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Item ID Number	05470 ☐ **Not Scanned**
Author	
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Report/Article Title	In the Circuit Court, Twentieth Judicial Circuit of Illinois, St. Clair County, Frances M. Kemner, et al., Plaintiffs, vs. Monsanto Company and Norfolk and Western Railway Company, Defendants, No. 80-L-970, Before the Honorable Richard P. Goldenhersh, Judge, Report of Proceedings, April 11, 1984, Jury Trial
Journal/Book Title	
Year	1984
Month/Day	April 11
Color	☐
Number of Images	132
Description Notes	Includes testimony from Ellen Silbergeld and references to Binghamton State Office Building

(V)

IN THE CIRCUIT COURT
TWENTIETH JUDICIAL CIRCUIT OF ILLINOIS
ST. CLAIR COUNTY

FRANCES M. KEMNER, ET AL,

Plaintiffs,

VS. No. 80-L-970

MONSANTO COMPANY, and NORFOLK AND WESTERN RAILWAY COMPANY,

Defendants.

Before the HON. RICHARD P. GOLDENHERSH, Judge

REPORT OF PROCEEDINGS

April 11, 1984

JURY TRIAL

APPEARANCES:

Mr. Rex Carr and Mr. Jerry Seigfreid
On Behalf of the Plaintiffs;

Mr. J. Bill Newbold, Mr. Kenneth R. Heineman and Miss Jane Rudolph
On Behalf of the Defendant, Monsanto Company;

Mr. Albert Schoenbeck and Mr. Stephen M. Schoenbeck
On Behalf of the Defendant, Norfolk and Western Railroad.

Kimberly Ganz, C.S.R., RPR, CM
Official Court Reporter

I N D E X

BE IT REMEMBERED, that on Wednesday, April 11, 1984, the same being one of the regular judicial days of said court, the above-entitled cause came on regularly for hearing before the HONORABLE RICHARD P. GOLDENHERSH, one of the Judges of said court, at the St. Clair County Building, 10 Public Square, in the City of Belleville, St.Clair County, Illinois. Whereupon the following proceedings were had:

(The following proceedings were had in chambers out of the presence and hearing of the jury.)

MR. NEWBOLD: Your Honor, you don't have a copy of the deposition so, with permission, I will show you this and also make any record standing up if that is acceptable.

THE COURT: Of course.

MR. NEWBOLD: Yesterday we went through all the various exhibits that both Mr. Carr and I intended to use. One of the exhibits that was admitted into evidence was--one of the exhibits was Dr. Ellefson's Exhibit DD now known as Plaintiff's Exhibit 226. It is my contention that Mr. Carr agreed with the witness that the third column should be headed possible cause if present rather than simply cause if present for the basis of my contention I would direct the Court's attention to page 63 line 25 which is the beginning of his foundation for the exhibit. "Question: Now, Doctor, I have another exhibit and probably have to put possible on that as well. Would

you mark that please..." and then the exhibit was marked as Ellefson's Deposition Exhibit DD now Plaintiff's 226 and Mr. Carr went from that point on to lay the foundation for this exhibit.

THE COURT: That is this one?

MR. NEWBOLD: Yes, sir.

MR. CARR: This is as it was handed to the witness, Judge.

THE COURT: Okay. So Gary Robinson was added.

MR. CARR: Judge, the Exhibit DD was--when I made the comment, "Now, Doctor, I have another exhibit and probably have to put possible on that one as well," I was directing the witness' attention to it. I had it in my hand at that time. I handed it to the reporter who marked it DD. Then it went to the doctor in the form as is except the words and/or genetic mutation was on the exhibit. I asked him to examine it and see that it had been changed and the generic mutation was stricken. As a matter of fact, he did it himself. He said--I asked do you want that genetic mutation out of this one, too, Doctor, and he says right. Do you want me to strike it from the sheet? Yes. Go ahead. He struck it from the sheet and it was in this form with the Gary Robinson.

THE COURT: Here is 226.

MR. CARR: Here it is. Yes, this is the original.

This is the one with one of the Robinson's in it or Walter Kidwell and subsequently Gary Robinson was added. This was the form it was in at the time. This is the original because it has got Kidwell in it and we took Kidwell out, but, anyway, this is the form it was in. The cause if present were there at the time. He approved it in that form. It's got possible condition over on the second column. It's got cause if present. The words "possible cause" doesn't really add anything to it. The witness approved it in this form and today, three months after the exhibit has been approved by the witness and after we have gone through it in chambers, counsel is now wanting me to withdraw this from the jury. The jury has all seen it and without the word "possible" above the word "cause". There is nothing in the record to indicate that it should be and I would certainly object to changing the exhibit that had been approved by everyone at this point.

THE COURT: It is your motion, do you have any reply?

MR. NEWBOLD: My reply--I think it is clear, Judge, when Mr. Carr says on page 63 line 25, "Now, Doctor, I have another exhibit and probably have to put possible on that as well." Mr. Carr is looking at the exhibit and knows that possible is already there for possible condition. He can only be referring to possible.

MR. CARR: I was referring to it. I am not quarreling

with that.

MR. NEWBOLD: To possible cause?

MR. CARR: There is no dispute of that but the witness never agreed with it. He never said yes do that. This is the form that you saw. This is the form that the witness saw. This is the form that we have had here for several days and today, Johnny come lately, for the first time you are saying that this exhibit as we have approved all of them up to this time, you are taking me up on a comment that I made probably have to put possible on that one as well that nobody agreed to, nobody said yes, we ought to put possible on that one as well.

MR. NEWBOLD: I think that Dr. Ellefson just assumed that possible would be inserted in that one.

THE COURT: I disagree. This witness showed absolutely no reticence in making any changes or any comments, for that matter, that he felt appropriate and I don't think he was in the habit of taking anything for granted, having gone through these five volumes of depositions with all of you. He didn't put it in. He approved it as amended. It went properly to the jury as amended. I disagree. I don't think he left that comment hanging in the air and there is no reason to change an exhibit which he approved while looking at it after amending it, so I am denying your motion.

(The following proceedings were had in the presence and hearing of the jury.)

THE COURT: Good morning.

MR. CARR: We start with another exciting day. This is the last deposition that will have to be read and all the other witnesses the plaintiff will have from now on will be live. Not necessarily exciting, though.

Page 80, line 15.

(At this time Mr. Carr continues the reading of the evidence deposition of Dr. Ralph Ellefson.)

Q. Have you written in the field of disorders of porphyrin and heme metabolism?

A. A little bit. Yes, I have.

Q. Have you been published in a book that is considered authoritative?

A. I have been published in a journal that is considered authoritative, yes.

Q. And did you publish in that journal what you thought to be the normal urinary ratios, porphyrin ratios?

A. I did not publish ratios.

Q. Doctor, referring to the Doss data, did you not testify, Mr. Newbold asked you, that your impression was that Doss' data and yours were not really in disagreement?

A. Doss or Strik?

Q. Doss.

A. That's correct.

Q. Doctor, doesn't Doss on page 14, doesn't he set out a table in which he has the ratios or uro and hepta and copro set out?

A. Right.

Q. And as normal, that is less than 20 percent for uro, less than five percent for hepta and more than 70 percent for copro. And then he shows in that table how porphyria has its biochemical manifestation by progressing from those percentages of the porphyrins to Type B, for instance, where the uro is greater than 40 percent, the hepta is less than 20 percent and the copro is less than 40 percent?

A Right. In association with increased uro-porphyrin and probably increased coproporphyrin. Mr. Carr, that is what the table states.

Q. There isn't anything in that table that refers to increased uros or increased copros. That table makes no reference to any such increase. Does it, sir?

A. Yes, it does, Mr. Carr.

Q. Where does it, sir?

A. In the first place, in the first column, the second category of persons are identified as having secondary coproporphyrinuria. Coproporphyrinuria implies that

coproporphyrin is increased in the urine.

Q. It implies it?

A. Yes. The term coproporphyrinuria means increased urinary coproporphyrin.

Q. Doctor, that is just the, one of the conditions shown on the page, is it not?

A. That's correct.

Q. Now, Doctor, referring to page 75, if you will of the Strik article.

A. Yes.

Q. And with regard to your testimony in response to Mr. Newbold, that Strik article does not find an inversion to be abnormal, will you look at the summary on that page 75 in the book called Chemical Porphyrias in Man, and does not that summary say that the urinary porphyrin pattern appears to be a more sensitive indicator for chronic exposure to TCDD than total porphyrin excretion?

A. That's what he states.

Q. The latter only becomes meaningful at levels higher than 200 ug/l, what is that?

A. Micrograms per liter.

Q. Whereas an abnormal pattern may coincide with levels below this value.

Does it not state that?

A. That is what it states.

Q. Now, Doctor, is it specifically referring to the pattern caused by chronic exposure to dioxin, is it not, sir?

A. That's what it states.

Q. And doesn't the author say that where in effect where you have a chronic exposure to dioxin, that the urinary porphyrin pattern is a more sensitive indicator than total porphyrin excretion?

A. Yes.

Q. Doesn't he say that?

A. Right. Yes. And I fully agree with that. The porphyrins excretion pattern is the vitally important thing, and that is what we have been reporting. That includes each of these things that we have reported on.

Q. And you are referring to the exhibits that you have just testified to as to these urinary patterns for some of the plaintiffs in this case. Is that correct, sir?

A. Yes.

Q. All right. And, Doctor, pattern means more than quantity, does it not? Doesn't pattern mean how one porphyrin relates to another, where it stands with ratio, the percentages? Isn't that what this author means when he says quote the urinary porphyrin pattern, and I emphasize the word pattern, appears to be a more sensitive indicator for chronic exposure to TCDD than

total porphyrin excretion?

A. No.

Q. You don't think that is what he means when he is talking about the urinary porphyrin pattern?

A. When he speaks of urinary porphyrin pattern, he is referring to, I am certain, the quantities of the individual porphyrins that we have been talking about. Uroporphyrin, coproporphyrin, heptacarboxylic, hexacarboxylic, pentacarboxylic, and so on.

Q. Doctor, doesn't he actually in the very next sentence say the contrary to what you just said? In the very next sentence, he says, the latter, that is total porphyrin excretion?

A. That's right.

Q. Only becomes meaningful at levels higher than 200 micrograms?

A. That's correct.

Q. Whereas an abnormal pattern may coincide with levels below this value?

A. That is correct. And that is not in disagreement with our data or our experience.

Q. And doesn't Strik also say that Type B, this is down further on the page, about six lines, seven lines from the bottom, quote, Type B is characterized by inversinn of the normal ratio of coproporphyrin to uroporphyrin in the urine,

with uro as the dominant porphyrin, end of quote.

Doesn't he say that?

A. Yes, that's correct.

Q. Now again, Doctor, he is talking about an inversion where there is a chronic exposure to dioxin. Is he not, sir? Isn't that what this article is all about?

A. That's correct.

Q. All right. So now he is saying, sir, that where one is exposed to dioxin and develops a Type B chronic hepatic porphyria, that it is characterized by an inversion of these normal ratios in the urine. Isn't he, sir?

A. That's correct.

Q. All right. Doctor, do you disagree that this ratio then that is mentioned by the authors in the American book, by Kappas, Sassa and Anderson is consistent with the ratios mentioned by Strik in this book that we just discussed?

A. If you are referring to normal, yes. Because that is what those authors referred to.

Q. All right. Now, Doctor, can it be that peculiarly, TCDD exposure can cause this inversion of ratios whereas exposure to some other type of substances might not cause an inversion of the ratio?

A. Yes.

Q. And can it be that normals who have never been

exposed to dioxin or a toxic substance can show an inverted ratio, and a person chronically exposed to TCDD can also display an inverted ratio, the inverted ratio in the case of the person exposed to the TCDD having been caused by that exposure whereas the inverted ratio in the normal person, that just happens to be the way he is. Is that possible, Dr. Ellefson?

A. I am sorry, Mr. Carr. I don't understand your question. Would you give it to me in small doses please?

Q. What I am asking you, isn't it possible that a person can have an inverted ratio and never be exposed to dioxin, and it's normal for him?

A. Yes.

Q. As indicated by some of your Mayo studies?

A. That's correct.

Q. Whereas dioxin can cause an inverted ratio in a person who would otherwise not have an inverted ratio?

A. Yes. Now the data presented by Strik and Doss indicate that that inversion occurs as the uroporphyrin concentration rises.

Q. All right. I won't quarrel with that.

A. As the uroporphyrin excretion rises.

Q. And Doctor---

A. So that kind of an inversion is not consistent with normal values. It is, it occurs as a result of increased

urinary excretion of uroporphyrin.

Q. Doctor, would you agree that a physician treating or responsible for the treatment of people who are exposed to 2,3,7,8 TCDD should look out for inverted ratios in their coproporphyrin-uro output?

A. Yes, that would be one of the factors to look for.

Q. And Doctor, Mr. Newbold referred to the preface of this book, Chemical Porphyria in Man. And you expressed some form of disagreement with that introductory, not the preface but the introductory statement?

A. Right.

Q. Because you said much of literature deals with inherited porphyria and not just chemical porphyria. Do you recall that, sir?

A. I believe you have misstated it.

Q. All right. Doctor, do you agree that this book, the first page that you have in front of you I suppose is the cover, or title page of the book, is dealing with just chemical porphyrias and not inheritable porphyrias, except as they may be caused by chemicals?

A. That is the primary objective, dealing with chemical porphyria. But there were some references to inheritable porphyria.

Q. Sure there are. No question about it. Because as you

testified, inherited porphyrias can be caused to be patent or expressible clinically by exposure to a substance such as dioxin, and so therefore this book if it deals with chemical porphyria should indeed touch upon such inherited forms of porphyria, right?

A. I suppose so.

Q. And Doctor, the preface of that page also deals, the preface of this book also deals with ratios and patterns of porphyrin metabolites, does it not, sir? Do you want to turn to page V, Romas numeral five?

A. Yes.

Q. And the authors there or the editor that wrote the preface, whoever that might be, Koeman, states as follows:

In clinical cases in man the condition of hepatic porphyria is usually associated with a considerable increase in the total amounts of porphyrins, especially uroporphyrin, excreted in the urine. However, in recent years it has been discovered that qualitative changes in the pattern of porphyrin metabolites in the urine provides a far more sensitive indication of these disturbances in the pathway of heme synthesis than the quantitative changes.

Does he not, sir?

A. He states that, yes.

Q. And he also says that one feature then is that, at

total levels of excretion which fall within the normal range, the proportion of porphyrin metabolites containing eight and seven carboxylic groups is increased relative to those containing six, five and four of these groups?

A. That's correct.

Q. My question is, the point that I am going to, Doctor, is he is talking about, and these changes specifically total levels of excretion of porphyrins which fall within the normal range, is he not?

A. For the total that's correct.

Q. Isn't that right? The total falls within a normal range?

A. That's correct.

Q. And he says even though the total may be within the normal range, the proportion of these various porphyrins changing can indicate a porphyria?

A. That's correct.

Q. These tests that Mr. Newbold asked you that as additional tests that could be performed to, I think you called it the delta-ALA and the fecal porphyrin test?

