in the case of an exterminator who had used both DDT and chlordane.

At the time I first saw this patient he had spent 2½ years visiting various physicians and institutions seeking relief from his disabling symptoms, which consisted of pain and sense of constriction in the throat and chest, irregular headache, and pain in his head, neck, and shoulders, muscular twitching all over his body, insomnia, inability to concentrate, forgetfulness and inattentiveness, disturbing sensations in various parts of his skin, repeated gastroenteritis and recurrent extreme muscular weakness. In the process of seeking a diagnosis he asked doctor after doctor whether the insecticides were responsible for his ailment and was repeatedly assured they could not be. He was subjected to virtually every test known to medical science and even had his skull opened for injection of air into his cerebral ventricles for X-ray purposes to make sure he had no brain tumor. None of the many tests and examinations could account for his symptoms. Finally one of the psychiatrists to whom he was referred recognized the ailment as having a toxic basis.

When I saw the patient he had an enlarged tender liver, signs of nutritional impairment, reduced ability to feel vibration in his legs and a reduction in his pulse pressure. Under ordinary circumstances none of these signs, nor all together, could account for all his symptoms. When he was advised to give up his job and seek less toxic employment, to remove all traces of DDT and chlordane from his environment, was given nutritional therapy to alleviate the liver damage and put on a diet low in insecticide residues, he showed

prompt improvement within a week. Four months later he was almost free of symptoms. He was then unknowingly exposed to DDT in a restaurant kitchen which had just previously been aerosoled with DDT. Within half an hour the entire syndrome returned and required more than a week to subside.

Again 2 months later he was inadvertently exposed to chlordane from an old kit he had previously used. This time there was a very severe exacerbation which required nearly 2 months for subsidence. This patient is now fortunately almost completely well for the first time since 1947.

The next patient, a woman, also had correctly diagnosed her own ailment as DDT poisoning, also was assured by physician after physician that here diagnosis was fantastic, and she spent 2 years, 3 months of it confined to bed, unsuccessfully seeking relief. She developed pneumonia immediately following spraying of her clothing with DDT for mothproofing purposes and recovered from this only to find that the symptom-complex I have already described persisted for month after month. She noted for herself that her symptoms became much worse every time she ate cream in any form, or fresh unpeeled vegetables or olives, or when she tried a reducing diet—which burns up the body fat and releases the stored DDT. Again physical findings were insufficient to account for her symptoms and she was dubbed neurotic by her various physicians. I advised her to remove all traces of DDT from clothing and home furnishings by dry cleaning, to eat only foods low in insecticide residues and to avoid exposure to DDT in any form. She was also given nutritional therapy to repair the liver damage. Improvement was noticeable in a few days and after 6 months the entire syndrome had subsided. During this period the patient had several acute recurrences of the entire disorder. One of these occurred when her next-door neighbor, fortified by recent statements in the press that DDT was safe, insisted on spraying vegetation immediately adjacent her home, despite her protests. Another occurred when she again attempted a reducing diet and lost 4½ pounds in a week.

Twice on visiting the houses of friends that, unknown to her, had just been sprayed with DDT, she became violently ill within an hour. Exacerbations also occurred on exposure to tobacco smoke, though previously she had herself been a smoker—we have found four parts per million of DDT and an undetermined amount of benzene hexachloride in one brand of cigarettes. And that sensitization to DDT also sensitizes to other related compounds is suggested by the fact that this patient could no longer tolerate the mothproofing agent, paradichlorbenzene, which prior to this illness had caused no symptoms—the sensitivity to tobacco smoke and paradichlorbenzene I have seen in numerous other similar patients.

A 6-year-old girl developed aplastic anemia—an extremely severe form requiring repeated transfusions to maintain life—immediately following spraying of the closets and screens in her bedroom with DDT. Though her mother noted that the anemia promptly got worse each time DDT was used, it was not even considered in the diagnosis. Dr. Felix Karpinski of Western Reserve University has recently reported five cases of children who developed hemorrhagic purpura, a serious condition in which the blood does not clot properly, after exposure to DDT.

For 8 months a man in his middle thirties had had continuous gastroenteritis associated with extreme and unbearable apprehensiveness, muscular weakness and numerous other symptoms such as I have described. He lost 30 pounds in the first 3 months of his illness and had not regained it. Physical examinations by several doctors were negative. The illness began shortly after spraying of his bed with DDT. In addition he was fond of butter and ate liberal slabs of it at each meal. Medications of various sorts failed to provide relief. There was prompt but partial improvement immediately on elimination of butterfat at my suggestion. There was further dramatic improvement when DDT was removed from his environment and other foods likely to be contaminated with DDT were eliminated. Within a few months all his symptoms had subsided and he had regained all his lost weight.

Another patient developed the symptom complex described together with a severe alleged gallbladder attack immediately after eating cherries which he subsequently discovered had been sprayed with DDT.

Dr. MILLER. Doctor, may I ask a question there?

Have you published any of these findings in scientific medical journals?

Dr. BISKIND. Yes, sir; I have.

Dr. MILLER. What were the comments of those who collaborated with you or read your articles?

Dr. BISKIND. Some were very favorable and some were violently antagonistic.

Dr. MILLER. Generally the theory that DDT is highly toxic in concentrated doses is accepted, of course. But the American Medical Association, a group that goes through these poisons with a fine-tooth comb, have not reached the conclusions that you are now giving to the committee. Is that true?

Dr. BISKIND. I am aware of that.

Dr. MILLER. You are aware of that?

Dr. BISKIND. Except the observations of the Food and Drug Administration that DDT stores in the body fat almost regardless of how little is present in the diet.

Dr. MILLER. You are making a very interesting statement, but it concerns me just a little because of its sensational nature and the wide use of DDT. And that is the reason I was asking you as to how widely your statement might be accepted by other scientific men.

Do you know of any scientific men, any large group of them, that accept the conclusions, apparently, that you have reached here in your paper?

Dr. BISKIND. Not any large group. However, there have been others who have worked in the field who do agree with me, and in fact have gone way beyond me. For instance, Dr. Francis Pottenger, Jr., in Monrovia, Calif., Dr. Mobbs in North Carolina, and the late Dr. John Toomey.

Dr. MILLER. You are putting your finger on a very vital point.

But I was just wondering Mr. Chairman, whether the record should be encumbered with something that is of doubtful—in all respect to you, doctor—of doubtful standing as far as scientific men are concerned.

The CHAIRMAN. I do not think that there is any doubt in my mind. It is a fact that DDT is used in hotels, is it not?

Dr. BISKIND. It certainly is.

The CHAIRMAN. And you have qualified as being the physician for the hotel owners and their employees.

Dr. BISKIND. I am on the staff of the Hotel Trades Health Center.

The CHAIRMAN. And therefore you would come into contact with people who have used DDT in some quantities.

Dr. BISKIND. Well, this health center has only been in operation a few weeks, so that I have not seen many of the hotel people.

The CHAIRMAN. But you have made a special study, have you, of DDT?

Dr. BISKIND. I have.