A. Right.

Q. The clinical findings that the treating or the examining doctor is presented with has a great deal to do with whether or not he would want these additional tests as have

been mentioned by you under Mr. Newbold's examination. Isn't that correct, sir?

A. I don't know, Mr. Carr. I would hope so.

Q. Well, if the doctor is doing his job, he is the one that is trying to determine what tests would be helpful and what tests would not be helpful?

A. Correct.

Q. And he relies upon what he sees, what he is confronted with. A doctor could, if he wanted to be sure of everything, could order every possible test on earth, couldn't he, sir?

A. Right.

Q. But he discriminates, doesn't he, a good doctor. He determines to have some performed and others not performed?

A. Yes.

Q. Now, in regard to the delta-ALA test, for instance, this is a rather crude test, isn't it, Doctor?

A. No, it is not.

Q. Is it commonly used today in the medical profession?

A. Yes, it is.

Q. As a matter of fact, hasn't it been largely replaced by the sophisticated HLC which you perform?

A. No. No, it is not.

Q. Do you also perform these delta-ALAs, Doctor?

A. One of the laboratories in this institution does.

Q. Do you?

A. My laboratory does not. But Dr. Jones' laboratory in chemistry here does.

Q. Doctor, insofar as a comparison between the HLC and the delta-ALA, the HLC is much more sensitive, is it not?

A. The high-pressure chromatography? No, it depends on what you are looking for, Mr. Carr. Delta-ALA and the porphyrins are at different locations in the scheme of porphyrinogen metabolism. And it is helpful to look at both delta-ALA---

Q. You say it's helpful?

A. Very helpful.

Q. but Doctor, isn't it a fact that negative results in the delta-ALA does not at all dispute or vitiate the results in the HLC?

A. Negative findings? Of the delta-ALA wold not detract from positive findings in the chromatographic analyzation of the porphyrins. That's true.

Q. The positive results would only be additionally suggestive. Wouldn't they, sir?

A. In some cases. In other cases they would have probably have been definitive. In cases where the porphyrin analyses were negative, delta-ALA analyses might have very well supported the diagnosis of an intoxication.

Q. What you are saying, where you've got a negative HLC it's possible you might find it on a dealt-ALA. Is that correct, sir?

A. That's correct.

Q. So the positive signs, however, that show up on the HLC, the tests that you assayed, does not, is not subtracted from by a negative finding on the ALA?

A. That's correct.

Q. And this statement is true, is it not, sir. Positive signs in these additional tests would only be additionally supportive. Negative signs would not detract from the indication of intoxication porphyria?

A. That's correct.

Q. Doctor, with regard to the examinations and the tests themselves of these 64 people whose urine samples you have seen, you gave a list to Mr. Newbold, to Bill, of some 20, 21 people, that suggested the existence of some form of porphyria, either intoxication porphyria or an inheritable form of porphyria, from, based upon the results that you reported. And in each case, Doctor, you testified as to the findings upon which you made your opinion.

And in the differentiation between intoxication and inheritable porphyria, you have in these cases nothing other than what you have already told us that would allow you to

differentiate whether it was an intoxication porphyria or an inherited form of porphyria. Isn't that correct?

A. I have nothing other than what?

Q. You have nothing to differentiate whether it is an intoxication porphyria or an inherited form of porphyria in these tests other than as you have described?

A. That is correct. There is no way of determining definitively whether one would have an intoxication porphyria or an inheritable porphyria without doing a family history study.

Q. What you have been able to do by some of these results is if it is an inheritable porphyria, you are able to distinguish between one form or the other of inheritable porphyria in some cases, are you not?

A. Yes. We have not adequate data in these cases though for that purpose.

Q. So what I am getting at, if it is a form of inheritable porphyria, you can in some instances tell which form it is by their urinary output, correct?

A. We really need more than just a urinary porphyrins test for that.

Q. Well, you have discriminated, not in these nine that is listed in Exhibit 226, but in Exhibit 225, you have described the abnormal condition as being possibly porphyria cutanea tarda,

which can be an inheritable porphyria?

A. Right.

Q. So you are able to by the porphyrin output, the pattern, if you will, to distinguish between some forms of inheritable porphyria and other forms of inheritable porphyria, are you not, sir?

A. Yes.

Q. All right. But insofar as being able to tell whether it is an inheritable porphyria or an intoxication porphyria, you have no way of distinguishing that, from the data that you have before you, isn't that correct, sir?

A. That's correct.

Q. These 21 plaintiffs, who could possibly have intoxication porphyria or inheritable porphyria have nothing to distinguish them, or nothing, one from another, other than their porphyrin analysis, so far as you are concerned, and any history that might have been given you. Isn't that correct, sir?

A. Right.

Q. Now you have received a history that these, and you know this from the results, the urine that was sent to you, that there are 64 people involved?

A. Yes.

Q. And we have some 20 out of 64. Don't we, sir,

involved, subject to my question right now?

A. Yes.

Q. All right. Now for any one of these to be a form of inheritable porphyria, three of the three or four forms of inheritable porphyria that we have discussed, the odds I think you said the other day are something like two-and-a-half to three as opposed to 100,000. Correct, sir?

A. Right.

Q. So for any one of those, those would be the odds. But now, Doctor, what would be the odds that one of these cases were a form of inheritable porphyria out of, where there is 64 people the subject you are drawing from. The odds would be, would it not, Doctor, billions and billions to one, that all 20 of those would have inheritable porphyria?

A. Looking at the matter superficially, yes, that's so.

Q. And that is the way I am looking at it, because these are statistics that I am looking at. Now if we put it a different way, that there is a town of 1000 people that this sample of 20 is drawn from. The odds, and assuming, and you have nothing to support that assumption, that these are the only 20 people in that town that have possibly got an inheritable porphyria.

A. Right.

Q. The odds that that 20 out of the 1000 would be

certainly billions to one as well, wouldn't it, sir?

A. Not necessarily.

Q. Well, the only difference would be if they all had some family relationship in that 1000 group. Wouldn't that be correct, sir?

A. That's correct.

Q. And we know, assume please that these 1000 folks are not all related, family-wise. That they have the normal breakdown of a normal midwestern small town, all right?

A. Yes.

Q. So the odds of all 20 out of this town of 1000 having an inheritable form of porphyria would be billions to one. Wouldn't it, sir? It's simple mathematical computation, isn't it?

A. Yes.

Q. Now, Doctor, however, if assuming that these 20-- so the odds of all 20 having inheritable porphyria has got to be billions or trillions to one. But the odds of it being intoxication porphyria is related only to whether or not they are exposed to a substance capable of causing intoxication porphyria. Isn't that correct, sir?

A. Right.

Q. And I don't mean to say that it's only dioxin that can cause intoxication porphyria.

A. Right.

Q. Doctor, even if we cut it down, if we took out all the possibles and the variants of normal, and we came down to the final group of ten or 12 or however many it is that you say suggestive or strongly suggestive of intoxication porphyria, the odds of that ten or 11 or 12--

MR. NEWBOLD: It's eight.

Q. Of having an inheritable form of porphyria, again out of 64, or out of the 1000, would be billions to one. Wouldn't it, sir?

A. Yes, unless they are related.

Q. Unless they are all related, right. And the relation would have to be in a bloodline, not by marriage. Correct, sir?

A. Right.

Q. And you've got no history that all these 12 or nine or 20 people are related by blood, do you, sir?

A. I have hardly any history at all.

Q. You did receive a history that the Bownes and the Burks, the two Bownes are related by blood, and the two Burks are related by blood. Didn't you, sir?

A. Right.

Q. But you were also told by Mr. Newbold that Larry Burks is an alcoholic, and the child at 16, presumptively would not be an alcoholic. Right, sir?

A. Yes.

Q. So that would again, the odds would be that this group that you could get ten people out of a small midwestern town who all had inheritable form of porphyria, the odds would be billions to one against it. Wouldn't it, Doctor?

A. Right.

Q. So is it fair to say that if they are not all interrelated that there is some form of toxic substance causing this intoxication porphyria?

A. Some or several.

Q. Some or several, yes. Dioxin, phenols, drugs, things of that sort. Isn't that correct, sir?

A. Right.

Q. And that would then depend upon the history, wouldn't it, sir?

A. Yes.

Q. And of course whether or not the history is true. All right.

While we are talking about Burks, isn't it a fact that the porphyria and abnormalities that he displays is not indicative of a form of porphyria caused by alcoholism? Examine it please, Doctor.

A. That isn't necessarily so, Mr. Carr.

Q. Doctor, didn't you testify that he shows indications

of coproporphyria or uro--I am sorry, that he indicates coproporphyria or intoxication porphyria and not porphyria cutanea tarda?

A. Right.

Q. And did you not testify that it is porphyria cutanea tarda that is caused by alcoholism?

A. That is commonly the cause. But coproporphyrinuria can be caused by alcoholism also.

Q. Now, Doctor, you have what values increased in Larry Burks?

A. I will have to look back at that. I believe it was the coproporphyrin and pentacarboxylic porphyrin, was it not? Larry Burks? Yes, in Larry Burks.

Q. That's the one that is the subject.

A. Okay. Coproporphyrin value is 142 as compared with an upper limit of 96. And the pentacarboxylic at seven as compared with an upper limit of four.

Q. And Doctor, did you not testify that too much alcohol to induce a porphyria cutanea tarda, you would find the uroporphyrins increased and probably the hepta as well?

A. Yes. In association with porphyria cutanea tarda, yes.

Q. And it is porphyria cutanea tarda that you testified under Mr. Newbold's questioning that can be provoked by the

ingestion of alcohol?

A. Porphyria cutanea tarda can. Yes indeed.

Q. And Larry Burks does not present a picture of porphyria cutanea tarda. Does he, sir?

A. That's correct. But his picture is not inconsistent with a porphyrinuria caused by alcoholism.

Porphyria cutanea tarda is a common occurrence in association with alcoholism. But coproporphyrinuria apparently can be induced also. Coproporphyrinuria is a common problem associated with degenerative liver disease. And it appears that alcoholic liver disease can be a cause as well as liver disease from other causes.

Q. Doctor, in any event with reference to Larry Burks, his test is indicative of a very definite metabolic abnormality, isn't it, sir?

A. I believe so. Michael Burks and Larry Burks have the same kind of problem.

Q. Doctor, in discussing some of these 64 plaintiffs, Mr. Newbold on redirect examination asked you about a number that you have taken and put on a possible list rather than strongly suggested, or however we got these lists-- I want to refer to, one of the ones that he mentioned is Ann Bolles. Isn't it a fact, Doctor, that you found that her abnormality, that is the 26 micrograms of uroporphyrin excretion, isn't it a

fact, that that finding is clinically significant?

A. Yes. That's correct.

Q. And, Doctor, does it not case suspicion toward either intoxication porphyria or porphyria cutanea tarda?

A. That's correct.

Q. And, Doctor, referring to Felix Dominguez, isn't the findings in the case of Felix Dominguez indicative of intoxication porphyria?

A. No.

Q. Doctor, when you testified here on the 6th of January, 1984, some 21 days ago, three weeks, didn't Mr. Newbold ask you on direct examination with reference to Felix Dominguez these questions:

Was Felix Dominguez' porphyrin analysis normal.

Your answer was no, it was not.

Question. And can you tell me in what respects it was abnormal.

Answer. The coproporphyrin was increased to the value of 120 with the upper limit being 96.

A. That's correct.

Q. Question. What is the significance of that one abnormal finding, Doctor.

And wasn't your answer, answer, this can be indicative of either coproporphyria or intoxication porphyria?

A. It can be.

Q. Doctor, my question is, wasn't that the question asked you at that time and wasn't that your answer at that time?

A. That's correct.

Q. So this abnormal finding is indicative of intoxication porphyria, is it not, sir?

A. No. It can be but it is not necessarily.

Q. Doctor, none of these things are necessarily indicative. You are just talking about what all of these abnormal findings can indicate, aren't you, sir?

A. Some of them are more so than others, Mr. Carr.

Q. I agree more so than others. No doubt about that, Doctor. But you are not saying for a certainty that any of these with abnormal findings for sure have coproporphyria or porphyria cutanea tarda or an intoxication porphyria or an inheritable porphyria. Are you, sir?

A. Some of these are quite strongly suggestive, Mr. Carr.

Q. Doctor, are the strongly, the ones that are strongly suggested, are those people Brenda Ballard, Greg Ballard, Esther Bevill, Ann Bolles, Mildred Bowne, Larry Burks, Michael Burks, Felix Dominguez, Joyce Mason, Gary Robinson, Patricia White?

A. I presume that's the list.

Q. Doctor, do you recall earlier we had gone through

a list that you said was strongly suggestive. And then I prepared an exhibit that used the words strongly suggestive. Do you recall that, sir?

A. I think so.

Q. And then you asked me to strike the words strongly suggestive and I did. Do you recall that, sir?

A. Yes.

Q. Now you are saying that there are cases of porphyria in these plaintiffs from Sturgeon where the test results are strongly suggestive of intoxication porphyria. Is that correct, sir?

A. No. You call these cases of porphyria.

Q. And you are quarreling with my use of the word porphyria?

A. Among these cases, there are some that look like porphyria, right.

Q. Now, you are saying it looks like. Didn't you say just a moment ago strongly suggestive?

A. Strongly suggestive. Yes, strongly suggestive of porphyria.

Q. And Doctor, in the case of Felix Dominguez, isn't the abnormal finding indicative of intoxication porphyria?

A. No.

Q. Or coproporphyria, either one of the two? Isn't it,

Doctor?

A. It could be indicative but not necessarily.

Q. Doctor, is it an abnormal finding or not?

A. I think it is.

Q. And you testified it was. Did you not, sir?

A. Yes.

Q. And is his porphyrin analysis then normal?

A. No, it is not.

Q. Is it abnormal?

A. I believe it is.

Q. And does it indicate coproporphyria or intoxication porphyria?

A. No. It could indicate but it doesn't necessarily. It is suggestive of coproporphyria or of intoxication porphyria.

Q. Doctor, I will certainly buy that. I won't quarrel with that one bit. I believe that is what I am asking you. You are using the word indicate and the word suggestive as being not synonymous. Is that correct, sir?

A. That's correct.

Q. Doctor, with relation to Duane Embree, isn't his abnormality also suggestive of intoxication porphyria or coproporphyria?

A It is suggestive, yes.

Q. And Doctor, in the case of Gary Robinson, isn't his

increased value of porphobilinogen at 2.8 indicative or suggestive of the presence of intoxication porphyria?

A. It's suggestive.

Q. All right. Back to one of these others that Mr. Newbold asked you about, with relation to John Bowne, who has what you have called a marginally increased porphobilinogen value.

A. Right.

Q. Isn't it a fact that this also is suggestive of intoxication porphyria or an inheritable form of porphyria?

A. Mildly suggestive.

Q. Doctor, you didn't use the word mildly suggestive when you were asked the question on direct examination. Did you, sir?

A. I am sorry. I don't recall.

Q. You said it casts suspicion. Didn't you, sir?

A. And I would agree with that.

Q. All right. With relation to John Dominguez, Doctor, with relation to John Dominguez, is it not a fact that his elevated coproporphyrin value suggests intoxication porphyria or an inherited form of porphyria?

A. This suggestion is very mild in this case.

Q. Well, without regard to whether or not it's very mild or mild, it does indeed suggest it. Doesn't it, sir?

A. Well, the combination of coproporphyrin value and the porphobilinogen value casts a very mild suspicion.

Q. And Doctor, with relation to David White, this abnormal coproporphyrin excretion could indicate a form of porphyria. Could it not, sir?

A. This value of 101 casts a suspicion.

Q. My question is, Doctor, could not this abnormal excretion indicate a form of porphyria such as intoxication porphyria?

A. It could be consistent with a porphyria.

Q. Doctor, would you please answer my question? You can say yes, it could indicate a form of porphyria such as intoxication porphyria, or you can say no, it doesn't. But please don't change my question.

My question I will ask you again, could not this abnormal coproporphyrin excretion indicate a form of porphyria such as intoxication porphyria?

A. I am still having difficulty with the use of the word indicate.

Q. Doctor, on January the 17th, did you not testify, page 264, and with relation to David White.

Doctor, could this abnormal coproporphyrin excretion indicate a form of porphyria.

And wasn't it your answer, I believe so.

Wasn't that your answer at that time, Doctor?

A. If that is what the record states.

Q. Well, to refresh your recollection, Doctor, wasn't that your answer at that time, I believe so?

A. Apparently so.

Q. Now Doctor, referring to Joe Robinson. Cannot the values reported for Joe Robinson, the porphobilinogen value of 1.6, is not that surely suspect?

A. It is suspect.

Q. And could it not be a form of intoxication porphyria being expressed there?

A. That's a possibility.

Q. Doctor, Mr. Newbold asked you a number of questions, or questions rather relating to the possible medicine, alcohol, or drug intake of a number of persons. Specifically Patricia White, Ann Bolles, Felix Dominguez, Larry Burks, John Bowne and John Dominguez. Do you recall that, sir?

A. Yes.

Q. And you in response to his questioning, you agreed that it's possible that the medications or drugs that they were taking, or alcohol in the case of some mentioned, could be responsible for the abnormal values that you found with regard to each of those persons. Do you recall that?

A. Yes.

Q. Again, whether or not that or a substance such as phenol or a substance such as dioxin, or some other substance not known and not mentioned caused these abnormalities is not something that is within your knowledge. Isn't that correct, sir? Doctor, isn't it a fact---

A. I guess the form of the statement is okay. I will answer yes.

Q. And Doctor, that is because as you have testified both on direct and cross examination a number of times, there are a lot of various things that cause intoxication porphyria. And you by your analysis have no way of distinguishing between one or more of these toxic substances that might cause a porphyria. Isn't that correct?

A. Yes.

Q. That is something that the treating doctor, the examining doctor or some other investigators determine by way of history. Isn't that correct, sir?

A. It may be impossible to determine whether a toxic substance has been involved.

Q. Doctor, but investigators do go to plants and determine whether or not there are toxic substances to which workers are exposed, do they not, sir?

A. Yes.

Q. And investigators go to waste sites where hazardous

materials are dumped and the people are exposed, to determine what kind of hazardous material may be afflicting the public in that particular community. Don't they, sir?

A. Yes.

Q. And Doctor, is it not possible by history to arrive at a reasonable conclusion as to what could be the cause of an intoxication porphyria notwithstanding the fact that you cannot tell by laboratory analysis?

A. It has been possible, of course, in many cases to identify substances responsible for intoxication porphyria. But it also has been impossible in many, many cases to identify substances that have been responsible for either inducing intoxication porphyria or precipitating acute episodes of inheritable forms of porphyria.

Q. What one does is take the evidence that is presented by investigation, by history and other ways in an effort to arrive at a logical or reasonable or scientific conclusion. Isn't that right, Doctor?

A. Right.

Q. Doctor, Mr. Newbold asked you about genetic mutation on redirect examination, insofar as it applies to these plaintiffs. And he suggested to you that you have no evidence of a genetic mutation took place from this porphyrin data. Do you recall that, sir?

A. Yes.

Q. You have no evidence from this data that you have that a genetic mutation has not taken place, have you, sir?

A. That's correct.

Q. And Doctor, he also asked you whether or not you had any evidence that any of these plaintiffs have suffered a mutation of their reproductive cells. Do you recall that, sir?

A. Yes.

Q. And you said there was no evidence of that, but just the contrary or the converse is just as true. That is you have no evidence, do you, sir, that the reproductive cells of these plaintiffs have not suffered a mutation. Isn't that correct?

A. That is correct. May I offer one free-standing unrelated statement? It will be very brief. Just a word of explanation.

I made an error a few days back in the use of a term. I believe I used the term transmutation a few times. The correct term is mutation. Transmutation refers to something entirely different.

Q. And Doctor, insofar as Eleanor Arp, Joyce Kemner, Gary Mason are concerned, these, the results in their analysis of their uroporphyrins do suggest an abnormality of porphobilinogen metabolism. Do they not, sir?

A. You stated porphobilinogen. Darryl Arp?

Q. No, Eleanor Arp, Joyce Kemner, Gary Mason.

A. Eleanor Arp had a pentacarboxylic porphyrin value of four with the upper limit stated as three.

Q. Doctor, we would save some time if you will review it just so you can answer my question.

A. Your statement was specifically in regard to porphobilinogen?

Q. Yes. These three.

A. Eleanor Arp?

Q. Persons, you have testified as to Eleanor Arp, Joyce Kemner, Gary Mason. That as to these three persons, that the abnormal findings while not necessarily indicative of a porphyria do suggest an abnormality in the porphobilinogen metabolism?

A. Porphyrinogen metabolism?

Q. Is that what it was?

A. Porphyrinogen metabolism. Porphobilinogen is normal here.

Q. Doctor, do these results in the case of Eleanor Arp, Joyce Kemner, Gary Mason suggest an abnormality in the porphyrinogen metabolism in those people?

A. Yes, mildly.

Q. And Doctor, this abnormality that is suggested, as you have described it, in the porphyrinogen metabolism, is part of

the so-called cascade whereby the heme is actually produced, isn't that correct, sir? Is that correct, Doctor?

A. Sequence.

Q. Sequence, cascade, sequence. Isn't it correct, sir, that this is important in production of heme?

A. Yes.

Q. And it is heme that is part of our blood system, is it not, sir?

A. Right.

Q. Now, Doctor, referring to your reference values that we have here, you have given us the raw data. Let's mark this one before I get on that raw data. I made this.

MR. CARR: I will pass it to the jury at this point, Your Honor. So the jury might understand, the list that was originally, that they are now put down in the bottom column.

(Whereupon Plaintiff's Exhibit 227 was passed to the jury.)

Q. Could you take a look at that exhibit? Doctor, that exhibit purports to be, it's captioned Quantitative Porphyrins, Abnormal Test Results Suggestive of Intoxication Porphyria or Need for Further Testing. And it's separated into two separate groups. One is suggestive and one you have testified need further testing.

Do you see that, sir?

A. Yes, I do.

Q. And does it accurately reflect the test value you have given earlier, sir?

A. I believe it would be appropriate if the word marginal were substituted for abnormal.

Q. Well, that wouldn't be appropriate because they were-- we will say abnormal or marginal.

A. Okay.

Q. And with that change then, Doctor, does it accurately reflect your testimony?

A. Mr. Carr, the last four names on the first part of this list, Gary Robinson, Joe Robinson, David White, Patricia White, really should be included in the second portion, need for further testing.

Q. You would draw the line right here then?

A. Yes.

Q. Is that all right now?

A. Yes.

MR. CARR: At this point, Your Honor, Mr. Newbold will read the part of his redirect examination of Dr. Ellefson.

THE COURT: We will take a short break at this time. Ladies and gentlemen, I would admonish you now as I do before any break and this admonishment will apply for any breaks during

the day that you are not to discuss this matter among yourselves or with anyone outside the jury panel or as of yet form any opinions or conclusions about the matters of trial. Court will be in about a fifteen minute recess.

COURT RECESSED:

(The following proceedings were had in the presence and hearing of the jury.)

THE COURT: Mr. Newbold.

MR. NEWBOLD: Your Honor, this is a continuation of my redirect examination of Dr. Ellefson.

Q. Doctor, under recross examination by Mr. Carr, he pointed out to you an article in a book. Disorders of Porphyrins and Heme Metabolism.

A. That's the title of the chapter.

Q. And Chapter six, he called it the porphyrias by Kappas, Sassa and Anderson. And Mr. Carr read you this sentence and asked you whether you agreed with it.

In all of the inherited forms of human porphyria, environmental factors including nonheritable factors play a vital role in determining clinical expression of the gene abnormality.

Do you remember him reading that to you?

A. Yes.

Q. Doctor, what are the environmental factors that the

authors are referring to in that sentence?

A. Probably toxic chemicals of a variety of sorts. Probably non-chemical stresses.

Q. What is a non-chemical stress?

A. Emotional stress, job related stress. I think those would be the main factors.

Q. Doctor, on page 1302 of that article, wherein the authors are talking about the clinical expression of acute intermittent porphyria, they state that, page 1302, third line:

Hormonal, drug and nutritional factors predispose to full expression of the disease probably by incuding hepatic delta-aminolevulinic acid synthase, the rate limiting enzyme for heme biosynthesis in the liver.

Do you agree with that?

A. Yes. The underlying factor, however, the primary underlying factor is the inheritable deficiency of the enzyme, neoporphyrinogen one synthase and metabolic problems related to that are related to stimulation of the synthesis of delta-aminolevulinic acid.

Q. Doctor, directing your attention then to page 1303 of the article, and going down, in the first column, ten lines down, the authors state:

In every major form of these diseases a clear environmental or chemical factor whether it be sunlight, in

the erythropoietic porphyrias, or drugs and hormones in the hepatic porphyrias, influences the clinical expression of the disorder in the genetically susceptible individual.

Do you agree with that?

A. Yes.

Q. Doctor, during the recross examination by Mr. Carr, he questioned you as to the findings by these authors concerning the ratios of coproporphyrins to uroporphyrins. Do you remember that cross examination?

A. Yes.

Q. Can you explain for me, Doctor, how your results, test findings here at Mayo Clinic differ or are the same with those of the authors of this book called Disorders of Porphyrin and Heme Metabolism?

A. Those authors have not stated actual ranges or actual examples of data. They have given average, usual numbers. We have no basis for direct comparison with the normative data that I provided.

Q. And why is there no basis for comparison?

A. Well, there may be a basis for a very limited comparison. If you look at the average values taken from our normative data set and compare with the average or usual values presented by these authors, then there should be close similarity.

But if we are going to look at a ratio of say

coproporphyrin to uroporphyrin, and the range that that ratio covers, then we must look at the range of values that these authors are referring to. And they are not presenting ranges of values from which we can derive a range for ratios.

Q. Doctor, directing your attention to page 14 of the book, Chemical Porphyria in Man, Dr. Ellefson's Deposition Exhibit 209, you were cross examined by Mr. Carr on this table, were you not?

A. Yes.

Q. And you were not able to continue your answer insofar as the increases of the coproporphyrinuria. Is that correct?

A. In regard to the increase of urine porphyrin excretion?

Q. Yes.

A. Right.

Q. And can you explain for me whether or not Doss in that table finds that there is a normal ratio of coproporphyrin to uroporphyrin when the excretion values are normal?

A. When the excretion values are normal, according to this table,coproporphyrin is much greater than uroporphyrin. Which is much greater than heptacarboxylic porphyrin, which is approximately equal to the pentacarboxylic porphyrin, which is greater than the hexacarboxylic porphyrin, which is greater than the tricarboxylic porphyrin.

Q. And according to the Doss Table Two, when do the

ranges get out of line?

A. As the patient or the person's disease becomes transformed from chronic hepatic porphyria Type A to chronic hepatic porphyria Type B.

Q. So does Doss' table deal with someone who has porphyria?

A. Yes, definitely.

Q. So is Doss' table a reflection of the ratios in a normal person?

A. Only in the portion of the table identified as referring to normal persons. The data indicated or the indication for persons with a secondary coproporphyrinuria, chronic hepatic porphyria, Types A, B, C, D, those must refer to persons who are excreting increased amounts of porphyrin.

This I must point out is further exemplified in the figure, the histogram--I am sorry, it's not a histogram, bar graph type figure and I believe two other papers. The same figure is used for at least two of the other papers in this exhibit.

Q. Doctor, directing your attention to page 75 and 76 of Exhibit 209, Chemical Porphyria in Man, do you recall being cross examined by Mr. Carr involving the inversion of the ratio of coproporphyrin to uroporphyrin?

A. Yes.

Q. And directing your attention to those pages, Does

Dr. Strik find an inversion when the reference values for the excretion of the porphyrins are normal?

A. Apparently not.

Q. Now Doctor, directing your attention to preface Roman five.

Doctor, Mr. Carr read you this sentence:

Quote one feature then is that, at total levels of excretion which fall within the normal range, the proportion of porphyrin metabolites containing eight and seven carboxylic groups is increased relative to those containing six, five and four of these groups.

Do you recall him cross examining you on that?

A. Yes.

Q. Doctor, does that mean that the author is concluding that when the normal reference values for coproporphyrins and uroporphyrins are within their normal ranges, that there have to be a certain ratio?

A. I believe he is implying that there is a limited range of ratios when they are within normal limits.

Q. Okay. Now is he talking about, when he says total levels of excretion which fall within the normal range, is he talking about the individual porphyrins that you have studied, or is he talking about all the porphyrin levels?

A. I believe he is referring to the sum total of all

of the porphyrins. The term total, I am sure he is using to refer to all of the porphyrin in the urine. And indeed it is possible to have a normal value for total urinary porphyrin excretion and to have within that a significantly increased uroporphyrin value or a significantly increased coproporphyrin value.

Q. Okay. Doctor, is there anything else in this article that you were cross examined on by Mr. Carr that expresses the author's opinion on the subject of the ratios within the normal excretion ranges?

A. Well, I believe there is a problem in the use of words. In the second statement of the third paragraph on that page, the author refers to qualitative changes in the pattern of porphyrin metabolites in the urine as providing a far more sensitive indication of porphyric disturbances in the pathway of heme synthesis than the quantitative changes. And I frankly do not know what he means by qualitative and quantitative here.

He goes on in the next statement to state that one feature then is that at total levels of excretion, and here he must be referring to the sum total of all the porphyrins in the urine, which fall within the normal range, the proportion of porphyrin metabolites containing eight and seven carboxylic groups is increased relative to those containing six, five and four of these groups.

Now here he is talking about a quantitative relationship of uroporphyrins and heptacarboxylic porphyrins to the other porphyrins. And I gather from his statement that that is what he is referring to, this qualitative change is used, the term is qualitative and quantitative rather imprecise here.

That may be a side issue, but it exemplifies the problem trying to understand some of the material in this document, because of imprecision in the use of some of the descriptive terms.

Q. Doctor, in the fourth paragraph of the preface to this article, the authors say the shift in the urinary porphyrin pattern does not appear to be related to any symptoms of disease either in animals exposed under experimental conditions or in human subjects accidentally exposed to a porphyrinogenic chemical.