The CHAIRMAN. I think the statement should be read.

Dr. MILLER. Then there is a definite reflection on the food and drug people and those responsible in the Agriculture Department for permitting the use of DDT.

The CHAIRMAN. Our testimony indicates that there is a constant struggle. I believe one doctor testified that this substance dulcin had been used as a sweetener since before the turn of the century? It was only in 1947 that it came to his attention that it was toxic, after having been accepted by everyone for over 50 years.

Sooner or later they will make discoveries, and I think this doctor has done yeoman service. He is to be complimented.

Dr. BISKIND. Thank you.

Dr. MILLER. It is true that what he says has not been accepted by a majority of the scientific men. I maintain that there is only a very small segment that accepts this viewpoint; and if there were a large segment that accepted the viewpoint, then the Government would have no right to permit DDT to be used any place. It is their fault, if they accept this man's viewpoint and findings. I am inclined to be sympathetic with him, because I think there is something to it, but if what he says is true, then it goes counter to the other large group of scientific men that says that it is safe to use, and has been given the green light by Government agencies.

So whom are we to accept here? A small segment, one individual, or a small group that says, "Yes, we find here some reactions?" Or are we going to accept the larger group of scientific men and Government agencies who, too, have made determinations?

The CHAIRMAN. I think pioneers have always been in the minority.

Dr. MILLER. Yes.

The CHAIRMAN. Not only in scientific study, but I think in most other things. And it takes a man such as this doctor to bring these facts to the attention of the others.

Dr. MILLER. I will not object to his reading it.

The CHAIRMAN. I think that his testimony is not only interesting, but is as valuable as any testimony that we have had before this committee. And I for one am very much interested and eager to hear the rest of it.

Dr. MILLER. I would be very happy to have it inserted in the record. I will accept it with a good deal of reservation. But if we do accept it as being true, then the Government agencies are to be severely reprimanded from this day on for permitting or giving the green light to the use of DDT.

The CHAIRMAN. It is brought to their attention in public. And if this committee serves no other useful purpose than bringing to the attention of the Food and Drug Administration the findings of this one doctor alone, substantiated by one or two other authorities, I think that we shall have rendered service.

Dr. MILLER. It is a startling statement; I will say that.

The CHAIRMAN. I wish you would continue, doctor. I am very much interested.

Dr. HEDRICK. May I ask a question?

The CHAIRMAN. Yes, doctor. We have two physicians here.

Dr. MILLER. And physicians disagree lots of times. We recover our mistakes sometimes.

The CHAIRMAN. We laymen are not supposed to know too much about this.

Dr. HEDRICK. As a matter of fact, lots of people have been exposed to DDT with apparently no injurious effects; is that not correct?

Dr. BISKIND. That is true.

Dr. HEDRICK. These people that you have been speaking about may have been hypersensitive to DDT, which is the reason why it affected them that way?

Dr. BISKIND. I do not think that there is any question that they are. But I think that the number that are, is far larger than ordinarily supposed. Both Dr. Pottenger and I independently estimated that approximately one-third of our patients showed overt symptoms. Actually, I found some signs suggestive of this disorder in more than one-third, such as disminished vibratory sensation in patients on whom I have had previous readings, with the Collens vibrometer.

The CHAIRMAN. Continue, doctor.

Dr. BISKIND. Still another patient who, like the one described, had a great fondness for butter and consumed great quantities of it, developed the syndrome described, lost 20 pounds, and was unable to regain it and was virtually unable to continue at his work because of the nervous symptoms and continuous tremors. He had signs of severe liver involvement. Improvement was striking as soon as butterfat was eliminated from his diet, and with added precautions against exposure to DDT, he made a virtually complete recovery in a few months, regaining all his lost weight.

These observations with regard to butterfat are not at all surprising in view of the many reports in the literature on the occurrence of DDT in cow's milk. We have found as much as 13 parts per million in butter on the New York market and Department of Agriculture reports indicate that very much higher values are not at all improbable.

In addition, I have seen several instances in which exposures to DDT sharply increased the insulin requirements of diabetics.

In the types of cases described recovery occurs slowly only when exposure to DDT is reduced to a minimum. Sprayed clothing, textiles and bedding must be cleaned with lipoid solvents; the particles of DDT must be removed from the room dust in places that have been treated with DDT aerosol, preferably by lacquering, painting or waxing affected surfaces. Wallpaper impregnated with DDT has caused severe symptoms in a number of cases investigated. Persons sensitive to DDT must avoid as much as possible visiting places known to have been treated with this agent. Foods or portions of foods in which DDT is now known to occur must be avoided. This entails avoidance of but-

terfat in all its forms, careful peeling of all fruits and vegetables and avoidance of those that cannot be peeled, substitution of fish and seafood and skim-milk products as much as possible for the usual sources of protein, and the medicinal grade of peanut oil, which we have found to be free of the DDT group of compounds, for the usual sources of fat.

Repeatedly, I have had patients who lost weight continuously to the extent of 20 or 30 pounds on a full diet containing large amounts of beef and butterfat who promptly regained all or most of their lost weight on a diet lower in calories but restricted as indicated. Unless further exposure to the newer insecticides is avoided as stringently as possible, both from direct contact or inhalation and from food, no remedies I have tried give any except slight symptomatic relief.

My original experience on more than 200 cases which I reported early last year has been considerably extended. My subsequent observations have not only confirmed the view that DDT is responsible for a great deal of otherwise inexplicable human disability, but a large number of additional cases has been reported to me by others.

Although the record is clear on this point, a great deal of confusion has been raised with respect to virus X. I do not know, nor have I ever stated, that the Los Angeles epidemic in 1947 was caused by DDT poisoning, although Dr. F. M. Pottenger, Jr., has supplied excellent evidence that subsequent similar outbreaks in that community were caused by pesticide poisoning. X obviously means "unknown" and unquestionably in medical research many viruses X have from time to time been postulated. What I stated in this connection in my original article was that the syndrome I described, and which is beyond question caused by DDT poisoning, was widely attributed to a virus X. It was so attributed by myself and by every other physician whose practice in this respect I know, as well as by the public.

And contrary to the implication in an official but anonymous communication on this subject, this particular condition to which the term "virus X" has been so generally applied, did not exist prior to the introduction of DDT as an insecticide.

I suggested for purposes of investigation that the same etiology may apply to X disease of cattle, which has caused tremendous losses of livestock in this country in recent years. Here, too, I do not know and have never stated that the original outbreaks of this type in 1939 were caused by DDT poisoning. I have no way of knowing whether DDT was available in this country for experimental or other use a year after its introduction as an insecticide in Switzerland. But here, too, the unknown X was subsequently widely applied both by veterinarians and farmers to a condition which all evidence indicates is caused by a toxic and not by an infectious agent. That the insecticides have never adequately been ruled out in this respect is indicated by the latest report to appear in the Journal of the American Veterinary Medical Association, in which the presence in feed and water of DDT-like compounds was dismissed as being in subtoxic amounts. Obviously, if a suspected cause is to be ruled out, it must be eliminated completely. One cannot simply dismiss the amounts to which the animals were exposed as subtoxic. From the investigations at the Food and Drug Administration, we know that even the smallest trace of DDT may be cumulatively stored in the body fat.

It is significant that lactating cows who excrete the accumulated DDT in their milk are much less susceptible to X disease than beef cattle.

Another question frequently raised is, if DDT and related compounds are toxic, why don't all of us show obvious signs of it? Everyone knows that the susceptibility to poisons varies tremendously from person to person and animal to animal. In determining the fatal dose of any substance the amount is chosen which kills 50 percent of the animals, because the amount that is fatal to 100 percent may often be several times the amount that would kill the more susceptible animals. Two men may work side by side in a storage-battery factory, both equally exposed to lead. One will remain at this employment for 20 years in good health; the other may die in 6 months of lead poisoning. As a matter of fact, I have a specific case of this sort in mind. Such examples may be multiplied indefinitely. There is evidence, however, that repeated exposure to DDT and similar compounds may suddenly increase susceptibility in previously resistant persons.

Exposure to DDT is now virtually universal, and it is impossible to separate the effects of direct exposure and those which occur following ingestion of contaminated food. Most of my observations have concerned reactions following on known direct exposure to DDT, and the repeated recurrence of the identical symptom complex on repeated known exposure in the same person. As I indicated before, Laug and his collaborators of the Food and Drug Administration have shown that there is no lower limit in the food below which storage of DDT in body fat does not occur, and that as others also have shown, when this fat is mobilized signs of acute DDT poisoning occur. With larger doses, FDA scientists have also shown that it is possible to store in the body fat many times the amount that would be acutely fatal intravenously in a single dose. Since DDT mobilizes from the body fat into the blood stream, the intravenous dose is the logical comparative one. Cumulative intoxication from extremely small amounts in food can thus be as dangerous as direct exposure to much larger amounts.

A study just reported from Britain in the November 1950, issue of the journal, Food Manufacture, confirms the FDA observations. Since it is brief, I would like to quote the entire item:

> Atomic bombs and DDT will be regarded by many as the two most notable scientific developments of the war. They have now been brought together in a more direct and scientific sense by recent British research carried out by the Pest Infestation Laboratory. Radioactive isotopes produced at the Harwell Atomic Pile have been used to study the biological movement of DDT residues upon wheat.
>
> In point of fact, DDT itself was not used. The radioactive isotope of bromine was more suitable than that of chlorine and an insecticide containing one bromine atom in the place of one of the chlorine atoms in DDT was prepared. This particular chemical was known, however, to have properties closely similar to those of DDT. Wheat grain was sprayed with the radioactive insecticide. When fed to hens, it was found that the insecticide had reached many of the hens' organs and tissues within a few days; autopsies 5 days after feeding showed the insecticide in the gizzard, the liver and the kidney, the tissues of the heart and brain, and the sciatic nerve fiber.
>
> When the wheat was milled, about one-third of the residue was found in the flour, thus showing that the insecticide had quickly penetrated the grain husks. Not only were residues also found in bread made from this flour, but there was an indication of some chemical association with wheat protein as a result of the bread-baking conditions. Rats fed with the bread, like the hens fed with the un-

milled grain, showed wide and rapid distribution of the insecticide in their bodies. Indeed, in all these animal tests, some concentration of the insecticide was found in every tissue examined.

These new results give strong confirmation for the view that DDT is a hazardous contaminant of animal and human foodstuffs. Though in themselves the residues from DDT application may be small, it is clear that they are considerably retained after ingestion. Toxic effects of a harmful if not lethal nature could arise from the cumulative absorption of DDT residues.

Too little remains known about the chemistry of DDT within the metabolism of animal life. Fortunately, the use of DDT as a contact insecticide for protecting stored grain has not been encouraged. Volatile fumigants have been preferred. The new research emphasizes the wisdom of this policy. It also suggests that DDT should never be used to dust or spray growing cereal crops.

It does not appear that in this country either of these practices has been discouraged.

Publication of my findings drew some sharp criticism, as Dr. Miller has suggested. They were characterized as "totally without foundation," "highly uncontrolled," "hysterical," and so on. The only evidence provided in refutation was the alleged lack of toxic effect from the military and public health uses of DDT and among workers in manufacturing plants, and observations made on two human volunteers at the National Institute of Health. The animal work could hardly be cited because virtually all of it shows DDT to be extremely dangerous. Aside from this, when it comes to emotional disorders of the type I have just described, one can ask an experimental animal how he feels but the answer is not likely to be satisfactory. Actually observation of the overt behavior of many species of animals exposed to DDT, from rats to cattle, suggests that the identical disorder occurs in them, too, as they become jumpy, irritable, erratic, confused, weak, and disequilibrated, not to mention convulsive.

In clinical medicine there is at present a deplorable tendency to assume that when objective physical findings and laboratory reports are substantially negative, there is nothing wrong with the patient, no matter how severe his symptoms. But a patient is a whole human being, and how he feels is to him the most important aspect of his existence. The patient is the only unimpeachable authority on this subject and no amount of contrary objective data can alter that fact.

It has been claimed that there were no ill effects from the use of DDT among Army personnel during the war and that this proves that this substance is absolutely safe for men. There are three things wrong with this claim: 1. It is not true. 2. The ill effects that resulted from DDT were invariably attributed to another cause. 3. Army personnel is highly selected and is far from representative of the population as a whole, as it consists mainly of young, active, healthy male adults.

Actually, as I have ascertained by talking with veterans of the north African and Pacific campaigns, including a number of physicians, DDT poisoning was not even considered, though the reactions I have just described occurred frequently. One of my patients had been through the campaigns in New Guinea and Leyte without benefit of DDT or of modern sanitation, and without ailments of any sort. His group was then transferred to the Philippines, where, because of the tremendous number of green flies, daily fogging with DDT was instituted. Promptly, virtually the entire outfit developed severe intractable gastroenteritis which taxed the sanitary facilities of the camp. Medical investigators called in did not even consider DDT as a possible cause of this disorder and attributed it to eating of unwashed fruit from native peddlers, even though no causative bacteria

could be found. My patient spent 18 days in the hospital and then made only a partial recovery; he had lost 20 pounds. He had had the entire symptom complex I described and this returned repeatedly over a period of 4 years after he was released from the Army, and especially after he started spraying DDT in the garden of his own home. He also had numerous acute attacks following the consumption of beef, butterfat, and other foods shown by Department of Agriculture investigators to be heavily contaminated.

In north Africa there was an extremely high incidence of liver affections, almost invariably called infectious hepatitis. There is no way to be certain that this diagnosis is accurate except that, as indicated by its name, it is transmissible. In the presence of actual cases of this type, and there is no doubt that there were many, the occurrence of another type of liver damage could readily be overlooked. Actually, as Dr. F. M. Pottenger, Jr., has found, there is excellent evidence that a great many of these cases were actually DDT hepatitis.