Do you agree with that?

A. Well, I believe there is a problem here in how the author uses the term symptoms of disease. Apparently in some experimentally induced porphyrias he has not observed signs of disease other than increased porphyrin and possibly porphyrinogen excretion. That is what he states.

Q. What does the author mean when he states that the shift in the urinary porphyrin pattern does not appear to be related to any symptoms of disease, either in animals exposed under

experimental conditions or in human subjects accidentally exposed to porphyrinogenic material?

A. I presume he is referring to his own experience. But if we look at persons who are known to have porphyria that has been provoked into active form as a result of exposure to a medication or a toxic chemical, those, many of those persons do indeed present signs and symptoms characteristic of disease. Neurologic signs are common. Dermatologic signs are common.

Q. Doctor, does this author also state in the same paragraph, it is also found that this effect is completely reversible since the pattern is restored to normal as soon as the compounds are eliminated from the body?

Is that what he states there?

A. Yes.

Q. And do you agree with that?

A. My feeling is that this might be correct, probably is correct in some cases where exposure to a toxin has been relatively light. But surely not of sufficient magnitude to provoke a clinically significant, medically significant episode of porphyria.

Q. Doctor, under recross examination by Mr. Carr, you testified that the odds for contracting intoxication porphyria are only related to an exposure to a toxic chemical. Did you recall being cross examined on that topic?

A. Yes.

Q. And you would agree, would you not, Doctor, that the odds relating to intoxication porphyria would be for toxic chemicals, drugs, medicines, and other agricultural pesticides or industrial chemicals?

A. Yes. I believe it's also fair to lump most of those into the overall category of toxic chemicals. Yes.

Q. Is also alcohol a toxic chemical?

A. Indeed it is.

Q. Doctor, the odds of contracting intoxication porphyria are also, are they not, related to how long one has been exposed to drugs, chemicals, pesticides and other toxic chemicals?

A. The time factor apparently has been important in some cases. Dose has been more important in some cases.

Q. And are the odds for contracting intoxication porphyria also related to the manner in which the person was exposed to the toxic chemical?

A. I presume that would be a very important factor.

Q. Doctor, directing your attention to Exhibit 227, which is Mr. Carr's exhibit, where he has two columns, one being suggestive of intoxication porphyria or need for further testing.

Do you recall testifying off of that exhibit, Doctor?

A. Yes.

Q. And do the names that appear under need for further testing, are those the same names which you had previously given me as being marginally abnormal or a variant of normal?

A. Yes.

Q. No further questions.

(At this time Mr. Carr continues with the reading of his recross examination.

Q. Doctor, just a short few, hopefully. In the chapter from the book, Disorders of Porphyrin and Heme Metabolism, Doss is cited from time to time as a reference authority, is he not?

A. I am not sure. I think he is.

Q. Yes, he is. I wouldn't be asking you that if he weren't.

A. Okay.

Q. Here is one. I have seen some others. Here is another one.

And so is it not true that Doss is relied upon--and here is another one. By the authors of this chapter in this book as a reference authority?

A. Yes.

Q. For some of the statements they make?

A. Right.

Q. Now Mr. Newbold referred to the statements in the

preface in the Strik and Doss book, Chemical Porphyrias in Man. Do you recall that?

A. Yes.

Q. And he directed your attention to the second to last paragraph on page Roman numeral five. Do you recall that?

A. Yes.

Q. In which it talks about the shift in the urinary porphyrin pattern.

A. Yes.

Q. And by that they are talking about this shift of pattern from more copro to less, and to more uro, correct?

A. I believe they are talking about a shift from having copro predominate to having uro predominate.

Q. Yes.

A. Okay.

Q. And that is the pattern they are talking about. And isn't this paragraph simply, means that the author believes that by detecting that shift, you can determine simply a pre-toxic effect, that is that this will precede possible toxic damage to the human body. Isn't that simply all he is saying in that paragraph, Doctor?

A. He is implying that this change can occur before any evidence of disease occurs.

Q. All right. And he is also suggesting in the next

paragraph that follows that, that because of this possibility of detecting this shift in pattern, in a routine measurement of the patterns, could represent a useful tool in monitoring humans against the effects of environmental contamination. Isn't that what he is saying?

A. Yes, to detect an effect before it becomes a disease problem.

Q. Right.

A. Yes.

Q. And he states in the part preceding that, that this hepatic porphyria probably precedes or coincedes, I still don't under that coincedes.

A. I don't either.

Q. Probably means come at the same time.

A. I suppose.

Q. Precede or coincede all of the same effects which may be induced by these chemicals and after sub-acute or short term exposure, and by these chemicals, Doctor, he is talking about environmental contaminants, vinyl chloride, hexachlorobenzene, certain brominated and chlorinated biphenyls and tetrachlorodibenzodioxin. Is he not?

A. Yes.

Q. No more questions.

MR. NEWBOLD: That's it.

THE COURT: Gentlemen, could I see you at the bench for just a second?

(Bench conference out of the hearing of the jury and off the record.)

MR. CARR: I call Dr. Ellen Silbergeld.

MR. HEINEMAN: Your Honor, if the Court please, before we get started, I would like to introduce my associate Jane Rudolph to the Court and to the jury, an attorney practicing with our firm.

THE COURT: Okay.

ELLEN SILBERGELD

called as a witness, being duly sworn, testified as follows:

DIRECT EXAMINATION
By
MR. REX CARR

Q. Now, Doctor, would you state your name for the jury, please.

A. My name is Ellen Silbergeld.

Q. And, Doctor, you are a doctor of what?

A. I have a Ph.D. in environmental science.

Q. And are you a married lady?

A. I am.

Q. And your age, ma'am, and remember you are under oath.

A. 38.

Q. And, Doctor, where did you attend--by profession,

what is your profession?

A. I am a toxicologist.

Q. All right. And where did you attend undergraduate in the course of arriving at the profession that you now enjoy?

A. Vassar College in Poughkeepsie, New York.

Q. Graduating when, Doctor?

A. 1967.

Q. Doctor Silbergeld, you went on to take additional training in your specialty and where did you take your training and when did you take it?

A. At Johns Hopkins University between 1968 and 1972.

Q. Did you get a degree beyond the A.B. degree and prior to the time you got a Ph.D.?

A. No. I was accepted straight into the Ph.D. program.

Q. All right, and you received the Ph.D. in 1972?

A. That is correct.

Q. All right. Could you explain to the jury the difference between a Ph.D. and, say, an M.D.?

A. Ph.D. degree is a research degree which is based on the conducting of original basic scientific research, if it is in the sciences. It does not permit the holder to practice clinical medicine.

Q. Whereas an M.D. is a doctor of medicine and does treat human beings?

A. That is right.

Q. Now, are there PhD.s not just in your field, Doctor, but in a number of other fields that have absolutely nothing to do with science or medicine or anything of that sort? Ph.D. in literature and Ph.D. in psychology or law--well, not in law but all sorts of other areas where there are Ph.D.s?

A. Yes, there are.

Q. Doctor, what kind of training did you receive, what did you study to arrive at--to be allowed to get a degree called Ph.D.?

A. For Ph.D. in the sciences, I had to study a number of courses in the basic sciences ranging from physics through mathematics through biology, biochemistry and pharmacology. A number of these courses were courses given at the Johns Hopkins Medical School and indeed were the same courses given to medical students enrolled to get the M.D. degree. In addition to receiving the Ph.D. degree at Johns Hopkins, I had to conduct,design, conduct and complete and publish original research in my field.

Q. And was it necessary that a board of professionals or people associated with your graduate school or at least one or more persons pass upon your proficiency in this phase before you could be awarded the Ph.D. degree?

A. Yes. AtJohns Hopkins there were two such boards of

examination.

Q. Now, Doctor, during the course of your education, did you have employment at various institutes or agencies during the time that you were receiving your undergraduate and graduate training?

A. While I was an undergraduate, I worked during the summers and during the school year to hold my scholarship which I was awarded by Vassar College.

Q. Doctor, did you bring with you--I have your copy. Would it help you to go through your qualifications that you have what is called a curriculum vitae in front of you, Doctor, to jog your memory?

A. Yes, it would.

Q. I will hand it to you and that is the curriculum vitae that I have previously been supplied at my request, is that correct?

A. It is.

Q. And, Doctor, while we are on the subject, the plaintiffs in this case have employed you as an expert toxicologist and you are getting paid and you expect and indeed to be further paid for services you have rendered us?

A. I do.

Q. All right. Now, Doctor, did you have occasion to receive some training in Sweden for instance, or some employment in

Sweden?

A. Yes.

Q. What was the nature of that work?

A. After graduating from college, I was hired to be an instructor in an international summer school run jointly by the University of California and the University of Uppsala, in Uppsala, Sweden.

Q. What was the purpose of that? What did you teach?

A. I was teaching a course in modern history.

Q. Not associated with toxicology, I take it?

A. No.

Q. All right. And what other employment did you have during the course of achieving your academic or professional degree?

A. In early 1968 I was employed by the National Academy of Sciences in Washington, D.C. as secretary to the Committee on Natural Resources. I was also appointed Program Officer of a special program devoted to producing scientific books on topics in environmental sciences. At the request of my supervisor at the National Academy of Sciences, I kept that latter position of Program Officer during the first two years of my graduate training on a part-time basis.

Q. And were you at that time engaged and had you decided upon your professional career to be that of a toxicologist?

A. I did.

Q. And did you in addition to that employment and during that period of time and following that, did you have another employment in Washington, D.C.?

A. I did. In the summer of 1968 and '69 after my first year of graduate school I applied for an internship with the Center for the Study of Responsive Law.

Q. And did they give you an internship?

A. I did receive that internship.

Q. How long were you with that center?

A. Full time for that summer although part of that time I was also taking some scientific course-work and then intermittently for about the next year and a half to work on completing a book which was published as a result of my work as an intern.

Q. And what was that book?

A. The name of the book was Water Wasteland.

Q. And did that deal, then, with the environment and contamination of our water and resources?

A. It dealt with efforts to control pollution of drinking water, yes.

Q. Now, Doctor Silbergeld, did you go on after your graduation to become employed as what is known as a fellow?

A. Yes.

Q. What is a fellow? I am not sure that I really understood what a fellow is other than a fellow on the street.

A. Well, for women, I guess, it is not a fellow on the street but a post-doctoral fellowship is an honorary competitive positbn awarded by universities with monies from the National Institutes of Health, in my case to allow a young scientist to develop and pursue independent research.

Q. You are being paid, then, to do research, is that what it is?

A. That is right. In addition, I assisted in supervising graduate students and in teaching in courses in toxicology.

Q. Now, you were by that time teaching in this field of toxicology, were you?

A. I was.

Q. And was that at Johns Hopkins in Baltimore, Maryland?

A. That was at Johns Hopkins, both the university and the medical school.

Q. Now, did you at about that time receive a professorship at Johns Hopkins?

A. At the conclusion of my fellowship, I was offered a position on the faculty as assistant professor in the department of environmental medicine.

Q. And did you accept it?

A. I accepted it for a short period but at the same time I was being offered a position at the National Institutes of Health and eventually I took that position and resigned my professorship at Johns Hopkins.

Q. All right. And when it says environmental medicine when you were for the short time a professor in that department, what is environmental medicine?

A. Environmental medicine is the field which studies the effects of alterations in the environmental including chemical exposure on human beings and experimental animals as models of human beings.

Q. All right. And your aim in doing that kind of work is what, Dr. Silbergeld?

A. The purpose of that kind of research is to understand and to predict the effects of environmental pollution and alterations on human health and to prevent them as far as possible.

Q. And following that extent as an assistant professor, did you then, as you have indicated, go on to the National Institutes of Health?

A. I did.

Q. What is the National Institute of Health? Is it a private organization, is it a government organization or combination? Just what is the National Institute of Health?

A. The National Institute of Health is a collection of biomedical research institutes under the Department of Health and Human Services. It is a government agency.

Q. A government agency? All right. And what was your position then with the National Institute of Health?

A. I was a staff scientist or fellow as indicated here and also was in charge of a specific laboratory, the laboratory of behavioral neuropharmacology.

Q. What does that mean, behavioral neuropharmacology?

A. That is the branch of biology which studies the effects of chemicals including drugs on the brain and behavior.

Q. And did you conduct at that time actual experiments, Doctor?

A. I conducted actual experiments and supervised experiments by people on my staff.

Q. What kinds of experiments were being undertaken by you and under your supervision?

A. Primarily animal experiments but I also had corroborative studies with clinical studies, that is M.D.s who were part of this branch at NIH.

Q. And what particular medicine or drug or chemicals were you studying?

A. We were examining the effects of a group of new drugs which had been proposed for the treatment of diseases with

Parkinsonism.

Q. And did you after your appointment as a fellow and head of this unit, did you receive some other employment by the National Institute of Health?

A. Yes. In 1979 I was promoted to chief of my own laboratory, a laboratory of neurotoxicology.

Q. And what did you serve as chief of that laboratory for how long?

A. For approximately two years.

Q. What is neurotoxicology?

A. It is the study of adverse effects of chemicals and other compounds on the nervous systems.

Q. And what sort of chemicals or compounds did you study for adverse effects on the nervous system?

A. We looked at a range of substances including metals like lead and manganese and polycyclic aromatic hydrocarbons.

Q. Stop. I can understand lead. Poly-what?

A. Polycyclic aromatic hydrocarbons.

Q. All right. What is that?

A. That is a complex molecule made of several chemical rings. Dioxin is a polycyclic aromatic hydrocarbon. We studied carbon and PCBs.

Q. PCB stands for what?

A. Polychlorinated biphenyls.

Q. And dioxin is one of those kinds of chemicals as well?

A. Dioxin is one of that class of chemicals known as PAH. We also studied the effects of some drugs and of sex steroids on the brain and behavior.

Q. Sex steroids. By that you mean the pill and things of that sort?

A. Components of the pill such as estrogen and progesterone, yes.

Q. And, Doctor, following your service as head of the section on neurotoxicology for the National Institute of Health, did you receive another appointment following that?

A. Yes.

Q. And what appointment did you receive there?

A. That of the chief toxics scientist for the Environmental Defense Fund and also guest scientist at NIH in the Reproductive Toxicology Section.

Q. And when did you receive those two appointments?

A. In 1982.

Q. And are you presently serving in both of those capacities as chief toxics scientist for the EDF and as a scientist for the National Institute of Health?

A. I am.

Q. Doctor, what is the EDF? What is the Environmental Defense Fund?

A. It is a private non profit organization which is devoted to protecting the human and natural environment.

Q. How does this organization go about that function?

A. We have a staff of about fifty professionals, lawyers, scientists, engineers and economists. We engage in educational activities and in working with congress and federal and state agencies to increase the degree of protection of our environment.

Q. And have you in your capacity in that employment, have you been called upon to testify and give evidence before congress or, that is, committees of subcommittees of congress?

A. Many times.

Q. And when you say many times, could you give us an idea of how many times you have testified for congressional committees?