As to the alleged freedom from toxic reactions in the public health usage, here, too, evidence gathered by Dr. Robert F. Mobbs, of North Carolina, indicates that these reactions occur frequently among affected populations but are not attributed to their actual cause. The use of DDT in an effort to stop the spread of poliomyelitis is a case in point.

Following a recent extensive trip through the South, Dr. Mobbs informed me that wherever DDT had been used intensively against polio, not only was there an epidemic of the syndrome I have described but the incidence of polio continued to rise and in fact appeared where it had not been before. This is not surprising since it is known that not only can DDT poisoning produce a condition that may easily be mistaken for polio in an epidemic, but also being a nerve poison itself may damage cells in the spinal cord and thus increase the susceptibility to the virus.

In this connection, an observation reported by Dr. Albert B. Sabin in the Journal of the American Medical Association in June 1947 is significant:

> Since the end of combat in the Philippines, poliomyelitis has been among the leading causes of death in American troops. Even though only the paralytic cases are reported from there, the incidence of poliomyelitis in American troops in the Philippines has been at least 10 times as high as in the Army within the continental limits of the United States during the past 2 years. Actually, I believe that it is even higher because hundreds of cases which would have been diagnosed as nonparalytic poliomyelitis here are being diagnosed as dengue-like or sandfly-like fevers * * * under conditions which, in my opinion, would preclude the occurrence of both dengue and sandfly fever. And yet, checks of the surrounding native population revealed no outbreaks of poliomyelitis.

Can the assiduous protection with DDT afforded our troops in the Philippines have any connection with this remarkable phenomenon?

With regard to workers in plants handling DDT and related compounds, Dr. Mobbs has reported:

> In checking on the workers in these plants I was struck by the fact that those who remained at this work for more than 1 month showed an average weight loss of 8 pounds per man * * * other symptoms were frequently reported by individuals directly exposed to these chemicals. These * * * included a dry cough, burning sensation on the skin and in the eyes * * * vomiting and bloated abdomen.

From the few cases I have seen among ex-workers in DDT-handling plants, it appears that those who become ill from their employment simply cease to work there after a short time.

The experience with the two volunteers at the National Institute of Health was in direct contrast with that of three exposed British investigators. The latter became seriously ill with many of the symptoms I have described and the ailment persisted for from 4 weeks to more than a year. The American investigators were presumed unaffected by DDT, although careful reading of the reports does not support this conclusion. Regardless of this, is an investigation, no matter how extensive and detailed, on two healthy male adults sufficient to warrant exposure of an entire population consisting of babies, children, and men and women of various ages and states of health?

In April of last year, Dr. Irving Bieber and I reported on a pregnant patient who developed the condition I have here described following direct exposure to DDT. Following delivery her milk was examined and found to contain on successive days 116 parts per million, 18 parts per million, 2 parts per million, 5 parts per million, and 5 parts per million of DDT. (For these determinations and all others relating to our own observations in this report, I am indebted to Messrs. Joseph Truhlar and Murray Corn of the Laboratory of Industrial Hygiene in New York.) Seven weeks later this patient's milk still contained 8 parts per million of DDT. During lactation this patient's symptoms improved markedly since she was excreting her body store of this toxic substance. The baby can hardly be said to have benefited equally; when the last determination was made, nursing was discontinued by the attending physician.

These determinations have been criticized because they were made by the so-called total chloride method, which detects DDT and other compounds with similar chemical properties but is not obsolutely specific for DDT. Parenthetically, when the same method was applied to cow's milk by investigators of the Department of Agriculture, it was accepted as valid. In our subsequent studies, the Schechter-Haller method was used; this is specific for DDT and nothing else. Specimens of mother's milk from six successive patients on the fifth day after delivery contained respectively 4, 2, 2, 1, and 0.5 parts per million of DDT and in the sixth a trace; the last specimen was not large enough for an accurate determination. When calculated to the fat content—and the evidence suggests that this fairly well reflects the amount in the body fat—the result is, of course, much larger; from about 7 to about 50 parts per million. Of course, all these patients had a history of known exposure to DDT, but where can one find a patient today who has not been directly exposed to this agent? (As E. B. White indicated in his famous satire in the New Yorker, to escape DDT requires a trip to another planet.) Is there any apologist for DDT who maintains that this poison is a proper ingredient of mother's milk? What happens to the growing baby, already born with DDT in its body fat because this substance passes the placental barrier, as he gradually stores the additional DDT from his diet in his fat depots?

At a certain stage of growth this body fat is consumed. Is it then surprising that pediatricians have noted a rising incidence of inexplicable, persistent, and refractory gastrointestinal ailments in babies and young children? These ailments are not reportable and do not swell the tables of public health statistics. What is happening to the growth curves of children born in the last 4 or 5 years? Must we wait until the predictable effects have been duly summarized in official reports years after the event?

Of course, substitution of cow's milk for mother's milk does not solve the problem, either. Reports from the Department of Agriculture on the DDT content of cow's milk indicate of from 0.5 to 25 parts per million. The butterfat, of course, contains much more, as high as 259 parts per million in one report.

Last year farmers were advised to stop using DDT in dairy barns or on dairy cattle. This, of course, is futile advice, first, because it is only advice and is not mandatory—hence, many have not stopped using it. Second, the fodder continues to be heavily contaminated. As an example, milk and cream which I obtained from one of the best dairies in Connecticut, in which DDT had never been used at any time, contained in the milk 0.5 part per million and in the cream 4 parts per million of DDT. The feed had been purchased on the open market.

A flagrant example of the unbelievable lengths to which this insecticide business has gone was reported to me by the owner of a certified milk farm in Kentucky. By the use of ordinary sanitary measures the milk produced by this farm always contained less than 6,000 bacteria per cubic centimeter, which is considered very good practice indeed. Nevertheless, a State dairy inspector ordered this dairy to institute the daily use of a 25-percent preparation of DDT, an order with which the owner fortunately refused to comply.

The toxicology of DDT has been investigated extensively in a large number of species and to this our own Government investigators have made a magnificent contribution. DDT has been found almost without exception to be lethal to every form of animal life tested, the only limiting feature being the waxy nature of DDT and its solubility mainly in lipoids and lipoid solvents. It is largely this limited solubility which has been depended on—excessively, it now appears—to safeguard man and other mamals from poisoning.

In rats, mice, rabbits, guinea pigs, cats, dogs, chicks, goats, sheep, cattle, horses, and monkeys, DDT produces functional disturbances and degenerative changes in the skin, liver, gall bladder, lungs, kidney, spleen, thyroid, adrenals, ovaries, testicles, heart muscles, blood vessels, voluntary muscles, the brain, and spinal cord and peripheral nerves, gastrointestinal tract, and blood.

DDT is as lethal in repeated small doses as in larger single doses. In low-grade chronic poisoning in animals, growth is impaired, and the implication of this observation for the growth of children should be given serious consideration. In rats, tumors in the liver have been produced by low-grade continuous poisoning with DDT. DDT is stored in the body fat and is excreted in the milk of dogs, rats, goats, and cattle and as we have shown, in that of humans, too. Virtually all these effects have also repeatedly been observed in known DDT poisonings in human beings. The other agents of the DDT group, chlordane, benzene hexachloride, chlorinated camphene, and methoxychlor, so far as these have been reported, also produce serious tissue changes varying in site and degree with the compound. Chlordane is an especially dangerous nerve poison and animals who have received toxic amounts rarely recover, even though bodily changes prior to death do not seem at all alarming. Fortunately in my own limited experience with chlordane poisoning in man, I can report that with stringent avoidance of further exposure and intensive nutritional therapy to help repair the tissue damage, recovery does occur, though

this may not be complete. Benzene hexachloride changes the chromosomes of plants and probably, too, those of animals. The possibility that this agent may adversely affect the heredity of human beings must be taken into consideration. Already in one report from Europe, seedlings treated with benzene hexachloride were so altered in their heredity that it was suggested that nondegenerated stocks be used for seed subsequently. In this country, where a mixture of DDT and BHC has been spread on the cotton crop for several years, is it accidental that this year the cotton crop is very nearly the lowest on record?

We are dealing with double-edged swords, for the very substances now promoted to increase the size of our crops in the long run turn out to be detrimental to agriculture itself. All these substances and the fantastically toxic parathion, too, inhibit the growth of certain plants, and compounds of the DDT group also persistently poison the soil, so far as present evidence goes, for 5 or 6 years and possibly indefinitely.

Some have insisted that without the use of the newer insecticides there would not be enough food to go around, that even though these substances are toxic, their use involves a necessary calculated risk. Somehow, in a short 5 years people seem to have forgotten that we had good crops, even immense surpluses, prior to 1945, with the use of methods then available. Better methods are always welcome, but certainly it is a reflection on American scientific and technical ingenuity to assume that the DDT and parathion groups of insecticides are the only ones that will adequately serve our purpose. Machines have been developed that remove insects from crops mechanically and no doubt are susceptible of further development. Compounds of the much safer pyrethrum and rotenone principles are available and are now being further developed. Preparations such as piperonyl butoxide and N-propyl isome that enhance the activity of pyrethrum principles are also available. Utilization of predator insects inherent in the balance of nature has been successful with certain crops, and development of further methods such as are now in experimental use to attract mosquitoes to traps by means of sound can no doubt be applied to other insects.

The use of the term "calculated risk" suggests a military campaign that involves casualties on both sides. Shall we sacrifice so many people for so many insects? If we do, we shall leave the world to the insects, for they outnumber us many millions to one, and because their life cycle is shorter they have already developed insecticide-resistant strains.

It has been suggested that human beings should be able to tolerate without harm 5 milligrams of DDT per day in their food. A little calculation shows this figure to be fantastically optimistic. Laug, Kunze, and their coworkers of the FDA, as I have already mentioned, have found that DDT stores up in the body fat no matter how low the level of intake, even down to 0.12 part per million—in fact, even the controls had DDT in their fat, so pervasive is this substance. With 5 parts per million in the diet, observable liver damage occurred. As is customary in animal experiments, this concentration was calculated to the dry weight of the diet. Five milligrams calculated to the dry portion of the average human daily intake would greatly exceed this figure of 5 parts per million and would be more nearly 10 parts per million. Actually, 5 parts per million is not safe, either, as the FDA

investigators have shown, since when the body fat containing stored DDT is for any reason burned up, serious intoxication results, an observation I have repeatedly made in humans also.

What are some of the consequences of the continued use of DDT and related compounds and of the parathion group of substances in agriculture?

The compounds of the DDT group are all extremely active direct liver poisons. DDT and parathion both interfere with the function of the gastrointestinal tract and hence interfere with absorption of essential nutrients. This, too, causes impairment of liver function. For many years before the problem of DDT poisoning intruded in my life, my collaborators and I had been working on the function of the liver in relation to disturbances in nutrition and other disturbances of the ductless glands. We found that if the liver is deprived of essential vitamins, it loses its ability to metabolize certain hormones and that this leads to a variety of more or less severe disturbances in the endocrine or glandular system. Among these are serious disorders of the sexual function in both sexes, diabetes, thyroid disturbances, and other changes. Poisoning the liver with a toxic substance has the same effect. The combination of a direct liver poison and a gastrointestinal disturbance which interferes with absorption of vitamins and other essential nutrients may lead to even more serious forms of these disorders. In addition, a damaged liver loses its ability to metabolize cholesterol, a waxy substance similar in chemical structure to some of the hormones. As a result, the amount of cholesterol circulating in the blood stream promptly rises. Cholesterol is a relatively insoluble substance and when the amount in the blood increases beyond normal limits it deposits in the inner lining of the blood vessels, as well as elsewhere in the body. In an artery this gradually narrows the opening of the vessel so that it may stop up altogether. When this happens in one of the coronary arteries which feed the heart muscle the effect is often sudden death.

In association with liver damage there is often also an increased fragility of the walls of the small blood vessels and they have a tendency to rupture easily. This may well be a factor in the production of cerebral hemorrhage.

There is no doubt in my mind that the widespread use of the new insecticides is implicated in the alarming rise in the incidence of deaths from heart attacks and other forms of vascular disease, especially in relatively young persons. The mortality from this source increased 7 percent in the year 1946–47 alone.

That exposure to the newer insecticides actually causes a rise in blood cholesterol in human beings, both Dr. F. M. Pottenger, Jr., in California, and I have repeatedly observed.

Dr. Pottenger informs me that the general level of blood cholesterol in his patients in 1950 is much higher than in 1945. He has seen variants of the syndrome I have described in about one-third of his patients.

In addition to this effect, DDT is known to increase the excitability of the heart muscle in animals, and it causes disturbances in heart rate and blood pressure in man—effects we have repeatedly observed. The combination of a narrowed coronary artery and the later effects make DDT even more potentially disastrous.

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Virtually all studies on the toxicity of the various insecticides have been made on the individual substances. However, this in no way reflects what happens in actual practice, for today, in a single day's diet, we may readily be exposed to DDT, BHC, chlordane, chlorinated camphene, methoxychlor, and parathion as well as some lead and arsenic. How many simultaneous insults can the human body take?

As for parathion, my own experience has been limited. However, one incident may be of interest to this committee. Two persons developed gastroenteritis, persistent headache, sweating of palms, disturbances of vision, and greatly increased fatigability over a period of 10 days. In an effort to trace the source, it was recalled that a new brand of flour had been in use for baking just before the onset of the affection. This had been consumed at the rate of about one-half to three-fourths of a pound of flour per day in bread and pastry. Another brand of flour made by the same manufacturer was substituted, with rapid subsidence of all the symptoms. Specimens of both flours were sent to the laboratory; the first contained one part per million of parathion, the second contained none.

Recent suggestions that human beings may with safety be permitted to ingest from 1 to 2.5 milligrams of parathion a day appear vastly excessive, in the light of this experience. Or, and I say this without levity, is it seriously believed that if the dose is not immediately fatal, it is safe?