A. Probably about eight times in the past two years.

Q. And, Doctor Silbergeld, in addition to this educational work, does the Environmental Defense Fund engage in litigation for purposes of enforcing the law?

A. It does.

Q. What kinds of litigation or what occasion for litigation that the EDF gets involved in?

A. The primary types of litigation, the toxic chemicals program gets involved in really--and relate to making sure that the environmental laws which congress has passed like the super funds law are adequately and forcibly utilized by agencies.

Sometimes parts of those agencies like the EPA don't really vigorously enforce the law. For instance, make sure that a dump site is cleaned up or establish consistent and clear standards for air or water pollution and those are the kinds of issues we would be involved in.

Q. Are the persons that function some of these agencies or some of the persons surely not all of them but are some of the persons that function these agencies, do they always follow the law as our government gives it to them?

A. Unfortunately not.

MR. HEINEMAN: Your Honor, I am going to object to this as going beyond the scope, a., of this lawsuit and, b., as to anything that relates to the lawsuit. I don't think it has anything to do with what this lady is here to testify about and I would object to it.

MR. CARR: Your Honor, it has to do with her qualifications to testify on the subject that this lawsuit is concerned about and I am not suggesting that the EDF is involved in this lawsuit in any way and it is not for that purpose.

THE COURT: Go ahead. Objection is overruled.

Q. (By Mr. Carr) Doctor, is it necessary on those occasions that suits be filed in order to require those persons to follow the law insofar as it affects toxic chemicals in our

environment that we all live in?

A. Sometimes it is.

Q. And are you--I know you are not a lawyer, but are you involved as part of your duties as a toxicologist for this Environmental Defense Fund, are you called upon from time to time to advise those persons in the fund as to what is or is not toxic, what may or may not be detrimental to the environment?

A. I am.

Q. And, Doctor, have you worked with, in the course of your occupation, have you worked with the toxic substance that we have described, that we know as 2,3,7,8 TCDD?

A. I have.

Q. And, Doctor, you have been now at this employment for what? Are you in your second or third year now?

A. Starting my third year.

Q. And, Doctor, your work with the National Institute of Health, in what capacity do you work for that agency?

A. I am a guest scientist, a research scientist in the laboratory of reproductive toxicilogy in the institute, the National Institute of Child Health and Human Development at NIH.

Q. And what does that mean? What, in fact, are you doing?

A. I am involved in basic research on the effects of chemicals including dioxin on reproduction.

Q. By reproduction, you mean babies being born?

A. Well, both the production of offspring in rodents and the biochemistry of the reproductive organs in these animals.

Q. As affected by toxic substances?

A. That is correct.

Q. Now, this National Institute of Health, that is a government agency?

A. It is.

Q. Do you serve on or with any other governmental agencies in addition to the National Institute of Health?

A. I do.

Q. What other agencies or agency do you serve with or on?

A. The EPA, the National Academy of Sciences. Those are the two.

Q. When you say the EPA, that is the Environmental Protection Agency?

A. Yes.

Q. What is your official capacity or connection with the EPA, Dr. Silbergeld?

A. My primary connection is as a member of the executive committee of the Science Advisory Board of the EPA. That is, the governing body which really passes on all the actions and policies of that agency in terms of their scientific worth.

Q. How long have you been on the--you say the executive board of the EPA?

A. Yes.

Q. How long have you been on that board?

A. About seven months.

Q. And you pass upon--give that to me again. What is it you actually do?

A. This board passes upon all the actions and policies and documents produced by the EPA in terms of their scientific merits.

Q. All right. You wouldn't have anything to do, then, with actually going up and cleaning or enforcing the EPA laws? You pass upon their scientific output?

A. The value of those actions in terms of their scientific basis, yes.

Q. All right. How many members are on that board?

A. I believe at present there are nine.

Q. And what are their professions or their academic or their professional standing? Who are these people? What positions do they hold in public life?

A. They have a range. They come from disciplines of engineering, medicine, toxicology, environmental ecology and other sciences. They are academic professions. They are members of industry and distinguished private citizens.

Q. All right. Now, Dr. Silbergeld, the other governmental agency with whom you have an association or employment is the

National Academy of Sciences?

A. The National Academy of Sciences.

Q. What is the National Academy of Sciences?

A. That is an independent organization chartered by congress and is the highest scientific body in the United States.

Q. And what is your function or position with the National Academy of Science?

A. I have been appointed a member of its board on toxicology.

Q. It has a specific board that deals with toxicology and toxic substances?

A. That is right.

Q. And you have been on that board how long?

A. For about six months.

Q. Are these positions that you have, do you do these things with the governmental agencies for pay or do you do them for free, gratis?

A. I am reimbursed for time and expenses by the EPA for service on the science advisory board and am reimbursed for expenses by the National Academy of Sciences, but I do it really because I have been nominated by the administrator of the EPA, Mr. Ruckelshaus in one case and the president of the National Academy of Sciences, Dr. Press, in another out of a sense of obligation.

Q. Noe, Dr. Silbergeld, during the time you have been engaged upon your career, have you had other professional appointments in addition to those that you have described earlier?

A. Yes.

Q. What are these other professional appointments? What do they consist of?

A. Various consultancies to government and other organizations.

Q. And what are these other agencies or organization of which you have consulted or belonged?

A. The National Science Foundation, the Food and Drug Administration.

Q. Stop one moment. The National Science Foundation, what do you do with them?

A. I was a consultant to their program looking at the potential hazards and toxic substances generated by new forms of energy such as shale oil products.

Q. And how long ago were you involved with that program?

A. 1974 to 1975.

Q. And what did you do--what other appointments have you had?

A. I have been a member of several national committees looking at specific issues in toxicology.

Q. And what are these committees?

A. One of them was a committee drawn up by the Nutrition

Foundation, a private organization, to examine the role of artificial food additives inproducing behavioral problems. in children.

Q. And how long did you serve on this committee on food additives?

A. Five years.

Q. And what did that committee actually do or, more precisely, what did you do on that committee dealing with food additives?

A. Two things. We looked at the issue which is sometimes popularly known as the Feingold hypothesis.

Q. As what?

A. The Feingold hypothesis.

Q. Means nothing to me. Tell us what that means.

A. Dr. Ben Feingold was a California pediatrician and allergist, recently deceased, who wrote a book called Why Your Child is Hyperactive in which he proposed for the first time, I think, that some of the artificial additives in our food supply might well be provoking behavior disorders such as hyperactivity and other learning disabilities in children. The Nutrition Foundation and other groups being concerned with food and the quality of the food supply looked into this hypothesis very seriously. So one of our duties was to examine all the evidence that Dr. Findgold and everybody else had on this subject

and to write a report which we did in 1977, I believe. After that the Nutrition Foundation collected some funds from various other foundations and from the food industry and used these to support independent research on this topic and I served on the grants committee which reviewed the proposals that came into the foundation for their merit on the subject.

Q. In other words, you passed upon whether or not a particular group of scientists or a scientist should or should not get funds to work on a particular topic dealing with food additives and hyperactivity in children?

A. That is right.

Q. You passed upon the merits of their proposals?

A. That is right.

Q. All right. Did you do, yourself, any research in the merits of food additives?

A. Yes, I did.

Q. All right. Now, for how long did you do research in the field of food additives, Doctor?

A. I guess starting about 1978 and some of my former colleagues in the neurotoxicology laboratory are still carrying out research on this topic and I maintain active communication and corroboration with them.

Q. Now, Doctor, what other groups did you serve with or for?

A. I was a member of the Department of Health, Education and Welfare, now the Department of Health and Human Services Committee to Coordinate Toxicology and Related Programs.

Q. That is government, the Department of Health and Welfare?

A. Yes.

Q. And was there a particular agency connected with the Department of Health and Welfare with which you worked or served?

A. The Food and Drug Administration which is part of that had a major role in this committee as well.

Q. Now, the Food and Drug Administration, is that a governmental agency that passed upon the purity or toxicity, if you will, of various drugs manufactured by drug companies or the pill and things of that sort?

A. That is right.

Q. I don't know why I got that pill on my mind today but there must be some other drugs that you work and looked at?

A. All drugs sold in this country.

Q. And what was the committee or group upon which you served at that time?

A. There is a special committee chartered by the section of the Department of Health and Human Services which looks at all the efforts related to toxicology which are going on within

the agency.

Q. He looks at--what do you mean?

A. Well, it varied. We pass on the overall research program to make sure that important areas are being covered. We devote a considerable amount of time to detailed oversight of the studies being done which are still being done in Michigan after the contamination with polybrominate biphenyls or PBB or a wide range of activities and efforts related to toxicology.

Q. And how long did you serve on that FDA committee?

A. For four years.

Q. And what next appointment or committee appointment did you have there at that time, Doctor?

A. I was also appointed to the official U. S. Delegation to the Soviet Union under the health agreement on environmental health.

Q. As a representative of our country?

A. That is right.

Q. By whom were you appointed to be our representative?

A. I think by the Director of the National Toxicology Program, Dr. David Rall.

Q. And what was the function--what was your function upon the U. S. Delegation to this Joint U. S.-Russian committee?

A. Really to develop an idea of what the Russian scientists

were doing in the area of toxicology both human and experimental and to recommend back to the American government those areas which our government ought to encourage based on that information. This involved going to the Soviet Union, meeting with Soviet scientists and discussing issues of research with them in the Soviet Union and in the United States when they came over to the U. S.

Q. And did your group, did the U. S. Delegation make an appropriate report to our government?

A. We did.

Q. How long did you serve on the U. S. Delegation?

A. About a year and a half.

Q. All right. And what other groups have you had a professional appointment, Doctor, in addition to that?

A. I have been a member of two committees of professional societies that I belong to. The Society for Neuroscience and the American Society for Neurochemistry.

Q. And are both of these committees dealing with your specialty, that is toxicology?

A. Not exclusively, although they are very concerned with neurotoxicology because of its importance in social issues in this country, yes.

Q. And what other professional appointments have you had, Doctor?

A. I have been and still am a member of the Official U.S. Delegation to the OECD, chemical safety program.

Q. What is the OECD?

A. That is the Organization for Economic Cooperation and Development. That is the major multilateral trade agreement which this country has with most of the other industrialized nations of the free world.

Q. Now, you are again serving as a representative of our country to some other--to some kind of international group?

A. That is right.

Q. And it deals with what? What does it deal with?

A. With chemical safety.

Q. First of all, why does this country belong to such an international group to start with?

A. We establish this group after W. W. II.

Q. Why?

A. To promote and encourage international trade.

Q. Does this have a bearing upon toxic chemicals as well?

A. It does. One of the so-called non tariff barriers to trade, that is an impediment to trade which doesn't involve placing a tax or tariff by one country on another country's products. One of these barriers relates to regulations about chemical safety which various countries have imposed. The OECD chemical safety group is an attempt to look at all those

regulations on chemical safety and toxicology and to harmonize them so that countries within the OECD can trade their chemical products easily and freely and reliably.

Q. And you have been our representative or one of our representatives to this group for how long?

A. For two years.

Q. Have you also had a position with the State of Maryland?

A. Yes. I was appointed by the governor of the State of Maryland to the Hazardous Waste Task Force and the Hazardous Waste Facility Siting Board.

Q. And what was the function of that task force?

A. To develop a state policy on handling of hazardous waste.

Q. And, Doctor, what other appointments have you had?

A. Well, I have also served as an officer and do serve as an officer for the Society of Occupational and Environmental Health which is a professional society.

Q. That is not a government agency, that is an organization consisting of professionals who work in that field?

A. That is right.

Q. How long have you held that position?

A. For approximately one year.

Q. Are there any other professional appointments that

you have had that you haven't mentioned?

A. I serve on the editorial board of a number of scientific journals.

Q. What scientific journals are you on the boards of?

A. Environmental Research, the American Journal of Industrial Medicine, Neurobehaviorial Toxicology, Neurotoxicology and the Journal of Hazardous Waste.

Q. The American Journal of Industrial Medicine, is that recognized as an authoritative publication in the field of industrial medicine?

A. I believe it is.

Q. What do you do on the editorial board of that publication?

A. I review manuscripts which are submitted for publication in the journal. I arrange for the special publication of symposia or meeting proceedings when these are appropriate and also meet with the other editors to discuss editorial policy.

Q. Does the publication Industrial Medicine, is it distributed to American industry by and large including the chemical industry?

A. I believe members of the American Chemical Industry are on the editorial board of that journal.

Q. Your Honor,this is an appropriate place to stop.

THE COURT: Okay. We will take a break for lunch at this point in time. I would appreciate if you would be back in

the courtroom at 1:30 and we will resume testimony.

The admonishments I gave you before apply. The Court is in recess for lunch.

COURT RECESSED:

(The following proceedings were had in chambers out of the presence and hearing of the jury.)

MR. CARR: It has come to our attention that Monsanto is continuing to take evidence deposition in this case. We are not receiving notice of these depositions. They have put in the record that by stipulation of all counsel that the plaintiffs have waived their right to attend this deposition and I am not going to accuse Monsanto of doing something irregular at this time because it may be that they have the view or opinion that we have entered into such a stipulation. We indeed had agreed for certain taking of records earlier in the case and prior to the time testimony was started that those depositions that simply dealt with custody of the records, that we would not attend, nevertheless we wanted notice, but---

THE COURT: I am sorry, I didn't hear that.

MR. CARR: Nevertheless we wanted notice and so I am not going to suggest any irregularity on their part but I would, and I thought I made it clear a month or so ago that we did not agree to the taking of any evidence depositions except by

permission of Court that it had to come up with the Court and the Court had to agree that you had the right to take such an evidence deposition and I now would like to put on the record and make it clear that the plaintiff objects to the taking of any evidence or discovery depositions for that matter in this case while the testimony is going on and that no further depositions be taken without notice to counsel and without presentation to the Court the necessity for the taking of such evidence deposition and that I acknowledge and I agree that there may be occasions when evidence depositions may have to be taken under the circumstances of this trial, but I want to know about it and I want the Court to set the time and the place, if we deem it necessary to do it, and we can't do it by agreement and we want copies immediately of all the records that have been heretofore supplied to Monsanto in the course of these evidence depositions that have been taken.

THE COURT: Which of you want to respond?

MR. HEINEMAN: Well, I will be glad to respond, Judge. I don't even know what he is talking about.

THE COURT: That is a good response.

MR. CARR: These were takenon the 19th of March and the 31st of March. Custodian of the hospital medical records for one and a trucking company employment record on Darrell Arp for another.

MR. HEINEMAN: For the record, the depositions that you are talking about are an evidence deposition of Hazel Dorenhelth on March 31, 1984, and a deposition of Ruth Duncan on March 19, 1984, is that right?

MR. CARR: No. I am talking about those--those are the two that have occurred that has been brought to my attention but I have also--was told orally a few days ago and I had forgotten it until these came in that a deposition of a Gary Smith had been set for last Saturday unbeknownst to me and that fortunately for us it was cancelled. Somebody couldn't show up and that it has been rescheduled for sometime in June without notice to us and certainly without our agreement or knowledge. So that is one thing I know that has occurred but these two depositions have just come to my attention today and it is those things that have directed my attention to this on-going situation.