The New York Times last April carried items indicating that because the wheat crop was threatened by green bugs and red spiders, more than 200,000 acres had been sprayed with parathion by airplane. What was omitted from the news dispatch was that the crop was threatened only because the prior use of DDT had killed off the normal predators of these two resistant insects, permitting them to flourish uncontrolled. Apparently the remedy for too much poison is still more.

Parathion is everywhere admitted to be deadly for man and all other animals. One manufacturer warns that sprayed areas may not even be entered without a mask and protective clothing for 30 days after application. Failure to heed this precaution has already resulted in numerous serious accidents to men. What happens to the birds and other wildlife who cannot read?

Parathion has an even greater immediate toxicity than such deadly war gases as lewisite, for instance. No one would even consider putting lewisite into the hands of untrained personnel with only printed or oral instructions as to safe methods of handling it, as has been done with parathion, with many resultant near-fatal and fatal accidents. According to a recent article in the Journal of the American Medical Association and a dramatic presentation in Life magazine, compounds of the parathion group are now part of the chemical warfare armamentarium of many nations.

According to J. C. Leary and his collaborators in a book on DDT published in 1946, when DDT arrived here from Switzerland in 1942—

> It was received with suspicion. Just previously the Germans had staged a fear propaganda campaign about the new nerve poisons developed by German chemists—part of the "war of nerves," presumably. And when the first tests of DDT brought insects down in convulsions, obviously due to nerve effects, the first thought was that maybe this was the nerve poison. Further testing shortly dispelled the idea, however, and the work went forward.

By whom and how this idea was dispelled is not indicated. It is to my mind significant that the Germans did not use DDT and permitted

their troops to become pediculous, although it cannot be said that they did not know about the substance.

The nations of the world are signatories to an agreement forbidding the use of poison in warfare. Surely our own civilian population in peacetime is entitled to the same consideration.

Government investigators who studied the pharmacologic effects of DDT in animals did a remarkable job, and regrettably until now a thankless one. It is unfortunate that their repeated warnings were overriden, when in September 1945 DDT was released to the public. As Leary and his coauthors pointed out in their book—

> Many Government experts, particularly those who had been working on it, would have preferred to withhold it for a much longer period, but the demand was so great they had to yield.

It is my opinion that the use on crops or in food establishments of any sort, of the chlorinated cyclic hydrocarbons—which include the DDT group of compounds and the organic phosphates of the parathion group—should be, and, if we want to survive, must be—specifically forbidden by law. I believe that all insecticides, and all other chemicals which may contaminate food, including all those now in use or to be used in the future, should be under the direct jurisdiction of the Federal Food and Drug Administration, who should be required to pass upon the safety of these substances before permitting their introduction into general use or the continuation of those now in use.

Of course, the facilities of this agency must be suitably expanded to cope with this formidable task. The cost, no matter how large, will be more than repaid in improved health and productivity of the people.

Nearly 2½ years ago, the Council on Foods and Nutrition of the American Medical Association warned, with respect to the indiscriminate use of pesticides:

> The time to establish controls, voluntary or otherwise, is now, before possible tragic consequences occur.

Facts are stubborn, and refusal to accept them does not avoid their inexorable effects—the tragic consequences are now upon us.

Thank you.

Mr. KLEINFELD. Doctor, I think you testified that the views which you have here expressed are not generally recognized by the medical or scientific profession; is that correct?

Dr. BISKIND. That is true.

Mr. KLEINFELD. Have you written papers which have been published in the various scientific literature, concerning DDT, which discussed your views as expressed here?

Dr. BISKIND. Yes, sir.

Mr. KLEINFELD. Are you in a position to name the papers and publications?

Dr. BISKIND. One was in the American Journal of Digestive Diseases in March 1949, entitled "DDT Poisoning and the Elusive Virus X." Another was a letter to the editor of the journal of the American Veterinary Medical Association, I believe in January 1949, on "X Disease," which was more suggestive than investigative.

A third one was in the American Journal of Psychotherapy with Dr. Bieber on "DDT Poisoning, a New Syndrome with Neuropsychiatric Manifestations." I just published another one on "Nutritional

Deficiency in the Etiology of Diabetes" in which I discussed the effects of DDT on diabetics.

Mr. KLEINFELD. Where was that published?

Dr. BISKIND. Journal of Insurance Medicine. That has already been published.

Mr. KLEINFELD. Is that about the sum total of it?

Dr. BISKIND. Yes, sir.

Mr. KLEINFELD. I think you mentioned it, but are there any other doctors or scientists who have done any similar experimental work on some of the insecticides which you have here discussed?

Dr. BISKIND. The two who have done probably more than I have are Dr. Robert F. Mobbs, Aberdeen, N. C., and Dr. Francis M. Pottenger, Jr., in Monrovia, Calif. We have also worked with the late Dr. John A. Toomey in relation to the polio problem, and his successor Dr. Robert M. Eiben, at Cleveland City Hospital. Also the Laboratory of Industrial Hygiene in New York City. They are doing the clinical work and the laboratory is doing the chemical work. That is not yet completed.

Mr. KLEINFELD. Have any papers by these people you have mentioned been published in the scientific literature?

Dr. BISKIND. Dr. Mobbs published one note and then a subsequent discussion of it about a child who lived, I think it was, about 300 feet from one of the insecticide plants in Aberdeen, in North Carolina, and died in convulsions. This insecticide plant manufactured or packaged DDT and benzene hexachloride. He suspected that the insecticides might be implicated so he took 6 rabbits and put them in the plant with the permission of the manager, and within a short time all of the rabbits were dead.

The tissues of the rabbits showed changes identical with those of the baby.

Mr. KLEINFELD. Have these results been published so far as you know?

Dr. BISKIND. Those results were published in the Journal of the American Medical Association.

Mr. KLEINFELD. Do you know when?

Dr. BISKIND. I can give you the exact reference.

Mr. KLEINFELD. If you can.

Dr. BISKIND. Surely. December 25, 1948, page 1253.

Mr. KLEINFELD. Do you know of any other papers that have been published on the subject which apparently confirm your views?

Dr. BISKIND. This one by Dr. Karpinski in the Journal of Pediatrics which was just published on five cases of hemorrhagic purpura in children entitled "Purpura Following Exposure to DDT." Also one by Dr. Hollander on "Dermatitis Caused by DDT." That was in the Archives of Dermatology. I have the reference here. It might take me a moment to find it.

Mr. KLEINFELD. You might give it to us later on if you will.

Dr. BISKIND. Certainly.

Mr. KLEINFELD. Most of your statement I gather, Doctor is based on your personal opinions; isn't that correct?

Dr. BISKIND. Yes. My personal interpretation of the observations I have made.

Mr. KLEINFELD. How would you describe your paper with respect to the actual clinical experimentation? Have you actually conducted testing on animals with the insecticides you have here described?

Dr. BISKIND. No; I have not. I have not done animal work directly. The Laboratory of Industrial Hygiene may have done some. I have not been party to that particular investigation.

Mr. KLEINFELD. So that most of what you say is your personal observations?

Dr. BISKIND. On human beings.

Mr. KLEINFELD. Most of them being your patients?

Dr. BISKIND. Most of them being my patients. Some were acquaintances.

Mr. KLEINFELD. Are you familiar, Doctor, with a release issued on April 1, 1949, by the Public Health Service with respect to the use of DDT?

Dr. BISKIND. Yes, sir.

Mr. KLEINFELD. May I mark this for identification, Mr. Chairman?

Mr. DELANEY. Yes.

(Thereupon, exhibit No. 2 was marked for identification.)

Mr. KLEINFELD. Doctor, I show you exhibit 2 for identification, being a release dated April 2, 1949, released by the Federal Security Agency. I ask you if you have ever seen a copy of that?

Dr. BISKIND. I have, indeed. That has been called to my attention a great many times.

Mr. KLEINFELD. Mr. Chairman, since this release indicates that there is a wide disparity in opinions I suggest that the Doctor might read this release. It sets forth the views of some of the agencies of the Federal Government.

Mr. DELANEY. If he cares to read it.

Mr. KLEINFELD. Would you mind reading it?

Dr. BISKIND. You mean read it out loud?

Mr. KLEINFELD. Yes.

Dr. BISKIND (reading):

The Federal Security Agency and the Department of Agriculture today issued the following statement after a meeting of the principal Government agencies concerned with the utilization of DDT in national and international health and economy:

"A number of statements have been published during the last several days which have misled and alarmed the public concerning the hazards of using DDT as an insecticide.

"DDT is a very valuable insecticide which has contributed materially to the general welfare of the world. It has been used with marked success in both the control and prevention of such insect-borne diseases as malaria and typhus and of insects which are destructive to crops and injurious to livestock and infest homes.

"It is well recognized that DDT, like other insecticides, is a poison. This fact has been given full consideration in making recommendations for its use. There is no evidence that the use of DDT in accordance with the recommendations of the various Federal agencies has ever caused human sickness due to the DDT itself. This is despite the fact that thousands of tons have been used annually for the past 4 or 5 years in the home and for crop and animal protection. However, minor toxic symptoms may be produced by kerosene and various solvents used in DDT and practically all other insecticidal mixtures.

"Statements that DDT is responsible for causing the so-called virus-X disease of man and X disease of cattle are totally without foundation. Both of these diseases were recognized before the utilization of DDT as an insecticide.

"The Food and Drug Administration has not prohibited the use of DDT in spraying dairy cattle and barns. The Federal Food, Drug, and Cosmetic Act requires the Food and Drug Administration to insure that the food supply of the American people does not contain any poisonous or deleterious substance that is not necessary in the production of the food. Studies by the Bureau of

Entomology and Plant Quarantine have shown that DDT when used on dairy cattle or when present on fodder fed to dairy cattle may appear in the milk. They also say that DDT in small quantities can be detected sometimes in milk, following ordinary use of the insecticide for fly control in dairy barns. Because of the vital importance of milk in the diet of infants, children, and people of all ages, it is essential that proper precautions be taken to protect the milk supply. Modification of the recommendation made by the Department of Agriculture on the use of DDT on dairy cattle was made merely as a precautionary measure.

"There is no justification for public alarm as to the safety of the milk supply from the standpoint of DDT contamination."

The above statement was issued following a meeting of representatives of these agencies: Under the Department of Agriculture, the Agricultural Research Administration; Bureaus of Animal Industry, Dairy Industry, Entomology and Plant Quarantine; Production and Marketing Administration, Insecticide Division; under the Department of the Army, the Office of the Surgeon General; under the Federal Security Agency, the Food and Drug Administration, and the Public Health Service; under the Department of the Navy, the Bureau of Medicine and Surgery; and Pan American Sanitary Bureau.

Quite a formidable group.

Mr. DELANEY. That was their testimony then. Haven't we testimony to the contrary since then?

Mr. KLEINFELD. Apparently the recommendation on DDT in dairy barns has been changed somewhat.

Mr. DELANEY. By the same people?

Mr. KLEINFELD. You have seen this statement of April 1, 1949.

Dr. BISKIND. Incidentally, I referred to that in my statement as the "official but anonymous communication."

Mr. KLEINFELD. I see. Then, Doctor, it seems that your views are considerably at variance with the views of these various——

Dr. BISKIND. Not entirely. There are some very curious admissions in that statement which I emphasized in reading.

Mr. DELANEY. Counsel, I asked for the date on that. I believe it was April 1949.

Mr. KLEINFELD. Yes, sir.

Mr. DELANEY. Since that time we had representatives of the Department of Agriculture tell us about tests that were made at Beltsville, Md., by spraying a barn in a manner in which the average farmer would do it. They found traces of DDT. Then they sprayed the barn and put fresh canvas up above the level of the animal, where he couldn't rub against it and come in body contact. They found traces of DDT in the milk. Isn't that right?

Mr. KLEINFELD. Yes.

Mr. DELANEY. As a result of that they issued a contrary order to that which you hold.

Mr. KLEINFELD. A stronger order. I am not saying which is right or wrong. I don't mean to indicate whether DDT is a valuable insecticide in food production. Apparently these agencies feel that as a general proposition DDT is a very valuable insecticide which has contributed materially to the general welfare of the world.

Mr. DELANEY. We will concede that it is very valuable. Does it do harm? Does it get into our food supply? The doctor tells us about some cases that he came in contact with first-hand with his patients, and what he did and what the results were, what his findings were. We have not had anyone say anything to the contrary. They have an opportunity to cross-examine the doctor and find out whether his findings are scientific or what he bases them on and so forth. He has made his statement. Those are his findings.

Mr. KLEINFELD. I am not disputing it. I am pointing out that there is apparently a difference of opinion. I am not saying who is right. We are not qualified to determine that.

Mr. DELANEY. We are not going to try at this moment.

Dr. BISKIND. May I make an observation?

Mr. KLEINFELD. Surely.

Dr. BISKIND. I believe that if 10 years ago the same agencies were asked whether Agenized flour was safe, they would have insisted that it was. Yet Agene has been interdicted for the bleaching of flour as of August of last year, I believe, because it was found to produce serious toxic effects on dogs.

Mr. DELANEY. There is nothing definite in science, is there? They may go along, as I illustrated here a few minutes ago, on a product that has been used as a substitute for sugar. That had been accepted for over 50 years.

Then one of the members of the Food and Drug Administration testified here that he had been doing some experiments and found that it was very toxic. And that was in 1947. As a result they issued an order abolishing the use of it. Is that not so?

Mr. KLEINFELD. Yes, sir. There have been different kinds of testimony. For example, I believe Dr. Lehman testified that parathion, when used properly, evaporates so rapidly that it is a safe insecticidal spray.

Mr. DELANEY. How long does this toxic effect remain in the body?

Dr. BISKIND. If these patients are not taken away from exposure to DDT, it remains indefinitely. At least so far as my present experience goes, which is a matter of 2½ years.