MR. HEINEMAN: You mentioned something earlier that I am not familiar with either and that has something to do with on behalf of the plaintiffs you had had some prior agreement with respect to these depositions going on without your presence?

MR. CARR: We had told them prior to the time of trial that if the depositions that they were taking were custodial records depositions only, that we would not--that we were not going to attend those depositions but we wanted a copy of the

notice and we obviously--because we may decide to attend one or the other of those. We wanted to have notice of all depositions and we obviously wanted copies of all the records as soon as Monsanto had those.

Now, that agreement was in force up until the time this trial started but I thought--well, I know I did not think, I know that we brought up the matter of evidence depositions on the record here a month or so ago and it was my clear understanding that no more evidence depositions would be taken without permission of Court and these two were taken and we received no notice of these and the only time we have known about it is now that it is after the fact and, in addition, this Gary Smith deposition that was apparently to be taken last Saturday of which I had no notice and now is apparently by oral, at least my secretary has been told it is now scheduled for some time in June. Again, we believe that is taken contrary to the understanding in this case that no more evidence depositions were to be taken without the permission of the Court.

MR. HEINEMAN: And my understanding is now you object to these two depositions?

MR. CARR: No, I am not objecting to those two depositions. I have--I am not accusing Monsanto of deliberately violating the understanding or the order of the Court. All I want is that we get immediately copies of those records.

MR. HEINEMAN: Well, Gary Smith has not taken place yet, as I understand it.

MR. CARR: That is correct.

MR. HEINEMAN: When is it set down?

MR. CARR: I have not received notice. Maggie said that they are going to reschedule it for some time in June but the danger in that---

MR. HEINEMAN: I think I got a phone call from Maggie about the Gary Smith one.

MR. CARR: The danger in all of that is that we are not getting notices. Now, if we were receiving notices and I believe that you were taking evidence depositions contrary to what the Court's order has been, we could immediately bring it to the attention of the Court but these two depositions to the best of my knowledge that you have in your hands, we received no notice of it and we received no notice of this Gary Smith deposition. The last word I had from Gary Smith is that you all were going to bring him in live and we were not going to take his evidence deposition.

MR. HEINEMAN: Who did you learn that from?

MR. CARR: I wouldn't know. Somebody. Maybe Wally Theiss, maybe Jane. Who knows.

MR. HEINEMAN: But there was a conversation with you or with my secretary?

MR. CARR: I can't even swear to that, to tell you the truth. I do know there was a Gary Smith deposition scheduled some time in January or December prior to the time we started trial. I do know that we were geared up to attend that deposition and that we received notice that it was cancelled and I thought that it was stated that they were going to bring him in live and that is the reason it was cancelled, but that is neither here nor there. That is not important.

THE COURT: Okay. Do you gentlemen have anything to say or are you just watching?

MR. A. SCHOENBECK: We have nothing to say, Judge, on it.

THE COURT: Well, it was my understanding that we had agreed after the Supreme Court stayed the proceedings, that there was going to be discovery going on up to the time the jury selection started and then after that it would be by leave and if there is anything that has to be taken, it can be by agreement, just let me know and that is no problem, but my understanding was that once the trial actually started, that any of these depositions would be taken by anyone by leave of court. That this specifically allowed taking depositions and other discovery until the jury selection started, but that has been a couple months already. If there is a reason to take an evidence deposition, we can have one taken but I think once a

trial starts, I think it is appropriate that it be done by leave and full notice and everything.

MR. HEINEMAN: Now, let us assume, for example, that there is a notice of one sent and there is no objection.

THE COURT: Fine.

MR. HEINEMAN: Do you have any objection to it going forward?

MR. CARR: I don't want it to be that way. I want it to be brought to the attention of the Court here.

THE COURT: There has to be notice and it has to be by leave. If no one objects, it is a form leave order. We can draw one up in a minute.

MR. CARR: When I am involved in a trial of this case, now you come and go and maybe you check your desk, but I am involved in the presentation of evidence, of corralling my witnesses and getting them going and going over depositions and I don't pay close attention to my mail. I do pay close attention to what is going on in the courthouse. So, indeed, send a notice but I don't want any evidence depositions or discovery depositions, for that matter, to be taken without bringing it to the attention of the Court and getting on the record that we either agree to it or the Court over our objection orders that it be done if we object to it. My concept is that we are in trial and anything that goes on in this case from this

point on either is by agreement of counsel or by permission of the Court.

THE COURT: Even if counsel agreed and not just on notice, it should be by order of Court. It should be by leave of Court and there is no problem if there is an agreement just entering a docket order. It will take a minute to draw it up but once we have actually started in trial, I think it should be by leave of Court.

MR. HEINEMAN: Okay.

THE COURT: If there is an agreement, we can just draw up a docket order. That is no problem. It will literally take a minute and if there is a problem, then we can have one of these discussions.

MR. HEINEMAN: But my understanding is--I just want to be clear--on the depositions of Ruth Duncan and Hazel Dorenhelth, you don't have any objection to those being used; it's just that you want the documents from them?

MR. CARR: I have no objection because I believe Monsanto took the depositions in good faith. I suspect that whatever we said here in the courthouse probably was not communicated to your people and there is no point in going through the machinery to get these depositions retaken.

What I am asking is that we do get immediately copies of those records.

MR. HEINEMAN: Okay.

MR. CARR: There may be something wrong with it and I might want to object to it and I want them early so if I am going to object to it, you will have adequate time to reschedule the depositions under the order of Court. If I do have an objection to it. I don't know what documents are given. I don't have the vaguest idea of what they say.

MR. HEINEMAN: Neither do I.

THE COURT: Okay. Any problem?

MR. HEINEMAN: No.

THE COURT: Fine.

(The following proceedings were had in the presence and hearing of the jury.)

THE COURT: Mr. Carr, you may proceed.

ELLEN SILBERGELD

having resumed the witness stand, being previously sworn, testified further as follows:

DIRECT EXAMINATION (Continued)
By
MR. REX CARR

Q. Dr. Silbergeld, we were at the noon recess engaged in discussing your various professional accomplishments. In addition to the ones that you have mentioned, have you also been appointed to a panel dealing with the--for the State of New York with something happening in a state office building?

A. Yes.

Q. What was that?

A. I am on the Governors Blue Ribbon Panel on the Binghamton State Office Building.

Q. What is the Binghamton State Office Building?

A. It is an office building owned by the State of New York where a PCB and chlorobenzene transformer was involved in a fire which lead to the wide-spread release of dioxinx, porphyrins and other chemicals in this building which remains closed to this day.

Q. When did that occur?

A. The fire occurred in 1981.

Q. And that building is yet closed?

A. It is still closed.

Q. And what was your function or what is your function on this panel in relation to the explosion in that building or that fire in that building?

A. The scientific panel provides advice to the state government including the Department of Health on the various remedial measures which have been taken in that building, the guidelines which the State Department of Health has developed with respect to acceptable exposures of people either involved in clean-up or office workers to the chemical which might remain in the building and, more generally, on the toxicology of those

chemicals.

Q. And with regard to that clean-up, say the building has been closed since 1981?

A. That is right.

Q. And does that mean that the building has not yet been cleaned to a level that would make it safe for humans to work there?

A. It is the opinion of the panel that the building cannot be safely reopened at the present time.

Q. All right. And, Doctor, have you served or are you a member of some other New York State panel?

A. I am also a member of the Joint New York State Centers for Disease Control panel looking at Love Canal.

Q. And what is Love Canal, Doctor?

A. Love Canal is a community in the town of Niagara Falls, New York, where there was a very famous and serious episode of chemicals escaping from an abandoned chemical waste dump and into the community.

Q. And what is the function of this panel you serve?

A. This panel is re-examining the question of whether or not the Love Canal area can be reopened for human beings to live in it.

Q. And what other persons or kinds of professional persons, if there are indeed professionals, that serve on this

panel along with you?

A. Other toxicologists, medical scientists,analytic chemists from the Federal government, State government and private sector.

Q. And is this a continuing on-going study as to the effects of those chemical wastes upon the inhabitants of the Love Canal area?

A. That is part of the oversight of this committee, yes.

Q. Anything else in that regard?

A. Charge to the committee is to make a recommendation to CDC in Atlanta and to the New York State Government about the advisability of allowing people to reoccupy the houses in Love Canal.

Q. When you say CDC, what does that mean?

A. CDC is the Centers for Disease Control which is part of the U. S. Public Health Service, a federal agency, located in Atlanta and among other things, investigates outbreaks of disease including environmentally-caused disease in the United States.

Q. All right. In addition to that panel, do you serve on some other environmental groups?

A. As part of my other activities, I have been involved in a number of such consultancies and activities, yes.

Q. Do you deal with a group dealing with agricultural

chemicals?

A. Yes. I am part of a national group called the Agricultural Chemical Discussion Group which is a joint industry-environmentalist group seeking to reduce the misuse of pesticides and other chemicals in agriculture.

Q. When you say joint industry and environmentalist group, do you mean by that members of the chemical industry hold membership on this committee?

A. Yes, they do.

Q. Do you know whether or not Monsanto has a representative there?

A. Through the National Association, the National Agricultural Chemical Association, they are represented, yes. I don't think we have had a specific member from Monsanto yet.

Q. Now, Doctor, I have noted in your employment and your other activities that there is a gap in '81 or '82 in your professional activities. Could you account for that, please?

A. Yes. In 1981 in June, I gave birth to a daughter and I took time off to stay at home with her.

Q. You live in Washington, D.C. with your husband and child?

A. No, I live in Baltimore.

Q. Is that where your husband and child is, in Baltimore?

A. Yes, I hope so.

Q. You live with them?

A. Yes.

Q. And you engage in your professional career as well as serve as a homemaker and mother and wife, is that correct?

A. Right.

Q. Now, Dr. Silbergeld, in the course of acquiring the qualifications that you have acquired to practice your profession, have you been invited to and have you in fact joined various professional socities dealing with the areas in which you hold expertise?

A. I have joined such associations, yes.

Q. And could you name those associates for us, please.

A. They are the American Public Health Association---

Q. What is the American Public Health? Is that a government agency or private agency? What is the American Public Health Association?

A. All of these are professional societies. They are private entities to which one is admitted after demonstration of appropriate credentials.

Q. All right. And what does the American Public Health Association deal with or in what is it involved?

A. It is the leading society for all professionals concerned with various aspects of public health, ranging from medicine through research.

Q. How long have you been a member of the American Public Health Association?

A. About a year and a half.

Q. What other associations in which you hold membership?

A. The Society for Occupational and Environmental Health.

Q. What is that group?

A. That is also a private professional society which was established by academic and industry scientists back in 1973. I am one of the founding members of that society.

Q. These associations, is it fair to say that a broad spectrum of professionals belong to these groups? That is, professionals that are employed by industry, professionals that are employed by colleges, universities, medical schools, professionals that are employed by the government? Is it a fair statement that all professionals that deal in these particular areas may join if they are qualified sufficiently?

A. Absolutely. There are no barriers to membership.

Q. Just what does the Society for Occupational and Environmental Health do? What does this association do?

A. Aside from providing an arena for professionals with similar interests to meet and know each other, the society promotes generally the fields of occupational and environmental health and holds symposia and other meetings and has published monographs based on these meetings.

Q. And what other associations in which you hold membership?

A. The Society for Neuroscience.

Q. Now, what is the Society for Neuroscience?

A. It is a professional organization made up primarily of biological scientists and M.D.s whose area of scientific interest is the nervous system. It includes neurotoxicologists as well as neuologists, psychiatrists, neurobiologists, a range of scientists.

Q. All right. Then, it is not just dealing with how toxic substances affect the nervous system, but it indeed is the entire science of neurology, the nervous system?

A. That is right.

Q. All right. And what other associations do you have membership in?

A. The Association of Women in Science.

Q. And is that self descriptive, that is, women who are professionals in scientific careers hold membership?

A. Also men, too.

Q. Men, too? How did that come about? You have it titled the Association of Women. You have some kind of second class membership for the men, do you?

A. No. As a matter of fact, some of our founding members were men who were interested in promoting and advancing

the careers of women in science.

Q. All right. Then, what else do you hold membership in, Doctor?

A. The American Association for the Advancement of Science.

Q. And is that title again descriptive of what this association does?

A. It is probably the largest single professional organization of scientists in the U. S. and covers all areas of basic and clinical sciences.

Q. How long have you held membership in that organization?

A. Oh, I think, about ten years.

Q. Do you have to meet certain--in any of these organizations or all of these organizations, do you have to meet certain standards of professional competence before you are invited or allowed to join?

A. Yes. All of them have some requirements for membership.

Q. All right. And the next association in which you hold membership?

A. The International Brain Research Organization is an international professional society to which one is invited to apply. One cannot even apply to this society. Then you are elected to membership.

Q. And when were you invited to become a member?

A. I think about three years ago.

Q. We will get to it in a moment. Did you do research necessary to qualify you for membership in this organization?

A. Yes, I did.

Q. And the next organization which you hold membership?

A. The American Society for Neurochemistry.

Q. And what is that?

A. That is a professional society of primarily biological scientists but also clinicians who are particularly concerned with the biochemistry of the nervous system.

Q. Now, you made a differentiation between biological scientists and clinicans. Would you explain the difference between those two groups or persons?

A. The only difference I have in mind is really as to whether the person holds a Ph.D. degree or an M.D. degree. Their research and their interests may be identical.

Q. When you say clinician, then, are you saying a medical doctor or a doctor that holds an M.D. degree?

A. I am.

Q. And when you say--what was bioscience or what did you do?

A. Biological scientists.

Q. Biological scientists would be a person involved in research that holds a Ph.D.?

A. Right, though I don't mean to imply that M.D.s do not conduct biological research.

Q. All right. And is this membership in this society limited to those professionals who do in fact do research into the chemistry of the nervous system?

A. That is right. One must demonstrate a record of conducting independent significant research in the brain, nervous system chemistry in order to be admitted to this society.

Q. And what other societies do you hold membership in, Dr. Silbergeld?

A. The American Society for Pharmacology and Experimental Therapeutics.

Q. And what is pharmacology?

A. Pharmacology is the study of drugs and other substances on biological systems.

Q. And what is experimental therapeutics?

A. Experimental therapeutics is that branch of pharmacology which deals with the development of drugs and other agents which may be helpful in treating human disease.

Q. And what is the foundation or what is the requirement to become a member in that society?

A. Again it is rather stringent in that one must demonstrate performance of independent significant research in these areas and have that demonstration supported by two people who are already members of this society.

Q. All right. Now, Dr. Silbergeld, in addition to the

society memberships that you held and the other activities that you have mentioned, have you been engaged in a number of other activities that parallels your professional work or that is involved in the exercise of your professional abilities?

A. I have.

Q. And what are these activities in which you have been engaged?

A. There are a wide range from participating in special conferences by invitation held by the National Institute of Health to---

Q. Do you hold or do you presently hold a position in the Society for Occupational and Environmental Health?

A. I do. I was elected secretary-treasurer last year of that society.

Q. Now, you have already mentioned what the society is and what it does and you hold a position of secretary-treasurer in that society?

A. That is right.

Q. And is this--were you elected to that position by your peers or by the other professionals who belong to that society?

A. That is right.

Q. Doctor, do you also serve--I think you had mentioned you serve on the editorial board of the American Journal of

Industrial Medicine. Do you serve on the editorial boards of other publications?

A. Yes, I do.

Q. And they are what?

A. Neurobehavioral Toxicology, Neurotoxicology, Environmental Research and the Journal of Hazardous Waste.

Q. Now, these various journals that you mentioned, are they published for the purpose of disseminating information to other professionals that deal with or work in the area of neurobehavioral toxicology, neurotoxicology and environmental research and hazardous waste?

A. To a large extent,yes.

Q. When you say you are on the editorial boards of these publications, what is your function? What do you do being on the editorial board?

A. Well, I review papers which are submitted by my peers for publication in these journals. These are what are called peer review journals. Nothing is published without very serious review.

Q. By peer, you mean other recognized competent professionals in the particular field that is being published?

A. That is right.

Q. All right.

A. And I will propose the publication of special issues.

For example, around the papers presented at a specific meeting or even to solicit certain papers from my colleagues which I feel are doing interesting research which should be published and also meet with the other members of the editorial board to talk about editorial policy.

Q. Dr. Silbergeld, have you participated in various conferences sponsored by the National Institute of Health dealing with your professional expertise?

A. Yes, I have.

Q. What kind of conferences are these? What is the purpose of them?

A. Well, there is a very special type known as a consensus conference.

Q. What does that mean?

A. That is a very interesting experiment by NIH to try and resolve important issues in medicine primarily by bringing together international experts on a subject to present all the most up-to-date information and attempt to generate a recommendation for primarily for clinicians practicing in that area of medicine. These recommendations are usually published in the journal of the American Medical Association.

Q. Is it then what you are doing is trying to arrive at agreed solutions to various health problems?

A. Trying to determine if there is an area of consensus

or agreement which might guide clinical medicine. For example, I served as an expert and gave a paper by invitation as an expert at an NIH consensus conference on the use of anticonvulsant drugs by pregnant women. There are concerns, of course, that the unborn child might be affected by these drugs and also concerns that the mother who has the disease of epilepsy or other convulsant disorder does need medical management during pregnancy so this is the kind of issue that a consensus conference attempts to come to grip with.

Q. All right. Now, have you also served in a very special role for the U. S. Secret Service?

A. Yes, I have.

Q. Is the U. S. Secret Service that agency which is responsible for protecting the life and safety of various government officials including the President and presently those persons who are leading candidates for the Presidential nominations?

A. Yes, it is.

Q. What did you do for the Secret Service?

A. I was asked by the Secret Service to be their expert consultant with respect to problems secret service agents were having with lead poisoning.

Q. And by lead poisoning, you don't mean the shooting of bullets into the persons of these agents, do you?

A. No. This was not---

Q. What do you mean?

A. It was not acute lead poisoning of that type but, rather, this was the problem that secret service agents were having in the course of their own work. Every secret service agent must spend one day a week at a firing range practicing his or her marksmanship and a lot of that practice takes place in an enclosed firing range. This is the problem police departments have had, too, but the secret service discovered that many of their men were actually experiencing dangerous levels of lead exposure as a result of this and so I was called in to advise them on the proper management of the agents and hygienic measures which might be taken in the firing range to reduce the problem.

Q. What did you discover the nature of the problem to be?

A. Well, the problem was caused by the very large volume of bullets that were being fired in this in-door range which generated lead as a dust as the bullet went down the barrel of the pistol and also when the bullet impacted on the walls at the end of the range or the target. There was also a generation of lead fumes from some of the chemicals used in the firing powder in the bullets and I did find from looking at the medical records that there was indeed a cyclicity of lead exposure in these men and at times in some people it reached quite dangerous

levels.

Q. How much lead was actually being generated by this firing process?

A. Hard to say but there were visible amounts of lead generated and so much lead that it was apparently economically worthwhile for a salvage company to come in from Baltimore, Maryland, and sweep down the range twice a month.

Q. For what purpose, to get the lead off?

A. To reclaim the lead and sell it.

Q. You are not talking about the bullets themselves, but the dust that came out of the muzzle of the gun?

A. That is right. There is the dust that was formed by those processes of impact and rifling down the barrel of the pistol.

Q. All right. Now, Doctor, in addition to that, have you served on other groups dealing with lead poisoning?

A. Yes. I was called to be the chair of a special committee convened by the Society for Occupational and Environmental Health to look at medical issues raised in El Paso by an episode of lead poisoning from a smelter. There had been reports from doctors whose work was sponsored by the smelter and also from doctors from the U. S. Public Health Service on this group of children and the findings were quite different and the purpose of this committee was to try and figure out the source of difference

and who was right in the situation.

Q. Doctor, have you also worked on pharmacology and toxicology research associateship program?

A. Yes. I was selected at NIH to be one of the sponsors and preceptors, that is advisors to post-doctoral fellows who came to NIH under this pharmacology-toxicology research program.

Q. And what period of time was that, Doctor?

A. From 1977 through 1981.

Q. Have you also served in various--in a particular capacity for the University of Pittsburgh and also for the University of Toronoto?

A. Yes. I have served on graduate boards examining Ph.D. candidates.

Q. In your field? That is, in the area of toxicology?

A. In toxicology.

Q. All right. Have you also lectured, been invited to give lectures at the medical school or Johns Hopkins Medical School?

A. Yes, I have.

Q. What do you lecture on? Are these for medical students that are going to become doctors?

A. No. These are for doctors who are achieving continuing medical education credits by attending special courses in environmental medicine or toxicology.

Q. And do you lecture, then, in your field of professional expertise?

A. I do.

Q. Doctor, have you also held elected positions--strike that. Have you also served as a lecturer for NIOSH?

A. Yes, I have.

Q. In what field?

A. Similarly, in courses for continuing medical education in occupational medicine.

Q. What is NIOSH?

A. That is the National Institute of Occupational Safety and Health which is a government agency.

Q. All right. And on how many occasions have you delivered lectures for the benefit of NIOSH?

A. I think a couple of times.

Q. And, Doctor, do you also or have you held an elected position with the Assembly of Science?

A. Yes.

Q. What was the position you held?

A. I was a councillor of the Assembly of Scientists for the National Institute of Mental Health and the National Institute of Neurological and Communicative Disorders and Stroke. That is really the neuroscientists at NIH and I was elected by my peers in those fields from those institutes.

Q. And have you also been a representative for that group on the EEO Committee?

A. No, that was a separate position. I was elected by all the staff members of the Neurology Institute to that institute's equal employment opportunity committee by federal law. Every bureau or organization in the government has to have such a committee and the members of it are selected by the staff.

Q. All right. And you were selected by the staff and so served?

A. I did.

Q. For what period of time?

A. From 1977 to 1980.

Q. And have you also served in the capacity of selecting for NIH a lectureship commission?

A. Yes. I was on a committee which selected the person to receive the honor of what is called the Solowey Lectureship which is an endowed lectureship at NIH in the area of neurosciences.

Q. Have you also served as a consultant to the Oil, Chemical and Atomic Workers Union of the AFL-CIO? What was that Doctor?

A. When I was in graduate school in 1970 I did serve as a consultant to that union on general issues of toxicology.

Q. Is that the union that works in the chemical industry among others?

A. It is one of the unions, yes.

Q. And have you also served for the EPA in reviewing documents in which they set up criteria in certain fields?

A. Yes. I have been an expert reviewing for a number of documents for EPA.

Q. Now, what does the EPA have to do? Why does it create these documents or what are these documents? Could you explain that, please.

A. These documents are really the basis for various standards or actions that the EPA takes. For instance, if the EPA wants to propose that there should be only one part per billion of lead in the area under the Clean Air Act, it must first draw up a compendium of all the scientific and medical information on the subject of lead, its distribution, its chemistry, its fat, its absorption, kinetics and effects on humans, and the natural environment and have that document reviewed and accepted and on the basis of that document, then propose a standard.

Q. Now, have you reviewed these documents dealing with metals and such as lead, manganese and mercury?

A. I have.

Q. In addition to those metals, have you also reviewed the criteria and documents dealing with dioxin?

A. Yes, I have.

Q. When did you first become a reviewer of these documents dealing with dioxin, Dr. Silbergeld?

A. May or June of last year when the documents were completed in draft review form by the agency.

Q. And do you continue to serve in that capacity for the EPA?

A. I do, and I am also the reviewer of those documents for the science advisory board which I am a member of because of my special expertise in that subject.

Q. Now, the science advisory board, have I asked you about that? What is the science advisory board for the EPA?

A. The EPA.

Q. The EPA?

A. That is right.

Q. Do you also serve or have you also served for NIOSH dealing with occupational safety and health?

A. Yes, I have.

Q. In what capacity?

A. I have been a member of the committee for NIOSH which passes on grant proposals which come in to study various aspects of occupational safety and health. My particular expertise is toxicology.

Q. And that toxicology, does it also deal with toxic substances such as dioxin, TCDD?

A. Yes, it does.

Q. Dr. Silbergeld, and you also served on committees, a committee dealing with the Frontiers of Neuroscience?

A. Yes. I was asked.

Q. Who sponsored that committee?

A. The National Institute of Mental Health which is part of NIH asked me to be part of a small group of neuroscientists to help them develop a strategy for supporting the most important new areas of neuroscience. They asked me because NIH considers that neurotoxicology is one of those important new areas and I was selected as the national expert to report on that for them.

Q. All right. And do you still serve in that capacity?

A. I believe that committee is still in operation. We haven't made a final report.

Q. Now, Doctor, during the course of your professional career and for that matter prior to the time you became fully qualified, have you had occasion to receive various honors and awards dealing with your achievements in the academic world and thereafter?

A. Yes, I have.

Q. What was the first award you received in the academic world and when was it?

A. I guess I was selected a national merit scholar when

I was in high school in 1963.

Q. And did that start you on your career in science and in this particular area?

A. No. That was general recognition for academic achievement in high school.

Q. All right. Did you receive a scholarship allowing you to attend college on that scholarship?

A. I received a scholarship from Vassar College which allowed me toattend that college, yes.

Q. When did you get that scholarship?

A. From 1963 through 1965.

Q. And what did you have to do to be awarded that scholarship?

A. I had a maintain a high grade point average and carry a certain number of courses each semester.

Q. And did you in fact achieve that grade point average sufficiently so that you would graduate summa cum laude?

A. Yes. I graduated fourth in my class.

Q. And was that with the honors called summa cum laude?

A. Yes, it was.

Q. And were you also elected because of your academic achievements grade-wise to the honorary society Phi Beta Kappa?

A. Yes, I was.

Q. Have you also received a fellowship with the Woodrow

Wilson National Foundation?

A. Yes, I did.

Q. Have you also received a Leverhulme and Fulbright Fellowship to the University of London in 1967?

A. Yes, I did.

Q. Did you receive a National Science Foundation Graduate Traineeship in '68 to '72?

A. Yes, I did.

Q. Did you also receive a research fellowship from the Public Health Service to the Woods Hole Group?

A. Yes.

Q. Did you also receive from the Rockefeller Foundation a predoctoral research fellowship?

A. Yes, I did.

Q. And have you received the National Institute of Health postdoctoral fellowship in environmental health sciences?

A. Yes.

Q. The Joseph P. Kennedy fellowship in neuroscience?

A. Yes.

Q. The Pharmaceutical Manufacturers Association Research Starter award in 1974 and '75?

A. Yes.

Q. Have you also been an exchange fellow to Yugoslavia as appointed by the National Academy of Sciences?

A. Yes, I was.

Q. Have you served as a lecturer at the University of Illinois as recently as 1984?

A. Yes. I was the lecturer in environmental sciences.

Q. At Champaign-Urbana or Chicago?

A. Champaign-Urbana.

Q. Have you also served as distinguished lecturer for the medical school in 1984?

A. Yes.

Q. And have you received Presidential commendation for the work that you have done, Dr. Silbergeld?

A. Yes, I have.

Q. When did you receive this Presidential commendation?

A. A couple of weeks ago.

Q. And congratulations, Doctor. Now, Doctor, in the course of the academic life that you have undertaken and thereafter in your profession, have you done original research in pharmacology, toxicology, drugs, neurochemistry, neurotoxic effects of various wasts and toxic materials and in that field have you done such research as allowed you to publish a number of scientific articles that have been accepted for publication by scientific publications who print such matter?

A. Yes, I have.

Q. And, Doctor, directing your attention to the articles

that you have published, have you published something like seventy-five articles that have been published in recognized journals and publications from '73 up to the present time?

A. Yes, about that number.

Q. And do you have presently--are you presently preparing articles for publication?

A. Yes, I am.

Q. Now, Doctor, I don't intend to get into each of those seventy-five articles, but I would like to mention and have you mention along the way the subjects of these articles that have been published. The first one that I have on the list that you furnished to me is an article that was published in the Environmental Science Technological Journal.

A. Environmental and that is a publication by the American Chemical Society.

Q. By the American Chemical Society?

A. Yes.

Q. When was that article published?

A. In 1973.

Q. And what was the subject matter?

A. It was a description of experiments which I conducted for my doctoral dissertation on the effects of the organ on the insecticide Dieldrin.

Q. Dieldrin is something that is sold as an insecticide to

kill insects?

A. It was.

Q. It was?

A. It is no longer sold in this country.

Q. Why not?

A. Its registration has been removed by the Environmental Protection Agency because of its toxicity.

Q. And did your research assist in coming to that conclusion?

A. I don't know. I am not acquainted with the proceedings which lead to the suspension of Dieldrin. I was looking at fairly sensative effects on eco systems of this pesticide, yes.

Q. And by eco systems, you mean streams and waters and air that surround us all?

A. Streams and life in those streams.

Q. And did you find indeed that this chemical had an adverse effect upon the fish in our streams?

A. It did particularly on the liver and the kidney and the nervous system.

Q. And is this chemical Dieldrin, is it related to or is a member of that chemical family that we have called halogenated hydrocarbons?

A. It is one of the polycyclic halogen.

Q. Polycyclic hydrocarbons. I mean, all of those things

means something. What is polycyclic?

A. Polycyclic means that chemically the molecule has more than one closed ring of carbon atoms.

Q. All right. That is polycyclic. More than one closed ring of carbon atoms. What about the hydrocarbons?

A. Halogenated means that there is a halogen, chlorine, florine or bromine attached to those rings.

Q. Now, that doesn't mean a thing to me. What is a halogen?

A. A halogen is just the scientific name for group of elements. Florine, chlorine or bromine.

Q. Okay. When you say halogen, then you mean a particular group of chemical elements known as florine, bromine and something else?

A. Chlorine. Right. Those are the halogens.

Q. All right, and the other word was carbon?

A. Hydrocarbons.

Q. What is hydrocarbons?

A. Hydrocarbon means that the rings are made up of carbon and hydrogen.

Q. I thought you said it dealt with chlorine and bromine and---

A. If it waid be useful, I could draw a picture but it means that the halogenated hydrocarbon is a chemical which has

as its backbone, if you will, carbons with hydrogens attached but also in some places instead of a hydrogen, there is a chlorine, a florine or a bromine attached. To call it polycyclic means that this skeleton has been formed into a ring with those halogens, florine, chlorine or bromine and hydrogen is still attached.