Mr. DELANEY. Let's say they were exposed and there is considerable quantity in the fatty tissue and you remove it. How long will it take to eliminate that from the system?

Dr. BISKIND. On that we do not have complete observations, because that is really a formidable task.

Mr. DELANEY. You would not hazard a guess?

Dr. BISKIND. No, sir. All I know is that in animals it takes approximately 4 months. Whether that applies to human beings or not I do not know. I do know that sometimes they get better within a matter of days when they are taken away from exposure to DDT, even though they must still carry a tremendous amount in their body fat. If they don't do anything that burns up that body fat like going on a reducing diet or missing meals——

Mr. DELANEY. That is when you feel the full effects.

Dr. BISKIND. That is when you feel the full effect of it.

Mr. DELANEY. When it burns out.

Dr. BISKIND. Yes, sir.

Mr. DELANEY. Dr. Hedrick?

Dr. HEDRICK. For the benefit of the record would you tell us what DDT is, and how it is made? The chemical contents of it, if you are permitted to tell that.

Dr. BISKIND. I know what it is. It has a double benzene ring with a chlorine atom at each end of the double benzene ring hooked together in the middle with an ethane group which has three chlorine atoms attached to the ethane group.

Dr. HEDRICK. Can you make a picture of it?

Dr. BISKIND. Certainly.

Dr. HEDRICK. Is there any known antidote for DDT now?

Dr. BISKIND. I have discovered none. I don't know of anyone else who knows of one. The only thing that gives any relief are the barbiturates which suppress the emotional disturbance to a certain extent.

Dr. HEDRICK. It is your belief that so-called virus X may not be infectious at all, that it may be——

Dr. BISKIND. For all I know there may be another virus that has not yet been identified. All I do know is that these cases that so many of us have been calling virus X are really DDT poisoning. As I say, the original epidemic in Los Angeles may not have been DDT poisoning. I have no way of knowing. There is always a possibility of new viruses floating around. But this particular syndrome which I described I have found no record of elsewhere, nor have I seen it in any other situation except cases where DDT is involved.

Dr. HEDRICK. Do most chemical houses make DDT or just a few companies?

Dr. BISKIND. I know of a few that make it. I do not think all of them make it.

Dr. HEDRICK. About how much is being consumed or used in this country a year, do you have any idea?

Dr. BISKIND. The last indication was that in the first 9 months of last year 18,000,000 pounds had been used. I do not know what the total consumption was.

Dr. HEDRICK. The Government used quite a lot of it, did it not, in spraying certain sections?

Dr. BISKIND. They have used it in public health applications, and in the Army, yes.

Dr. HEDRICK. I know I was in Florida 2 or 3 years ago and they were spraying a whole county down there.

Dr. BISKIND. In that connection, a letter that I received from the late Dr. John A. Toomey, former professor of contagious diseases at Western Reserve University, may be of interest. He wrote this letter right after he had returned from a sabbatical year when practicing in Florida. It is dated May 5, 1949:

> I received the copies of your articles on DDT and virus X. I think that you have something there. Certainly the manner in which DDT has been used, especially in the South, has been little short of reprehensible. They dust it in the air and on the food and kill everything, and still they have plenty of polio, and practically no flies before starting. In fact, they had no flies in that area * * * of epidemiologic importance.
>
> All I can say is that DDT would kill all the wildlife and make everyone sick, especially those who eat in ordinary restaurants.

Dr. Toomey was one of the foremost authorities on polio. He worked with it for 20 or 30 years. He is not given to rash statements.

Dr. HEDRICK. I have no further questions.

Mr. DELANEY. Doctor, we want to thank you for your well-prepared statement. It is quite a statement, I might say. Thank you very much.

Dr. BISKIND. Thank you.

(The documents prepared and submitted by Dr. Biskind are to be found in the files of the select committee.)

COMPARE THESE NEWS RELEASES WITH DR. BISKIND'S FINDINGS AND THE N. Y. TIMES CLIPPING ------ A GOOD EXAMPLE OF WHAT WE CONSIDER COMMERCIAL PROPAGANDA.

NEW YORK TIMES
2-1-52

York Times

FOOD MAN DEPICTS FIGHT ON PESTICIDES

Tells House Group Firm Spent $668,000 to Purge Baby Items and Peanut Butter

DENIES 'HYSTERICAL' VIEW

Federal Drug Act Is Antiquated on Residues of Insecticides, Beech-Nut Aide Asserts

Special to THE NEW YORK TIMES.

WASHINGTON, Jan. 31—L. G. Cox, director of technical projects for the Beech-Nut Packing Company, told the special House committee investigating the use of chemicals in food products today that his company had spent $668,000 in the last six years keeping residues of new pesticides out of baby foods and peanut butter.

Dr. Cox said that experiments had indicated that young animals were usually more susceptible than older ones to the chronic toxic effect of DDT and related chemicals. Fragmentary data indicates that a new-born baby may already have a slight amount of DDT stored in his tissues, he added, and may be receiving additional amounts in the mother's milk.

"We are therefore of the opinion," he told the committee, headed by Representative James J. Delaney, Democrat of New York, "that any insecticide residue which tends to accumulate in fatty tissue should be eliminated in so far as possible from the baby's diet at the time when milk and prepared baby foods are the major part of its diet."

Dr. Cox also said that this policy involved hardship on both the company and the farmer. He added that his company had been accused by manufacturing chemists of "being hysterical about the problem." A fund of about $119,000, he said, has been raised by the manufacturing chemists "to counteract unfavorable publicity."

Six-Year Efforts Depicted

His thirty-page brief detailed a six-year fight against DDT residues on leafy vegetables, against BHC (another insecticide) contamination in peanuts, off-flavor effects of chlordane insecticide, and other pesticide problems.

In 1948, he said, the company had to reject squash from Florida, peaches from Pennsylvania and celery from Florida; in 1950 it incurred a financial loss of $15,000 by having to reject contracted vegetables exposed to BHC, and to buy others in the open market at much higher prices; and in 1951 it was "forced to reject contracted apples in New York because of BHC contamination."

He contended that the present Food and Drug Act was antiquated in the matter of pesticides, since the chemicals mainly used against pests had been developed since the law's enactment. He urged that a Government research system go hand-in-hand with stricter control. Among his recommendations were the following:

¶The Department of Agriculture and at least four regional experiment stations should cooperate in testing new pesticides and in recommending their use "on a sound, scientific basis with protection to the farmer, the food processor, and the consumer."

¶The Public Health Service should make necessary tests to establish proper tolerances for chemicals.

¶The Food and Drug Administration should have full responsibility for enforcing such tolerances.

¶Laws should be enacted to require evidence of adequate toxicological testing, data on residues and recommendations for their removal, the publication of tolerances in The Federal Register, sample analyses on shipments and public warnings and seizures where tolerances were exceeded.

Dr. Don Carlos Hines of the research staff of Eli Lilly & Co., Indianapolis, a firm that manufactures a pellet used in the chemical caponizing of chickens, testified that the residues of these capsules were "neither helpful nor harmful, but neutral" if consumed by human beings.