Q. All right. And is phenols, orthochlorophenol, does that fall in the classification that you have just described?

A. No because it is only one ring so it would not be a polycyclic halogenated hydrocarbon but it would be a halogenated hydrocarbon.

Q. All right. What about 2,3,7,8 TCDD? Is that?

A. That is a polycyclic halogenated hydrocarbon.

Q. All right. And that is in the family that you were studying as far back as 1973, then, is that correct?

A. That is correct.

Q. So, when you say or use the words polycyclic halogenated hydrocarbon, you are talking about a group of chemicals which make up a family, one of which is the subject of this lawsuit, 2,3,7,8 TCDD, is that correct?

A. That is correct.

Q. All right. Now, is there a relationship between these various families or why are they--why is there a group or what is the significance of a group of chemicals known as polycyclic

halogenated hydrocarbons? What is the significance of that?

A. The reason why they are grouped is purely chemical. That is, their chemical structure, the way they are put together, the atoms that go into them can be classified in a certain way but to the toxicologist there are additional reasons why these chemicals can be considered related or parts of a family. They have many effects in common.

Q. Doctor, do these particular chemical structures that you have described in this polycyclic halogenated hydrocarbons, do they occur naturally in nature or does man make these chemicals?

A. Most of these chemicals are man-made.

Q. And have these chemicals found various uses--strike that. Why has man been called upon to make these particular chemicals?

A. Well, ever since the identification and synthesis of benzene which is one of the simplest of the cyclic compounds, a great deal of the products that we now use including very important drugs and therapeutic agents have exploited the properties of this type of molecule but they are in the main relatively recent synthesized, that is, artificial compounds.

Q. Now, directing your attention just for a moment, and I don't want to digress to it yet because we will get into it in detail later, but 2,3,7,8 TCDD when it follows in this group of chemicals that you have just described is not a

chemical that the chemical industry has made for a specific purpose, has it, ma'am? Is it?

A. No. As far as I know, it has always been an unintentional contaminant except, of course, for research purposes relatively recent.

Q. And there are circumstances under which--and we will get to that later on--under which this 2,3,7,8 is manufactured?

A. Cogenerated, yes.

Q. All right. Now, Dr. Silbergeld, in addition to the very first publication you had that dealt with this particular kind of chemical and you have discovered what occurred in fish, did you during the rest of your career, during the on-going years from '73 on, did you do other work that dealt with this kind of chemical and the effects of various chemicals upon humans and animals and things of that sort?

A. Yes.

Q. Now, have you published articles known as Lead Induced Behavior Disorder in Life Science Texts?

A. Yes.

Q. Blood glucose is an environmental stress in fish and environmental contamination toxicology publication?

A. Yes.

Q. And another work on lead entitled Evidence for a prejunctional effect on neuromuscular function?

A. Yes.

Q. What on earth does that mean? Prejunctional effect on neuromuscular function?

A. Well, it had been known for a long time that occupational and environmental exposure to lead produced peripheral neuropathy.

Q. By peripheral, you mean the nerves that serve our legs and arms and not the nerves that serve our brain?

A. Right. That part of the nervous system outside the brain and the spinal cord.

Q. Aside the brain and the beside the spinal cord is not the peripheral nerves but the nerves that comes off the spinal cord to the legs, the fingers, the arms are peripheral nerves?

A. Yes.

Q. Could you go back, then, to tell me what you were doing with that?

A. It had been known that lead caused this kind of effect and indeed that this effect was characterized by something known as wrist drop in effected people which looked like this (indicating) but no one knew whether that effect was an effect of lead on the muscle or on the nerve that served that muscle and this research which I conducted was one of the first fairly clear demonstrations that the effects of lead were on the nerve

before they were on the muscle. Yes. So it was a neuropathy and not a myoneuropathy that it had been referred to.

Q. And this was published in a magazine known as Nature. Where does Nature stand on the level of recognized scientific publications in the scientific community?

A. Probably along with the Journal of Science. It is the most prestigious and most difficult journal to get a paper published in.

Q. In order to get that paper published in that particular publication, was your article reviewed by other scientists to determine its authenticity and originality and correctness?

A. All my papers have been so reviewed.

Q. When you say that all your papers, you mean all seventy-five that have been published in these various publications?

A. That is right. I have published only in what are called peer review journals.

Q. And again, by that we mean your equals, so to speak, on a professional scale?

A. Yes.

Q. Now, Dr. Silbergeld, have you also done--well, you have done a number of works, a number of original research on the effects of lead, have you not?

A. That is right.

Q. On this first page at least half a dozen including

pharmacological and neurochemical lead induced hyperactivity?

A. Yes.

Q. And by hyperactivity, do you mean that the child that is called hyperactive?

A. Well, that research lead into that area but this particular research which was published in 1975 was the first observation which I made that lead exposure at relatively low levels of experimental animals could provide pathologic increases in activity and the paper then tried to explore the biochemical effects of lead which were responsible for that action, that behavioral abnormality. On the basis of that, we, of course, became very interested in whether similar things might be happening in kids, human children, exposed to lead.

Q. And has it been confirmed that these things that you discovered to have occurred in animals are indeed occuring in children?

A. Yes. The standard textbooks on childhood psychiatric disorders now all refer to lead as one of the causes of hyperactivity in children and I believe all of them make reference to my work.

Q. Now, Doctor, have you published original articles in a journal called or publication called Health Effects of Occupational Lead and Arsenic Exposure?

A. Yes.

Q. In 1976?

A. Yes, I did.

Q. Under what sponsorship was the publication of this particular magazine or article?

A. This was a monograph which was sponsored and published by the National Institute of Occupational Safety and Health.

Q. And who was the editor of that monograph?

A. Dr. Bertrum Carnow.

Q. The same Dr. Bertrum Carnow who has examined and treated the plaintiffs in this case?

A. Yes.

Q. And when was this publication?

A. 1976.

Q. And was it under the auspices of more than just one agency that this publication occurred?

A. No. Just NIOSH. All the other parts of the alphabet soup refer to the various agencies that NIOSH is part of. Center for Disease Control, the Public Health Service and the U. S. Department of Health and Education and Welfare as it was then known.

Q. Was--strike that. What is a monograph?

A. A monograph is a book devoted to a specialized topic. In this case, the health effects of two metals.

Q. And what was Dr. Carnow's role in that book publication?

A. I believe he had a great deal to do with convening the meeting at which the papers were presented for selecting the experts, the speakers, for making sure that the papers were gathered and with the assistance of an editorial board, in reviewing them critically and preparing them for publication.

Q. All right. And, Doctor, have you also done work dealing with poisoning by lead in children that discusses the alterations in urinary metabolites?

A. Yes, I have.

Q. You published that when, Doctor, and who published it?

A. Science Magazine published it in 1976.

Q. Where does Science stand in the scale of recognized prestigious scientific publications?

A. As I said, I think along with Nature as the most prestigious and certainly the most difficult to get a paper published in.

Q. And just what work did you find or did you do with relation to determining this form of intoxication as indicated by these urinary metabolites?

A. I had observed in working with mice that low levels of lead could cause significant alterations in brain chemistry. Now, these can be measured in mice, of course, by looking at the brain directly, but I knew that wasn't something that could ever be done in clinical medicine, at least not at that time.

Q. By clinical medicine, you mean something could not be done with a live child?

A. That is right. With a human being. So, I developed a method for looking at these same biochemical changes in the urine of these animals, made a careful correlation between those changes appearing in the urine and the changes in the brain which is where they originated and then looked at urine samples collected from children who were exposed to lead. I developed the assay for doing these measurements and in corroboration with Dr. Julian Chisolm who is a medical doctor and a pediatrician conducted these experiments on his population of children treated at the Johns Hopkins lead poisoning clinic.

Q. Did you find as a result of your studies with the urine of the children that it confirmed that what you found as having occurred in the urine of mice?

A. Yes, we did.

Q. And was this study of the mice helpful and rather essential in discovering what would happen to the children exposed to lead?

A. Yes, it was and indeed that is really the purpose of toxicology as an experimental science. It is to provide models of human diseases and to give insights which can later be tested in human beings. It is not an end in itself because of the effects of lead in mice.

Q. All right. You are not looking to find out whether or not what makes mice healthy or sick except insofar as it might help you or other scientists or doctors discover what makes humans healthy and sick, is that a fair statement?

A. That is the fundamental basis of biological research, yes.

Q. Doctor, have you also published original work in this area of hyperactivity in the journal called Biology of Cholinergic Function?

A. Yes.

Q. Did I say that right?

A. That is the Biology of Cholinergic Function.

Q. Say it again.

A. Cholinergic Function. It refers to a certain type of nerve pathways in the brain and in the peripheral. Those terms that use that to communicate with other nerves. That is why they are called the cholinergic. Acetylcholine.

Q. Acetylcholine?

A. Right.

Q. That doesn't mean a thing to me. What is acetylcholine, Doctor?

A. Acetylcholine is an amino acid. That is a fairly small molecule which is synthesized, made in nerves in the body of animals and humans, worms, all kinds of life forms and is

among other things the chemical which controls all our muscle movements. It is a chemical that is affected by nerve gases and a variety of insecticides. It is a very important chemical in the body.

Q. All right. And did you find in your research that this chemical in the body can be affected by other chemicals that may be ingested or lead or metals that are taken into the body?

A. What we found was that chemicals which effect this system specifically may well produce syndromes of hyperactivity in animals and probably in human beings, too.

Q. And did you publish three or four, at least, articles dealing with that conclusion and that occurrence in Life Sciences, in Biochemical and Pharmacological?

A. Yes.

Q. And, Doctor, have you also done work in differential effects of three dopamine agonists: Apomorphine, bromocriptine and lergotrile?

A. Yes.

Q. And I know I murdered those words. What is all that? What does that mean?

A. Well, this was work very closely connected with work being done with M.D.s when I was at NIH on the set of new drugs being used to treat patients with Parkinson's disease. Lergotrile and Bromocriptine are two of those drugs. They are known as

ergotdrugs and this paper was an examination of differences in how these particular drugs act on parts of the nervous system which are known to be damaged in Parkinson's disease. It was an attempt to select the drug which might be the most useful and the least dangerous in treating Parkinson's disease.

Q. And, Doctor, did you also--that was published in what journal?

A. Journal of Neurochemistry.

Q. And is that the journal that neurochemists accept as their official publication and magazine?

A. It is.

Q. Doctor, did you also do something that I read as Na+ regulates release of Ca++ sequestered in synaptosomal mitochondria?

A. Yes, I did.

Q. What does that mean?

A. Well, that is actually sodium. That is Na+ regulates the release of calcium, Ca++. Bound up within the mitochondria, within the ends of nerves.

Q. That is what mitochondria is called?

A. That is synaptosomal. Mitochondria, are small compartments, if you will, within most cells and in nerves they are compartments which contains an awful lot of calcium and what my experiments showed was that the movement of calcium in

and out of these mitochondria could be controlled by sodium.

Q. When you are doing all of these publications, is it correct and a fair statement that you have had to do research in the laboratory over a period of time to arrive at these conclusions that you subsequently published?

A. Yes.

Q. And it is work that you are doing yourself and/or in conjunction with other scientists?

A. That is right.

Q. Now, Doctor, have you also published in a publication called Animal Models of Psychiatry and Neurology works that you did with animal models of hyperactivity?

A. Yes.

Q. And have you done work in presynaptic function and hepatic drug metabolism in the hypothermic actions of some novel dopaminergic agonists?

A. Yes. This was another paper on those ergot drugs which are being proposed for treating Parkinson's disease and another way of trying to look at how these drugs act.

Q. And, Doctor, have you done original research and thereafter published on neuropharmacology dealing with hyperkinesis?

A. Yes.

Q. Hyperkinesis, is that another word for hyperactivity?

A. It is. Some people use that word interchangeably with

hyperactivity and I think the editor of this particular volume preferred that term. It does describe the same behavioral disorder in children.

Q. This continued your research or some years now at this point dealing with what causes children to become hyperactive?

A. That is right.

Q. Did you also publish works in the field of subcellular mechanisms of lead neurotoxicity, review of neurotoxicity of lead in experimental studies. Synaptosomal calcium metabolism studies by electron microprobe analysis and advances in neuropharmacology of Parkinsonism. All of these works were also published by established and authoritative publications?

A. Yes, they were.

Q. And have you worked in uptake and release of dopamine in substantia nigra: effects of GABA and substance P. Neuroscience Letter. Have you worked in rat rotation monitoring for pharmacology research? Have you worked in quantitative aspects of normal locomotion in rats? Have you worked in abnormal locomotion in rats after bilateral intrastriatal injection of kainic acid?

A. Yes.

Q. I know I didn't pronounce any of those right but, Doctor, these works with rats, why are you working with rats in these areas?

A. The whole purpose of working with rats is to gain a more complete understanding of what is happening in people.

Q. And, pardon the expression, do rats and human beings have certain characteristics in common? Not all humans, but, Judge, I think I need a recess at this time.

THE COURT: Do you want that question answered?

Q. Would you answer my question seriously rather than in the way I put it?

A. Fortunately, yes, because if we didn't know that in much more important areas rats are good models or predictors or stand-ins for human beings, we would have no choice but to experiment on human beings. For example, the publication on the advances in the neuropharmacology of Parkinsonism is really a description with two clinical collections of the very great contributions by experimental studies and have made to producing drugs which are very, very effective in treating human being with this dread disease. Now, if we couldn't rely on the similarity between human brain and the rat brain, we would have no choice but to throw drugs of unknown toxicity and effectiveness at humans with very serious results. The paper below on synaptosomal uptake and release of dopamine in substantia nigra effects of GABA and substance P which sounds like a lot of gobble-di-gook, is really looking at components of that part of the brain which is affected in Parkinsonism in people

and which, of course, in rats and only in rats we can take out and study in great detail and determine what are the chemical and anatomic relationships in that system which when they are disturbed lead to the very serious life threatening symptoms of Parkinsonism.

MR. CARR: Now, Your Honor, we can have that recess.

THE COURT: Fine. Court will be in recess.

COURT ADJOURNED FOR THE DAY:

STATE OF ILLINOIS)
TWENTIETH JUDICIAL CIRCUIT) SS
COUNTY OF ST. CLAIR)

I, Kimberly Ganz, one of the Official Court Reporters, do hereby certify that the foregoing transcript is a true and correct transcript of the proceedings had in the above-entitled cause.

Dated this 18 day of April, 1984.

Kimberly Ganz

KIMBERLY GANZ

STATE OF ILLINOIS)
TWENTIETH JUDICIAL CIRCUIT) SS
COUNTY OF ST. CLAIR)

I, Richard P. Goldenhersh, one of the Judges in and for the Twetieth Judicial Circuit, do hereby certify that the foregoing transcript is a true and correct transcript of the proceedings had in the above-entitled cause.

Dated this 18 day of April, 1984.

HON. RICHARD P. GOLDENHERSH